ADITYA ENGINEERING COLLEGE

An Autonomous Institutuion
Approved by AICTE • Permanently Affiliated to JNTUK • Accredited by NAAC with 'A' Grade
Recognised by UGC under sections 2(f) and 12(B) of UGC Act, 1956
Aditya Nagar, ADB Road, Surampalem - 533437, Near Kakinada, E.G.Dt., Ph:99498 76662

Program Name : B.Tech. in Civil Engineering

Syllabus Revision for the Academic Year 2019-2020				
S.No	**Semester**	**Course Code**	**Course Name**	**% of content revised for the existing year**
1	I	191HS1T01	Communicative English	90
2	I	191BS1T01	Differential Equations and Linear Algebra	20
3	I	191BS1T02	Engineering Physics	60
4	I	191ES1T01	Programming for Problem Solving Using C	10
5	I	191HS1L01	Communicative English Lab-I	5
6	I	191BS1L01	Engineering Physics Lab	60
7	I	191ES1L01	Programming for Problem Solving Using C Lab	10
8	I	191ES1L02	Basic Engineering Workshop	55
9	I	191MC1A01	Environmental Science	25
10	I	191MC1A02	Constitution of India	100
11	II	191BS2T05	Partial Differential Equations and Vector Calculus	40
12	II	191BS2T06	Chemistry of Materials	70
13	II	191ES2T02	Engineering Graphics and Design	55
14	II	191ES2T03	Essential Electrical and Electronics Engineering	10
15	II	191ES2T04	Engineering Mechanics	15
16	II	191HS2L02	Communicative English Lab- II	0
17	II	191BS2L04	Engineering Chemistry Lab	50
18	II	191ES2L03	Essential Electrical and Electronics Engineering Lab	100

19	II	191ES2L04	Civil Engineering Workshop	100
20	II	191PR2P01	Engineering Exploration Project	100
21	III	171BS3T10	Probability and Statistics	25
22	III	171ES3T05	Basic Electrical and Electronics Engineering	0
23	III	171ES3T09	Strength of Materials - I	0
24	III	171CE3T01	Building Materials and Construction	0
25	III	171CE3T02	Surveying	0
26	III	171CE3T03	Fluid Mechanics	0
27	III	171CE3L01	Surveying Lab	0
28	III	171ES3L03	Strength of Materials Lab	0
29	III	171HS3A09	Professional Ethics and Human Values	0
30	III	171HS3A10	Employability Skills - I	0
31	IV	171CE4T04	Building Planning and Computer Aided Drawing	0
32	IV	171CE4T05	Concrete Technology	0
33	IV	171CE4T06	Engineering Geology	0
34	IV	171CE4T07	Hydraulics and Hydraulic Machinery	0
35	IV	171CE4T08	Strength of Materials – II	0
36	IV	171CE4T09	Structural Analysis - I	0
37	IV	171CE4L02	Fluid Mechanics and Hydraulic Machinery Lab	0
38	IV	171CE4L03	Concrete Technology Lab	10
39	IV	171HS4A08	Intellectual property rights and patents	0
40	IV	171HS4A11	Employability Skills - II	0
41	IV	171HS4A04	Managerial Economics and Financial Analysis	0
42	V	171HS5T05	Management Science	20
43	V	171CE5T10	Design and Drawing of Reinforced Concrete Structures	0

44	V	171CE5T11	Transportation Engineering	32
45	V	171CE5T12	Structural Analysis - II	0
46	V	171CE5T13	Water Resource Engineering - I	17
47	V	171CE5E01	(PE I)Construction Technology and Management	33
48	V	171CE5E02	Urban Hydrology	0
49	V	171CE5E03	Traffic Engineering	17
50	V	171HS5T06	Employability Skills - III	100
51	V	171CE5L04	Engineering Geology Lab	25
52	V	171CE5L05	Transportation Engineering Lab	20
53	V	171CE5S01	MOOCs – I	100
54	V	171CE5P03	Surveying Camp	100
55	VI	171CE6T14	Design and Drawing of Steel Structures	0
56	VI	171CE6T15	Geotechnical Engineering - I	33
57	VI	171CE6T16	Water Resource Engineering - II	0
58	VI	171CE6T17	Prestressed Concrete	0
59	VI	171CE6E04	PE II Ground Water Development	0
60	VI	171CE6E05	Pavement Analysis and Design	17
61	VI	171CE6E06	Repair and Rehabilitation of Structures	0
62	VI	171CE6E07	PE III Ground Improvement Techniques	0
63	VI	171CE6E08	Finite Element Methods	17
64	VI	171CE6E09	Earthquake Resistant Design	0
65	VI	171HS6T07	Employability Skills - IV	100
66	VI	171CE6L06	Geotechnical Engineering Lab	20
67	VI	171CE6L07	Irrigation Design and Drawing	0
68	VI	171CE6S02	MOOCs - II	100

69	VII	R1641011	Environmental Engineering - II	0
70	VII	R1641012	Water Resource Engineering - II	0
71	VII	R1641013	Geotechnical Engineering - II	0
72	VII	R1641014	Remote Sensing & GIS Applications	0
73	VII	R164101A	Finite Element Methods(Elective I)	0
74	VII	R164101B	Ground Improvement Techniques	0
75	VII	R164101C	Air Pollution & Control	0
76	VII	R164101D	Urban Hydrology	0
77	VII	R164101E	Traffic Engineering	0
78	VII	R164101F	Advanced Structural Engineering(Elective II)	0
79	VII	R164101G	Advanced Foundation Engineering	0
80	VII	R164101H	Environmental Impact Assessment & Management	0
81	VII	R164101I	Ground Water Development	0
82	VII	R164101J	Pavement Analysis and Design	0
83	VII	R1641019	IPR & Patents	0
84	VII	R1641017	GIS & CAD Lab	0
85	VII	R1641018	Irrigation Design & Drawing	100
86	VIII	R1642011	Estimation Specification & Contracts	0
87	VIII	R1642012	Construction Technology & Management	0
88	VIII	R1642013	Prestressed Concrete	0
89	VIII	R164201A	Bridge Engineering (Elective III)	0
90	VIII	R164201B	Soil Dynamics and Foundations	100
91	VIII	R164201C	Solid and Hazardous Waste Management	0
92	VIII	R164201D	Water Resources Systems Planning	0
93	VIII	R164201E	Urban Transportation Planning Engineering	0

94	VIII	R1642015	Seminar on Internship Project	100
95	VIII	R1642016	Project	0
Total number of courses in the academic year 2019-2020				= 95
Number of courses having revision in syllabus content >/= 20% in the academic year 2019-2020				= 30
Percentage of syllabus revision carried out in the academic year 2019-2020 = (30/95)*100				= 31.57 %

Program Coordinator

Head of the Department

Head of the Department
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2019-20
AR19

PROGRAM STRUCTURE

I SEMESTER

Course Code	Name of the Course	Course Component	Periods/Week				Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	Total Hours	
191HS1T01	Communicative English	HSMC	3	0	0	3	3
191BS1T01	Differential Equations and Linear Algebra	BSC	3	0	0	3	3
191BS1T02	Engineering Physics	BSC	3	0	0	3	3
191ES1T01	Programming for Problem Solving Using C	ESC	3	0	0	3	3
191HS1L01	Communicative English Lab-I	HSMC	0	0	3	3	1.5
191BS1L01	Engineering Physics Lab	BSC	0	0	3	3	1.5
191ES1L01	Programming for Problem Solving Using C Lab	ESC	0	0	3	3	1.5
191ES1L02	Basic Engineering Workshop	ESC	0	0	3	3	1.5
191MC1A01	Environmental Science	MC	2	0	0	2	0
191MC1A02	Constitution of India	MC	2	0	0	2	0
		TOTAL	**16**	**0**	**12**	**28**	**18**

II SEMESTER

Course Code	Name of the Course	Course Component	Periods/Week				Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	Total Hours	
191BS2T05	Partial Differential Equations and Vector Calculus	BSC	3	0	0	3	3
191BS2T06	Chemistry of Materials	BSC	3	0	0	3	3
191ES2T02	Engineering Graphics and Design	ESC	1	0	3	4	2.5
191ES2T03	Essential Electrical and Electronics Engineering	ESC	3	0	0	3	3
191ES2T04	Engineering Mechanics	ESC	3	0	0	3	3
191HS2L02	Communicative English Lab-II	HSMC	0	0	2	2	1
191BS2L04	Engineering Chemistry Lab	BSC	0	0	3	3	1.5
191ES2L03	Essential Electrical and Electronics Engineering Lab	ESC	0	0	3	3	1.5
191ES2L04	Civil Engineering Workshop	ESC	0	0	3	3	1.5
191PR2P01	Engineering Exploration Project	PROJ	0	0	2	2	1
		TOTAL	**13**	**0**	**16**	**29**	**21**

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III SEMESTER

Course Code	Name of the Course	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	Total Hours	
171BS3T10	Probability and Statistics	BS	3	1	0	4	3
171ES3T05	Basic Electrical and Electronics Engineering	ES	3	1	0	4	3
171ES3T09	Strength of Materials - I	ES	3	1	0	4	3
171CE3T01	Building Materials and Construction	PC	3	1	0	4	3
171CE3T02	Surveying	PC	3	1	0	4	3
171CE3T03	Fluid Mechanics	PC	3	1	0	4	3
171CE3L01	Surveying Lab	PC	0	0	3	3	2
171ES3L03	Strength of Materials Lab	ES	0	0	3	3	2
171HS3A09	Professional Ethics and Human Values	HSS	2	0	0	2	0
171HS3A10	Employability Skills - I	HSS	0	0	2	2	0
		TOTAL	**20**	**6**	**8**	**34**	**22**

IV SEMESTER

Course Code	Name of the Course	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	Total Hours	
171CE4T04	Building Planning and Computer Aided Drawing	PC	3	1	2	6	3
171CE4T05	Concrete Technology	PC	3	1	0	4	3
171CE4T06	Engineering Geology	PC	3	1	0	4	3
171CE4T07	Hydraulics and Hydraulic Machinery	PC	3	1	0	4	3
171CE4T08	Strength of Materials – II	PC	3	1	0	4	3
171CE4T09	Structural Analysis - I	PC	3	1	0	4	3
171CE4L02	Fluid Mechanics and Hydraulic Machinery Lab	PC	0	0	3	3	2
171CE4L03	Concrete Technology Lab	PC	0	0	3	3	2
171HS4A08	Intellectual property rights and patents	HSS	2	0	0	2	0
171HS4A11	Employability Skills – II	HSS	0	0	2	2	0
171HS4A04	Managerial Economics and Financial Analysis	HSS	2	0	0	2	0
		TOTAL	**22**	**6**	**10**	**38**	**22**

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V SEMESTER

Course Code	Name of the Course	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	Total Hours	
171HS5T05	Management Science	HSS	3	1	0	4	3
171CE5T10	Design and Drawing of Reinforced Concrete Structures	PC	3	1	0	4	3
171CE5T11	Transportation Engineering	PC	3	1	0	4	3
171CE5T12	Structural Analysis - II	PC	3	1	0	4	3
171CE5T13	Water Resource Engineering - I	PC	3	1	0	4	3
---	**Professional Elective – I**	PE	3	1	0	4	3
171HS5T06	Employability Skills - III	HSS	2	0	0	2	1
171CE5L04	Engineering Geology Lab	PC	0	0	3	3	2
171CE5L05	Transportation Engineering Lab	PC	0	0	3	3	2
171CE5S01	MOOCs – I	SS	0	0	0	0	0
171CE5P03	Surveying Camp	PC	0	0	0	0	0
		TOTAL	**18**	**6**	**8**	**32**	**23**

VI SEMESTER

Course Code	Name of the Course	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	Total Hours	
171CE6T14	Design and Drawing of Steel Structures	PC	3	1	0	4	3
171CE6T15	Geotechnical Engineering - I	PC	3	1	0	4	3
171CE6T16	Water Resource Engineering - II	PC	3	1	0	4	3
171CE6T17	Prestressed Concrete	PC	3	1	0	4	3
---	**Professional Elective - II**	PE	3	1	0	4	3
---	**Professional Elective - III**	PE	3	1	0	4	3
171HS6T07	Employability Skills - IV	HSS	2	0	0	2	1
171CE6L06	Geotechnical Engineering Lab	PC	0	0	3	3	2
171CE6L07	Irrigation Design and Drawing	PC	0	0	3	3	2
171CE6S02	MOOCs - II	SS	0	0	0	0	0
		TOTAL	**18**	**6**	**8**	**32**	**23**

MOOCs – Massive Open Online Courses

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VII SEMESTER

Course Code	Name of the Course	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	Total Hours	
171CE7T18	Geotechnical Engineering - II	PC	3	1	0	4	3
171CE7T19	Environmental Engineering	PC	3	1	0	4	3
171CE7T20	Remote Sensing and GIS Applications	PC	3	1	0	4	3
171CE7T21	Estimation, Specificationsand Contracts	PC	3	1	0	4	3
---	**Professional Elective – IV**	PE	3	1	0	4	3
---	**Professional Elective – V**	PE	3	1	0	4	3
171CE7L08	Environmental Engineering Lab	PC	0	0	3	3	2
171CE7L09	GIS And Computer Aided Design (CAD) Lab	PC	0	0	3	3	2
171CE7P01	Industry Oriented (Internship) Minor Project	PR	0	0	0	0	1
		TOTAL	**18**	**6**	**6**	**30**	**23**

VIII SEMESTER

Course Code	Name of the Course	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	Total Hours	
---	**Professional Elective – VI**	PE	3	1	0	4	3
---	**Open Elective**	OE	3	1	0	4	3
171CE8P02	**Major Project**	PR	0	0	0	0	14
		TOTAL	**6**	**2**	**0**	**8**	**20**

IV Year - I Semester

S. No.	Subjects	L	T	P	Credits
1	Environmental Engineering - II	4	--	--	3
2	Water Resource Engineering - II	4	--	--	3
3	Geotechnical Engineering - II	4	--	--	3
4	Remote Sensing & GIS Applications	4	--	--	3
5	**Elective I** i. Finite Element Methods ii. Ground Improvement Techniques iii. Air Pollution & Control iv. Urban Hydrology v. Traffic Engineering	4	--	--	3
6	**Elective II** i. Advanced Structural Engineering ii. Advanced Foundation Engineering iii. Environmental Impact Assessment & Management iv. Ground Water Development v. Pavement Analysis and Design	4	--	--	3
7	IPR & Patents	--	2	--	--
8	GIS & CAD Lab	--	--	2	2
9	Irrigation Design & Drawing	--	--	2	2
	Total Credits				**22**

IV Year - II Semester

S. No.	Subjects	L	T	P	Credits
1	Estimation Specification & Contracts	4	--	--	3
2	Construction Technology & Management	4	--	--	3
3	Prestressed Concrete	4	--	--	3
4	**Elective III** i. Bridge Engineering ii. Soil Dynamics and Foundations iii. Solid and Hazardous Waste Management iv. Water Resources Systems Planning v. Urban Transportation Planning Engg	4	--	--	3
5	Seminar on Internship Project	--	3	--	2
6	Project	--	--	--	10
	Total Credits				**24**

Total Course Credits = 48+44 + 42 + 46 = 180

SYLLABUS

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COMMUNICATIVE ENGLISH

(Common to all branches)

I Semester **L T P C**
Course Code:191HS1T01 **3 0 0 3**

Introduction:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training the students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competence of the students of Engineering. As far as the detailed textbooks are concerned, the focus should be on the skills of Listening, Speaking, Reading and Writing. The non-detailed textbooks are meant for extensive reading both to instruct and delight. Hence the focus in the syllabus is primarily on the development of communicative skills and fostering of ideas about the essence of English Communication.

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1: Identify the ways to overcome fear and use of words paradoxically, interpret the developing conditions and the core competences of the state to prioritize education system.

CO 2: Explain about world's most precious natural resources.

CO 3: Explain about importance of unity to aboilish war.

CO 4: Respond well to the changing situations in life with independent knowledge for better decision making.

CO 5: Demonstrate writing and concepts of effective writing skills.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12
CO1	-	-	-	-	-	-	1	-	-	3	-	-
CO2	-	-	-	-	-	-	1	-	-	3	-	-
CO3	-	-	-	-	-	-	-	-	-	3	-	-
CO4	-	-	-	-	-	-	-	-	2	3	-	2
CO5	-	-	-	-	-	-	-	-	1	3	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO1	PSO2	PSO3
CO1	-	-	-
CO2	-	-	-
CO3	-	-	-
CO4	-	-	-
CO5	-	-	-

Methodology:

1. The class is to be learner-centered where the learners are to read the texts to get a comprehensive idea of those texts on their own with the help of the peer group and theteacher.

2. Integrated skill development methodology has to be adopted with focus on individual language skills as per thetasks/exercise.
3. The tasks/exercises at the end of each unit should be completed by the learners only and the teacher intervention is permitted as per the complexity of the task/exercise.
4. The teacher is expected to use supplementary material wherever necessary and generate activities/tasks as per the requirement.
5. The teacher is permitted to use lecture method when a completely new concept is introduced in the class.

Recommended Topics:

UNIT-I:
1. An Astrologers' Day - R.K. Narayan (Detailed)
2. Bade Bhai Saab - Munshi Prachanda (Non-Detail)

UNIT-II:
1. Building A New State - A. P. J. Abdul Kalam (Detailed)
2. Morning Bells- Jayashree Mohan Raj (Non-Detail)

UNIT-III:
1. Water:The Elixer of Life- C. V. Raman (Detailed)
2. The Power of Plate of Rice- Ifeoma Okoye (Non-Detail)

UNIT-IV:
1. The Woodrose-Abburi Chaya Devi (Detailed)
2. The Cop and The Anthem- O. Henry (Non-Detail)

UNIT-V:
1. Progress- St. John Ervine (Detailed)
2. Dial 000- Barry Rosenberg (Non-Detail)

Textbooks:
Detailed Textbook: 'Using English' by Orient Black Swan.
Non-Detailed Textbook: 'Life, Language and Culture - Explorations' by Cengage.

Reference Books:
1. Objective English, Pearson Publications.
2. Effective English Communication, Tata Mc Graw-Hill Publishing.
3. Effective Technical English, Scitech.

Weblinks:
1. http://sittingbee.com/an-astrologers-day-r-k-narayan/
2. http://bbrenglishforall.blogspot.com/2014/01/building-new-state-study-material.html
3. https://www.literatureworms.com/2012/10/water-elixir-of-life-by-sircvraman.html
4. http://macon.hol.es/woodrose-abburi-chaya-devi.pdf
5. https://ardhendude.blogspot.com/2013/07/analysis-of-progress-by-st-john-ervine.html

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DIFFERENTIAL EQUATIONS AND LINEAR ALGEBRA
(Common to all branches)

I Semester **L T P C**
Course Code: 191BS1T01 **3 0 0 3**

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Apply the concepts of Mean Value theorem, Partial Differentiation and identify the maxima and minima of a given function.
CO 2: Solve the linear differential equations and model various situations involving differential equations of first order.
CO 3: Solve linear differential equations of higher order and model various situations involving second order differential equations.
CO 4: Calculate Rank of a matrix and solve the system of Linear equations and find the Eigen values and Eigen vectors.
CO 5: Compute various powers of a matrix and identify the nature of the quadratic form.

Mapping of Course Outcomes with Program Outcomes:

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO/PSO	PSO1	PSO2	PSO3
CO1	-	-	-
CO2	-	-	-
CO3	-	-	-
CO4	-	-	-
CO5	-	-	-

UNIT I:
Differential Calculus:
Rolle's theorem, Lagrange's theorem, Cauchy Mean Value theorem, Taylor's and Maclaurin's theorems (All theorems Without Proof).
Partial Differentiation: Euler's theorem (without proof), Total derivative, Chain rule, Taylor's and Maclaurin's series expansion of functions of two variables, Jacobian, Functional dependence.
Applications:
Maxima and Minima of functions of several variables without constraints and with constraints (Lagrange's method).
** (SCILAB Exercise: Plot graphs of various single and multivariable functions).

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UNIT II:

Differential equations of first order:

Introduction to differential equations, linear differential equation of first order - Bernoulli differential equation - Exact differential equations- Equations reducible to exact,

Applications:

Orthogonal trajectories, Newton's Law of cooling, RL circuit.

UNIT III:

Linear differential equations of second and higher order:

Linear differential equations of higher order with constant coefficients, Complementary function and Particular integral with RHS term of the type polynomials in x, e^{ax}, sin ax,

cos ax, e^{ax} V(x), xV(x)- Method of Variation of parameters, Equations reducible to constant coefficients –Cauchy-Euler equation, Legendre's equation.

Application: LCR Circuit

** (SCILAB Exercise: Introduction to SCILAB commands and Solution of Initial Value Problems)

UNIT IV:

System of linear equations, Eigen values and Eigen vectors:

Definition of a Vector space, Linear dependence and independence of vectors, Rank of a matrix, Echelon form and Normal form, solving system of Homogenous and Non homogenous linear equations- Gauss Jordon elimination method, Eigen values, Eigen vectors, Properties of eigen values and eigen vectors (without proof)

Applications:

Free vibrations of a two mass system

UNIT V:

Quadratic forms:

Cayley -Hamilton theorem (without proof), Inverse and powers of a matrix by using Cayley - Hamilton theorem, Diagonalization of a matrix, Quadratic forms, Reduction of quadratic form to canonical form using orthogonal transformation, Nature of the quadratic form.

**(SCILAB Exercise: Basic Operations on matrices, computation of rank, computation of eigen values and eigen vectors)

**Not to be examined

Text Books:

1. Advanced Engineering Mathematics, R.K.Jain, S.R.K.Iyenkar, Alpha Science Publications.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India.
3. B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
4. P.Sivaramakrishna Das, C.Vijayakumari, Engineering Mathematics, Pearson Publications.

Reference Books:

1. D.G.Zill, MICHAIL R CULTER, Advanced Engineering Mathematics 3rd Edition Norosa Publications 2009.
2. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press.
3. Peter O'neil, Advanced Engineering Mathematics, Cengage Learning.
4. Glyn James, Advanced modern engineering mathematics, Pearson education.

Web Links:

1. https://nptel.ac.in/courses/111106100/
2. https://nptel.ac.in/courses/122107037/14
3. https://nptel.ac.in/courses/111106051/
4. http://mathworld.wolfram.com
5. https://www.khanacademy.org
6. https://spoken-tutorial.org/tutorial-search/?search_foss=Scilab&search_language=English

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ENGINEERING PHYSICS

(Common to CE, ME, Min.E, PT&Ag. E)

I Semester
Course Code:191BS1T02

L	T	P	C
3	0	0	3

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1: Explain the basic concepts of crystal structure and X-ray diffraction Techniques.

CO 2: Apply the knowledge of acoustics to improve acoustic quality of concert halls and understand the concepts of flaw detection techniques using ultrasonics.

CO 3: Apply the structure- property relationship exhibited by solid materials within the elastic limit.

CO 4: Explain the basic concepts of LASERs along with its Engineering applications and familiarize with types of sensors for various engineering applications

CO 5: Explain about magnetic and dielectric properties of different materials.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12
CO1	2	1	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	2	1	-	-	-	-	-	-	-	-	-	-
CO5	2	1	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO1	PSO2	PSO3
CO1	-	-	-
CO2	-	-	-
CO3	-	-	-
CO4	-	-	-
CO5	-	-	-

UNIT-I

Crystal Structure:

Basis and lattice – Crystal Systems – Bravais Lattice - Symmetry elements- Unit cell-packing fraction – coordination number- Miller indices – Separation between successive (h k l) planes – Bragg's law-Bragg's x-ray spectrometer.

Crystal Defects:(qualitative description only) Point defects-Schottky, Frenkel defects, Line defects-Edge, screw dislocations

UNIT-II

Acoustics:

Introduction –Reverberation - Reverberation time - Sabine's formula (Derivation)–absorption coefficient and its determination-factors affecting acoustics of buildings and their remedies.

Ultrasonics: Production of ultrasonics by Magnetostriction and piezoelectric methods– Detection of ultrasonics - acoustic grating - Non-Destructive Testing-pulse echo system through transmission and reflection modes- Applications.

UNIT-III

Elasticity:

Stress, strain, Hooke's law, stress-strain curve, generalized Hooke's law with and without thermal strains for isotropic materials, different types of moduli and their relations, bending of beams – Bending moment of a beam – Depression of cantilever.

UNIT-IV

Laser:

Introduction to wave optics & Interferometer-Characteristics–Spontaneous and Stimulated emission of radiation – population inversion- Einstein's coefficients & Relation between them and their significance - Pumping Mechanisms - Ruby laser – Helium Neon laser – CO_2 laser-Applications.

Sensors:(qualitative description only):

Different types of sensors and applications; Strain and Pressure sensors- Piezoelectric, magnetostrictive sensors, Temperature sensor - bimetallic strip, pyroelectric detectors.

UNIT-V **Magnetism:**

Introduction – Magnetic dipole moment – Magnetization-Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr Magneton - Classification of magnetic materials (Dia, Para, and Ferro) – Domain concept of Ferromagnetism - Hysteresis – soft and hard magnetic materials – Applications of Ferromagnetic materials.

Dielectrics:

Introduction - Dielectric polarization– Dielectric polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative)-Lorentz internal field – Claussius_Mossoti equation- Frequency dependence of polarization - Applications of dielectrics.

Textbooks:

1. "Textbook of Engineering Physics" by P G Kshirsagar & M N Avadhanulu, S Chand &Company Ltd
2. "Engineering Physics" by R K Gaur and S L Gupta, Dhanpat Rai Publications.
3. "Sensor and Transducers" by Ian R Sinclair, Elsevier (Newnes) 3rd Eds.

Reference Books:

1. "Engineering Physics" by M R Srinivasan, New Age InternationalPublishers.
2. "Lectures on Physics" by Richard P Feynman, Pearson Publishers, NewMillennium Eds.
3. "Lasers and Non-linear Optics" by B B Laud, New Age International Publishers (3rdEds.).

Web Links:

1. http://nptel.ac.in/courses/122107035/11
2. http://nptel.ac.in/courses/115102023/
3. https://phet.colorado.edu/en/simulations/category/physics
4. http://physicsgecg.blogspot.in/p/reading-materials.html
5. https://sites.google.com/site/physicsbysureshsaganti/home

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ENGINEERING PHYSICS LAB

(Common to CE, ME, Min.E, PT& Ag.E)

I Semester	**L**	**T**	**P**	**C**
Course Code: 191BS1L01	**0**	**0**	**3**	**1.5**

Course Outcomes:
At the end of the Course, Student will be able to:

- CO 1 : Determine the rigidity and young's modulus to understand material properties.
- CO 2 : Determine Acceleration due to Gravity and Radius of Gyration and spring constant by oscillatory mechanics.
- CO 3 : Find the strength of the magnetic field.
- CO 4 : Determine wavelength of unknown source, particle size using lasers.
- CO 5 : Determination of velocity of sound, moment of inertia.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	2	-	-	1
CO2	3	2	-	-	-	-	-	-	2	-	-	1
CO3	2	1	-	-	-	-	-	-	2	-	-	1
CO4	3	2	-	-	-	-	-	-	2	-	-	1
CO5	3	2	-	-	-	-	-	-	2	-	-	1

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO1	PSO2	PSO3
CO1	-	-	-
CO2	-	-	-
CO3	-	-	-
CO4	-	-	-
CO5	-	-	-

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LIST OF EXPERIMENTS:
(Any 10 of the following listed experiments)

1. Determination of Rigidity modulus of a material- Torsional Pendulum.
2. Determination of Young's modulus by method of single cantilever oscillations.
3. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum.
4. Verification of laws of vibrations in stretched strings – Sonometer.
5. Determination of spring constant of springs using coupled oscillators.
6. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus
7. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
8. Measurement of magnetic susceptibility by Gouy's method.
9. Determination of ultrasonic velocity in liquid (Acoustic Grating)
10. Determination of dielectric constant by charging and discharging method
11. Determination of wavelength of Laser by diffraction grating
12. Determination of particle size using Laser.
13. Determeination of Pressure variation using strain Gauge sensor.
14. Determination of Moment of Inertia of a Fly Wheel.
15. Determination of Velocity of sound –Volume Resoantor.

LIST OF AUGMENTED EXPERIMENTS
16 to 19 (Any two of the following experiments can be performed)

16. Determine the Young's Modulus of the material of the bar subjected touniform bending
17. Determine the Young's Modulus of the material of the bar subjected to non-uniform bending
18. V-I characteristics of P-N junction Diode.
19. V-I characteristics and Breakdown voltage of Zener Diode

Reference Books:

1. Engineering Physics Lab Manual by Dr.C.V.Madhusudhana Rao, V.Vasanth Kumar, Scitech Publications.
2. Laboratory Manual Cum Record for Engineering Physics I & II by Dr.Y.Aparna, Dr.K.Venkateswara Rao, VGS Technoseries.

ENGINEERING PHYSICS - VIRTUAL LAB – ASSIGNMENTS

LIST OF EXPERIMENTS

1. Hall Effect
2. Crystal Structure
3. Brewster's angle
4. Numerical Aperture of Optical fiber
5. Photoelectric Effect
6. LASER – Beam Divergence and Spot size
7. Michelson's interferometer
8. Black body radiation
9. Flywheel – moment of inertia
10. AC Sonometer
11. Resistivity by four probe method
12. Newton's rings –Refractive index of liquid

Web Link:
1.www.vlab.co.in

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BASIC ENGINEERING WORKSHOP

(Common to all branches)

I Semester
Course Code: 19S1ES1L02

L	T	P	C
0	0	3	1.5

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1 : Prepare carpentry joints using carpentry tools
CO 2 : Develop various fitting joints using fitting tools.
CO 3 : Develop component drawings for making the sheet metal models.
CO 4 : Prepare sheet metal models using drawings and tin smithy tools
CO 5 : Experiment with the various house wiring connections.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	1	-	-	-	-	-	-	-	1	-	-	1
CO2	1	-	-	-	-	-	-	-	1	-	-	1
CO3	1	-	-	-	-	-	-	-	1	-	-	1
CO4	1	-	-	-	-	-	-	-	1	-	-	1
CO5	1	-	-	-	-	-	-	-	1	-	-	1

Mapping of Course Outcomes with Program Specific Outcomes

CO/PSO	PSO1	PSO2	PSO3
CO1	-	-	-
CO2	-	-	-
CO3	-	-	-
CO4	-	-	-
CO5	-	-	-

List of Experiments:

Carpentry:
1. Cross Lap Joint
2. Dovetail Joint
3. T - Joint

Fitting:
4. Vee Fit
5. Square Fit

House Wiring:
6. Parallel Connection of three bulbs
7. Series Connection of three bulbs

Tin Smithy:
8. Taper Tray
9. Funnel
10. Plain Pipe

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List of Augmented Experiments:
(Student can perform any one of the following experiments)
1. Stair Case wiring
2. Florescent Lamp Fitting

Reference Books:
1. Engineering Workshop by Dr. A. B. Srinivasa Rao, AMIGO Books.
2. Manual on Workshop practice by Dr. P.Kannaiah & Dr. K.L.Narayana, Scitech publications.

Web Links:
1. http://tite.ac.in/index.php/departments/mechanical-engineering/workshop
2. https://www.gopracticals.com/basic-engineering/workshop/

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CHEMISTRY OF MATERIALS
(Common to CE, ME, Min.E, PT& Ag.E)

	L	T	P	C
II Semester	**L**	**T**	**P**	**C**
Course Code: 191BS2T06	**3**	**0**	**0**	**3**

Course Outcomes
At the end of the Course, Student will be able to:

CO 1: Compare the quality of drinking water and problems associated with hardwater.

CO 2: Explain the fundamentals and applications of Electrochemical energy systems.
CO 3: Explain fundamentals and applications of polymers and building materials.
CO 4: Explain the fundamentals and controlling methods of corrosion.
CO 5: Explain the properties and applications of nano materials, conductors, Semiconductors and Super conductors.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	-	-	-	-	-	-	-	-	-
CO3	2	-	-	-	-	-	-	-	-	-	-	-
CO4	2	-	-	-	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO/PO	PSO1	PSO2	PSO3
CO1	-	1	-
CO2	-	-	-
CO3	-	1	-
CO4	-	1	-
CO5	-	-	-

UNIT- I:
Water Technology:
Introduction –Soft Water and hardness of water, types of hardness of water, degree of hardness of water, Units of hardness of water, problems on hardness, Boiler troubles - scale and sludge, Boier corrosion, Industrial water treatment- zeolite and ion-exchange processes.
Specifications for drinking water, Bureau of Indian Standards (BIS) and World health organization(WHO) standards, - desalination of brackish water, reverse osmosis (RO) and electrodialysis.

UNIT - II:
Electrochemical Energy Systems:
Introduction-Electrochemical Cell(Galvanic cell), Electrochemical series, Applications, single electrode potential, Hydrogen and Calomel electrode, Nernst Equation for a single electrode ,Concentration Cells(Electrode & Electrolyte),Construction of glass electrode.
Batteries – Classical batteries-dry/Leclanche cell,Modern batteries-zinc air, lithium cells-Li MnO_2 cell- challenges of battery technology. Fuel cells- Introduction- classification of fuel cells – hydrogen and oxygen fuel cell, propane, and oxygen fuel cell-Merits of fuel cell.

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UNIT - III:

Polymers and Building Materials:

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation (Free radical mechanism for addition ploymerization)

Plastics - Thermoplastics and Thermosettings, Preparation, properties, and applications of – PVC, Bakelite.

Steel – Types of Steel, chemical composition – applications of alloy steels

Cement: Portland cement, constituents, Manufacture of Portland Cement, chemistry of setting and hardening of cement.

UNIT - IV:

Corrosion Engineering:

Corrosion: Definition – theories of corrosion, dry corrosion, and electro chemical corrosion – factors affecting corrosion, nature of the metal and nature of the environment.

Corrosion controlling methods: Sacrificial and Impressed current cathodic protection, Metallic coatings, anodic coatings, cathodic coating, galvanizing, and tinning, metal cladding, Electroplating –organic coatings, paints (constituents and their functions).

UNIT - V:

Material Science and Engineering:

Nano Materials: Introduction to Nano materials, chemical synthesis of nanomaterials: Sol-gel method,characterization of nanomateirals by TEM (includes basic principle of TEM), Applications of nanomaterials in wastewater treatment,lubricants, and engines

NanoTubes:Carbon nano tubes- Types of CNT's-preparation methods–Arc vapourisation, Laser abiliation and chemical vapour deposition –properties and applications.

Band Theory of Solids: Introduction –Explanation of conductors, semiconductors, Insulators by Band Theory- Super Conductors-Types-Preparation-Propertiesand Applications.

Appendix: Introduction to Smart Materials.

Textbooks:

1.P.C. Jain and M. Jain, Engineering Chemistry, 16/e, Dhanapat Rai & Sons, (2014).
2.B.K. Sharma, Engineering Chemistry, Krishna Prakasham, (2014).
3. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.

Reference Books:

1. Sashi Chawla, A Textbook of Engineering Chemistry, Dhanapath Rai and sons, (2003).
2. B.S Murthy and P. Shankar, A Textbook of NanoScience and NanoTechnology, University Press (2013).
3. S.S. Dara, A Textbook of Engineering Chemistry, S. Chand& Co, (2010).

Web Links:

1 http://www.nptelvideos.in/2012/11/chemistry-of-materials
2 http://www.nptelvideos.com/lecture.php?id=2946
3 http://www.nptelvideos.com/lecture.php?id=2922
4 http://www.nptelvideos.com/lecture.php?id=2954

ENGINEERING CHEMISTRY LAB

(Common to CE, ME, ECE, CSE, Min.E, PT&Ag. E)

IISemester **L T P C**
Course Code:191BS2L04 **0 0 3 1.5**

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1 : Demonstrate Complexometric titrations by volumetric analysis.
CO 2 : Demonstrate Acid – Base titrations by instrumental analysis.
CO 3 : Estimate Vitamin C using volumetric analysis
CO 4 : Prepare polymer like Bakelite.
CO 5 : Prepare alternative fuel like Bio-Diesel.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	1	1	-	1
CO2	2	-	-	-	-	-	-	-	1	1	-	1
CO3	2	-	-	-	-	-	-	-	1	1	-	1
CO4	2	-	-	-	-	-	-	-	1	1	-	1
CO5	2	-	-	-	-	-	1	-	1	1	-	1

Mapping of Course Outcomes with Program Specific Outcomes

CO/PSO	PSO1	PSO2	PSO3
CO1	-	-	-
CO2	-	-	-
CO3	-	-	-
CO4	-	-	-
CO5	-	-	-

Introduction to Chemistry laboratory – Molarity, Normality, Primary, secondary standard solutions, Volumetric titrations, Quantitative analysis, Qualitative analysis, etc.

Exercise 1:
Determination of Total Hardness of a water sample.

Exercise 2:
Determination of Dissolved Oxygen in Water Sample.

Exercise 3:
Determination of Zinc by Complexometric method

Exercise 4:
P^H metric titration of (i) strong acid vs. strong base.

Exercise 5:
Determination of Fe (II) in Mohr's salt by potentiometric method.

Exercise 6:
Potentiometry – Titration between strong acid – strong base

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Exercise 7:
Conductometric titrations (Strong acid vs Strong base).

Exercise 8:
Preparation of Phenol- Formaldehyde resin.

.
Exercise 9:
Preparation of Urea-Formaldehyde resin.

Exercise 10:
Preparation of bio diesel.

Exercise 11:
Determination of Vitamin – C.

LIST OF AUGMENTED EXPERIMENTS
12 to 15 (Any two of the following experiments can be performed)

Exercise 12:
Determination of percentage Moisture content in a coal sample.

Exercise 13:
Determination of acid value and saponification value of a given lubricant.

Exercise 14:
Determination of viscosity of a liquid.

Exercise 15:
Estimation of Calcium in port land Cement.

Reference Books:
1. A Textbook of Quantitative Analysis, Arthur J. Vogel.
2. Dr. Jyotsna Cherukuris (2012) Laboratory Manual of engineering chemistry - II, VGS Techno Series.
3. Chemistry Practical Manual, Lorven Publications K. Mukkanti (2009). Practical Engineering Chemistry, B.S.Publication.

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ENGINEERING GRAPHICS AND DESIGN

(Common to CE, ME, ECE, CSE, IT, Min.E, PT & Ag.E)

II Semester **L T P C**
Course Code: 191ES2T02 **1 0 3 2.5**

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Make use of fundamentals of Engineering Drawing to sketch basic curves, conic sections, cycloid, epicycloid, hypocycloid and involute.
- CO 2: Apply the principles of orthographic projections for points, lines and planes.
- CO 3: Apply the principles of orthographic projections for solids.
- CO 4: Apply the AutoCAD software for the orthographic projection of the machine parts.
- CO 5: Apply the AutoCAD software for the isometric projection of the machine parts.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	1	-	-	-	-	-	-	-	-	1	-	1
CO2	1	-	-	-	-	-	-	-	-	1	-	1
CO3	1	-	-	-	-	-	-	-	-	1	-	1
CO4	1	-	-	-	3	-	-	-	-	1	-	1
CO5	1	-	-	-	3	-	-	-	-	1	-	1

Mapping of Course Outcomes with Program Specific Outcomes

CO/PSO	PSO1	PSO2	PSO3
CO1	-	-	-
CO2	-	-	-
CO3	-	-	-
CO4	-	-	-
CO5	-	-	-

CONVENTIONAL DRAFTING

UNIT-I

Introduction to Engineering graphics: Principles of Engineering Graphics and their significance- conventions in drawing- lettering – BIS Conventions- - Conic sections -Cycloid, epicycloids and hypocycloid-Involutes

UNIT-II

Projection of points, lines and planes: Projection of points in any quadrant, lines inclined to one or both planes, finding true lengths, angle made by line. Projections of regular plane surfaces.

UNIT-III

Projections of solids: Projections of regular solids inclined to one or both planes by rotational or auxiliary views method.

COMPUTER AIDED DRAFTING

UNIT-IV

Introduction to Computer Aided Drafting: Basic drawing and editing commands-Dimensioning principles and conventional representations, Systems of projections, Conventions and application to orthographic projections

UNIT-V

Isometric Projections: Principles of isometric projection- Isometric scale; Isometric views: lines, planes, figures, simple and compound solids

Text Books:

1. N.D.Bhatt, Engineering Drawing, 53rd Edition, Charotar Publishers, 2016.
2. K.L.Narayana & P.Kannaiah, Engineering Drawing, 3rd Edition, Scitech Publishers, Chennai, 2012.

Reference Books:

1. Dhanajay A Jolhe, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2009.
2. Shah and Rana, Engineering Drawing, 2/e, Pearson Education, 2009.
3. Venugopal, Engineering Drawing and Graphics, 3/e, New Age Publishers, 2000.
4. K.C.John, Engineering Graphics, 2/e, PHI, 2013.
5. Basant Agarwal & C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2008.

Note:

1. Manual and Computer Aided Drafting classes can be held in alternative weeks for optimal utilization of computer facilities.
2. External examinations to be conducted both manual and computer mode with equal weightage of marks.

Web Links:

1. https://www.wiziq.com/tutorials/engineering-drawing
2. www.me.umn.edu/courses
3. Youtube: http-sewor,Carleton.cag,kardos/88403/drawings.html conic sections-online, red woods.edu

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ENVIRONMENTAL SCIENCE
(Common to all branches)

I Semester	**L**	**T**	**P**	**C**
Course Code:191MC1A01	2	0	0	0

Course Outcomes: At the end of the Course, Student will be able to:

CO1: Outline the natural resources and their importance for the sustenance of the life
CO2: Explain about the biodiversity of India, threats and its conservation methods
CO3: Illustrate various attributes of the pollution, impacts and measures to control the pollution along with waste management practices
CO4: Describe social issues of both rural and urban environment to combat the challenges and the legislations of India in environmental protection
CO5: Explain the population growth and its implications

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	1	2	-	-	-	-	-
CO2	-	-	-	-	-	1	2	-	-	-	-	-
CO3	-	-	-	-	-	1	2	-	-	-	-	-
CO4	-	-	-	-	-	1	2	-	-	-	-	-
CO5	-	-	-	-	-	1	2	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO/PSO	PSO1	PSO2	PSO3
CO1	-	1	-
CO2	-	1	-
CO3	-	1	-
CO4	-	2	-
CO5	-	1	-

Unit – I
Multidisciplinary Nature of Environmental Studies: Definition, Scope and Importance, Need for Public Awareness.
Natural Resources: Renewable and non-renewable resources – Natural resources and associated problems.

Unit – II
Ecosystem, Biodiversity and Its Conservation:
Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers, and decomposers. Food chains, food webs and ecological pyramids.
Biodiversity And Its Conservation: Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Values of biodiversity. Hot-spots of biodiversity – Threats to biodiversity. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Unit – III
Environmental Pollution and Solid Waste Management:
Environmental Pollution: Definition, Cause, effects, and control measures of:

a. Air Pollution.
b. Water Pollution
c. Soil Pollution

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d. Marine Pollution
e. Noise Pollution

Solid Waste Management:
Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution.

Unit – IV

Social Issues and The Environment:
Social Issues and the Environment: From Unsustainable to Sustainable development – Urban problems related to Energy &Water. Resettlement and rehabilitation of people, Environmental ethics, Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents, and holocaust. Environment Protection Act – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act-Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

Unit – V

Human Population and The Environment: Population growth, variation among nations. Environment and human health, Human Rights, Value Education. Role of Information Technology in Environment and human health.

Text Books:
1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, Universities Press.
2. Environmental Studies by Palaniswamy – Pearson education.
3. Environmental Studies by Dr.S.Azeem Unnisa, Academic Publishing Company.

Reference Books:
1. Textbook of Environmental Science by Deeksha Dave and E.Sai Baba Reddy, Cengage Publications.
2. Textbook of Environmental Sciences and Technology by M.Anji Reddy, B.S Publication.
3. Comprehensive Environmental studies by J.P.Sharma, Laxmi publications.
4. Environmental sciences and engineering – J. Glynn Henry and Gary W. Heinke – Prentice Hall of India Private limited.
5. A Textbook of Environmental Studies by G.R.Chatwal, Himalaya Publishing House
6. Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela-Prentice Hall of India Private limited.

Web Links:
1. https://www.youtube.com/watch?v=mOwyPENHhbc
2. https://www.youtube.com/watch?v=_mgvsPnCYj4
3. https://www.youtube.com/watch?v=L5B-JMnBIyQ
4. https://www.youtube.com/watch?v=3RDGV5i82_Q

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PROBABILITY AND STATISTICS
(Common to CE& Min.E)

III SEMESTER
Course Code: 171BS3T10

L	T	P	C
3	1	0	3

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Apply various Probability distributions for both discrete and continuous random variables.
CO 2: Compute mean and variance of sample means with replacement and without replacement.
CO 3: Apply various tests to test the hypothesis concerning mean, Proportion, variance and perform ANOVA test.
CO 4: Apply the concepts of correlation and regression to the given statistical data.
CO 5: Examine quality of the product using control charts.

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3
CO1	-	-	-
CO2	-	-	-
CO3	-	-	-
CO4	-	-	-
CO5	-	-	-

UNIT I: Random variables and Distributions
Review of elementary probability, Random variables- Discrete and Continuous Random variable-Distribution function-Expectation, variance, Moment Generating function –Discrete Distributions- Binomial, Poisson Continuous Distributions -Normal Distribution.

UNIT II: Sampling Theory
Introduction - Population and samples- Sampling distribution of means (known and unknown), proportion, sampling distribution of sums and difference-Central limit theorem-Point and interval estimation for means and proportions.

UNIT III: Tests of Hypothesis
Introduction –Statistical hypothesis-Errors of sampling, level of significance - One tail and two-tail tests- Testing of hypothesis concerning single mean, proportion, two means and two proportions using Z-test. Testing of hypothesis concerning single mean, two means using t-test. Independence of attributes by

χ^2–test-ANOVA for one-way and two-way classified data.

UNIT IV: Correlation and Regression
Introduction – Simple correlation-properties-Pearson and rank correlation Regression – straight line and quadratic curve by method of least squares.

UNIT V: Statistical Quality Control Methods
Introduction - Methods for preparing control charts – Problems using x-bar, p, R charts and attribute charts.

Text Books:

1. Probability and Statistics for Engineering and the Sciences, Jay L.Devore, 8th edition, Cengage.
2. Probability, Statistics and Random processes, T.B.Veeraju, TMH

Reference Books:

1. Probability and Statistics Engineers and the Scientists, Shron L.Myers, Keying Ye, Ronald E Walpole, 8th Edition, Pearson 2007.
2. Introduction to probability and statistics, William Menden Hall, Robert J. Bever and Barbara Bever, Cengage learning.2009
3. Introduction to probability and statistics Engineers and the Scientists, Sheldon, M. Rosss, 4th edition, Academic Foundation, 2011
4. Applied statistics for Engineers and Physical Scientists, Johannes Ledolter and Robert V.Hogg, 3rd Edition, Pearson, 2010
5. Probability and Statistics for Engineering, Richards A Johnson, Irvin Miller and Johnson E Freund. 9th Edition,PHI.
6. Probability and statistics by T.K.V.Iyengar, S.Chand publishers.

Web Links:

1. http://nptel.ac.in/courses/111105041/1
2. http://mathworld.wolfram.com/Statistics.html
3. http://mathworld.wolfram.com/topics/ProbabilityandStatistics.html
4. http://mathworld.wolfram.com/topics/Probability.html

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MANAGEMENT SCIENCE

V Semester **L T P C**
Course Code: 171HS5T05 **3 1 0 3**

Course Outcomes:
At the end of the Course, Student will be able to:

CO1: Apply management and motivation theories to renovate the practice of management.
CO2: Use principles of Statistical Quality Control and Materials management in the design of products and process controls.
CO3: Appraise the functional management challenges associated with high levels of change in the organizations.
CO4: Identify activities with their interdependency and use scheduling techniques of project management PERT/CPM.
CO5: Develop global vision and management skills both at strategic level and interpersonal level.

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	-	-	-	-	-	-	-	-	-	2	-	1
CO 2	1	1	-	-	-	-	-	-	-	3	-	1
CO 3	-	-	-	-	-	-	-	-	-	1	-	1
CO 4	1	1	-	-	-	-	-	-	-	1	1	1
CO 5	-	-	-	-	-	-	-	-	-	1	-	1

Mapping of Course Outcomes with Program Specific Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3
CO 1	-	-	-
CO 2	-	-	-
CO 3	-	-	-
CO 4	-	-	-
CO 5	-	-	-

UNIT 1
Introduction to Management: Concept nature and importance of Management, Generic Functions of Management, and Evaluation of Management thought, Theories of Motivation, Decision making process, Designing organization structure, Principles of organization & Organizational typology.

UNIT 2
Operations Management :Principles and Types of Management, Work study, Statistical Quality Control, Control charts (P-chart, R-chart, and C-chart) Simple problems, Material Management: Need for Inventory control, EOQ, ABC analysis (simple problems) and Types of ABC analysis (HML, SDE, VED, and FSN analysis), Justin- Time(JIT) system, Total Quality Management(TQM), Six sigma, Supply chain management

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UNIT 3

Functional Management : Concept of HRM, HRD and PMIR, Functions of HR Manager, Wage payment plans(Simple Problems),Job Evaluation and Merit Rating,Marketing Management, Functions of Marketing, Strategies based on product Life Cycle, Channels of distributions.

UNIT 4

Project Management: Development of Network, Difference between PERT and CPM, Identifying Critical Path, Probability, Project Crashing (Simple Problems).

UNIT 5

Strategic Management : Vision, Mission, Goals, Strategy, Elements of Corporate Planning Process, Environmental Scanning ,SWOT analysis, Steps in Strategy Formulation and Implementation, Generic Strategy Alternatives, Basic concepts of MIS, ERP, Capability Maturity Model(CMM) Levels, Balanced Score Card.

Text Books:

1. Management Science, Arya Sri, Tata McGraw Hill, 2009
2. Management, James Arthur, Finch Stoner, R. Edward Freeman, and Daniel R. Gilbert 6th Edition, Pearson Education.

References Books:

1. Principles of Marketing - A South Asian Perspective, Kotler Philip, Gary Armstrong, Prafulla Y. Agnihotri, and Eshan ul Haque, Pearson Education, 13th Edition , 2010.
2. A Handbook of Human Resource Management Practice, Michael Armstrong, Kogan Page Publishers, 2010.
3. Quantitative Techniques in Management, N.D. Vohra, Tata McGraw Hill, 4th Edition, 2010.

Web links:

1. www.managementstudyguide.com
2. www.citehr.com
3. www.nptel.ac.in/courses/122106032
4. www.btechguru.com/courses--nptel--basic-course

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TRANSPORTATION ENGINEERING

V Semester	**L**	**T**	**P**	**C**
Course Code: 171CE5T11	**3**	**1**	**0**	**3**

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1: Develop geometric design of transport systems.
CO 2: Design the traffic signaling system.
CO 3: Design highway Intersections.
CO 4: Design of rigid and flexible pavements.
CO 5: Explain the basic concepts of railway and airport engineer.

Mapping of course outcomes with program outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	2	3	2	2	2	2	-	2	-	-	2	-
CO3	2	3	2	2	2	2	-	2	-	-	-	-
CO4	3	2	-	-	3	3	2	3	2	2	2	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-

Mapping of course outcomes with program Specific Outcomes:

CO / PSO	PSO 1	PSO 2	PSO 3
CO1	-	2	-
CO2	-	3	-
CO3	-	3	-
CO4	-	3	-
CO5	-	2	-

UNIT - I

Introduction to Highway Engineering:

Highway Development and Planning Highway development in India –Necessity for Highway Planning – Different Road Development Plans – Classification of Roads – Road Network Patterns – Highway Alignment – Factors affecting Alignment – Engineering Surveys.

Highway Geometric Design:

Importance of Geometric Design – Design controls and Criteria- Highway Cross Section Elements – Sight Distance Elements –Stopping sight Distance – Overtaking Sight Distance and intermediate Sight Distance – Design of Horizontal Alignment – Design of Super elevation and Extra widening – Design of Transition Curves –Design of Vertical alignment-Gradients – Vertical curves.

UNIT - II

Traffic Engineering:

Basic parameters of traffic –Volume –Speed and density –Traffic volume studies – Data collection and presentation –Speed studies –Data collection and presentation – Parking studies and parking characteristics. road traffic signs –Types andspecifications –Road markings –Need for road markings –Types of road markings –Design of traffic signals –Webster method –IRC method.

UNIT – III

Intersection Design:

Types of intersections –Conflicts at intersections –Types of at-grade intersections channelization –Objectives –Traffic islands and design criteria –Types of grades – Separated intersections –Rotary intersection –Concept of rotary intersection and design criteria- Advantages and disadvantages of rotary intersection.

UNIT - IV

Design of Pavements:

Types of pavements – Functions and requirements of different components of pavements - Design Factors.

Flexible Pavements:

Design factors – Flexible Pavement Design Methods – CBR method – IRC method – Burmister method – Mechanistic method – IRC Method for Low volume Flexible pavements.

Rigid Pavements:

Design Considerations –Wheel load stresses – Temperature stresses – Frictional stresses – Combination of stresses – Design of slabs – Design of Joints – IRC method – Rigid pavements for low volume roads – Continuously Reinforced Cement Concrete Pavements – Roller Compacted Concrete Pavements

UNIT - V

Railway Engineering:

Permanent way components –Cross section of permanent way –functions of various components like rails –Sleepers and ballast –Rail fastenings –Creep of rails – Theories related to creep –Adzing of sleepers –Sleeper density. gradients –Grade compensation – Cant and negative super elevation –Cant deficiency.

Airport Engineering:

Factors affecting selection of site for airport –Aircraft characteristics –Geometric design of runway –Computation of runway length –Correction for runway length – Orientation of runway –Wind rose diagram.

Text books:

1. Highway Engineering, S.K.Khanna & C.E.G.Justo, Nemchand & Bros., 7th edition, 2011.
2. Railway Engineering, A text book of Transportation Engineering, S.P.chadula, S.Chand & Co. Ltd.,2013.
3. Highway Engineering Design, L.R.Kadiyali and Lal- Khanna Publications,2007.
4. Airport Planning and Design, S.K.Khanna and Arora, Nemchand Bros, 6th edition, 2012.

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Reference books:

1. Highway Engineering, S.P.Bindra, DhanpatRai & Sons., 4th Edition.
2. Traffic Engineering & Transportation Planning, Dr.L.R.Kadyali, Khanna publications, 6th Edition,1997.
3. Railway Engineering, August, Prabha& Co., 15th Edition,1994.
4. Air Transportation Planning & design, Virendhra Kumar &Statish Chandhra, Gal Gotia Publishers1999.

Web Links:

1. http://nptel.ac.in/courses/105101087/29
2. https://novalynx.com/store/pc/What-Is-a-Wind-Rose-d55.htm
3. https://ircep.gov.in/

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CONSTRUCTION TECHNOLOGY AND MANAGEMENT
(PROFESSIONAL ELECTIVE-I)

V Semester
Course Code: 171CE5E01

L	T	P	C
3	1	0	3

Course Outcomes:
At the end of the Course, Student will be able to:

- CO 1: Plan and schedule on various construction projects.
- CO 2: Solve PERT and CPM networks & have a better idea upon utilization of resources in Construction.
- CO 3: Compare the functioning of various earth moving equipment.
- CO 4: Explain the methods of production of aggregate and concreting.
- CO 5: Classify different types of pile driving equipment.

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	2	2	2	2	-	-	2	-	2	2
CO2	3	2	1	1	2	2	2	-	2	-	2	2
CO3	-	-	-	-	-	2	-	-	-	-	-	3
CO4	-	-	-	-	-	2	-	-	-	-	-	3
CO5	-	-	-	-	-	2	-	-	-	-	-	3

Mapping of Course Outcomes with Program Specific Outcomes:

CO / PSO	PSO 1	PSO 2	PSO 3
CO1	-	3	-
CO2	-	2	-
CO3	-	2	-
CO4	-	2	-
CO5	-	2	-

UNIT –I:
Introduction:
Steps involved in planning - Objectives – Principles –Advantages - Limitations - Stages of planning - Scheduling - Preparation of construction schedules -Methods of scheduling
- Bar charts -Mile stone charts – Controlling - Project work break down.

UNIT – II:
Project Management Through Networks:
Objectives of network techniques - Fundamentals of network analysis - Events; Activities- Dummies - Types of networks - Choice of network type - Advantages of network techniques over conventional techniques.
Program Evaluation and Review Technique (PERT): Introduction - Earliest expected time - Latest allowable occurrence time - Slack - Critical path - Probability of completion time for a project.

UNIT – III:

Critical Path Method (CPM):

Introduction-Difference between CPM and PERT-Time estimates- Earliest event time- Latest event time- Float- Critical activities and critical path.

Cost Control: Direct cost-indirect cost-total project cost- Optimization of cost through networks-Steps involved In optimization of cost- allocation of resources

UNIT – IV:

Construction Equipment:

Classification of construction equipment- Earth moving equipment- capacities of trucks and handling equipment-calculation of truck production- Excavation equipment-Hauling equipment- Earth compaction equipment- Hoisting equipment.

UNIT – V:

Aggregate & Concreting Equipment:

Crushers & Types of crushers-selection of crushing equipment- concrete mixers-mixing and placing of concrete- consolidating and finishing- Piling & Pile driving equipment - form work- fabrication and erection.

Text Books:

1. Construction Planning, Equipment and Method, Purifoy and Schlender, Shapira, Tata McGraw-Hill,2010
2. Construction Project Management Theory and Practice, Kumar Neeraj Jha, Pearson,2011
3. "Construction Technology, Subir K. Sarkar and Subhajit Saraswati, Oxford University press,2008

Reference Books:

1. Construction Project Management, K.K.Chitkara, McGraw Hill,2014.
2. Project planning and control with PERT and CPM, Dr.B.C.Punmia, K.K.khandelwal, laxmi publications, 2016

Web Links:

1. nptel.ac.in/courses/105103093/
2. nptel.ac.in/courses/105103093/22

ENGINEERING GEOLOGY LAB

V Semester **L T P C**

Course Code: 171CE5L04 **0 0 3 2**

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1 : Apply the knowledge of geology in the field of civil engineering.
- CO 2 : Explain physical properties of various minerals and rocks.
- CO 3 : Interpret geological maps, topographical maps and satellite imagery.
- CO 4 : Identify various geological formations.
- CO 5 : Distinguish various landforms and rock formations in constructional areas through field examinations

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	2	1	-	-	-	-	-	-	-	-	-	-
CO3	2	1	-	-	-	-	-	-	-	-	-	3
CO4	3	2	-	1	-	-	-	-	-	-	-	-
CO5	3	2	-	2	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes:

CO / PSO	PSO 1	PSO 2	PSO 3
CO1	3	-	-
CO2	2	-	-
CO3	2	-	-
CO4	3	-	-
CO5	3	-	-

List of Experiments:

1. To identify the physical properties of Rock forming minerals – Quartz group, Feldspar group, Garnet group, Mica group & Talc, Chlorite
2. To identify the physical properties of Olivine, Kyanite, Asbestos, Tourmaline, Calcite, Gypsum
3. To identify the physical properties of Ore forming minerals – Magnetite, Hematite, Pyrite, Pyralusite, Graphite, Chromite
4. To identify the physical properties of Igneous rocks – Types of Granite, Pegmatite, Gabbro, Dolerite, Syenite, Granite Poryphery, Basalt.
5. To identify the physical properties of Sedimentary rocks – Sand stone, Ferruginous sand stone, Lime stone, Shale, Laterite, Conglomerate
6. To identify the physical properties of Metamorphic rocks Granite Gneiss, Slate, Muscovite & Biotite schist, Marble, Khondalite
7. Interpretation of topographical maps and satellite imagery
8. Drawing of cross sections of formations from geological maps showing tilted beds, faults, unconformities
9. Simple Structural Geology problems
10. Field work – To identify Mineral and Rock deposits, Geomorphology& Structural Geology of an area

List of Augmented Experiments:

(Any two of the following experiments can be performed)

11. Electrical resistivity and seismic survey methods
12. Stratigraphy of India and Andhra Pradesh and borehole data
13. Finding Strike and Dip of geological formations using Brunton Compass

References:

1. Applied Engineering Geology Practicals, M T Mauthesha Reddy, New Age International Publishers, 2nd Edition
2. Foundations of Engineering Geology, Tony Waltham, Spon Press, 3rd edition,2009
3. Engineering Geology Lab Record, Manual First Edition, Laxmi Publications Pvt Ltd, First edition 2017

Web Links:

1. https://nptel.ac.in/courses/105105106/5
2. https://www.slideshare.net/romangantawa/engineering-properties-of-rock
3. https://www.sciencedirect.com/book/9780128028339/engineering-properties-of rocks.

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TRANSPORTATION ENGINEERING LAB

V Semester **L T P C**

Course Code: 171CE5L05 **0 0 3 2**

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1: Characterise the highway aggregates.
CO 2: Conduct tests on suitability of bitumen.
CO 3: Identify the parking capacity and use of parking facilities.
CO 4: Design the marshal stability mix.
CO5 : CBR test on soils.

Mapping of course outcomes with program outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	1	-	-	-	2	-	-	-	-	-	-
CO2	2	1	-	-	-	2	-	-	-	-	-	-
CO3	3	1	-	-	-	-	-	-	-	3	-	-
CO4	2	1	-	-	-	2	-	-	-	-	-	-
CO5	2	1	-	-	-	2	-	-	-	3	-	-

Mapping of course outcomes with program Specific Outcomes:

CO / PSO	PSO 1	PSO 2	PSO 3
CO1	2	-	-
CO2	3	-	-
CO3	3	-	-
CO4	2	-	-
CO5	2	-	-

List of Experiments:

1. To determine the Aggregate crushing value of aggregates
2. To determine the Aggregate impact value of aggregates
3. To determine the Flakiness index and elongation index of aggregates
4. To determine the Deval's abrasion value of aggregates
5. To determine the Los angles abrasion value of aggregates.
6. To determine the Specific gravity & Water absorption of aggregates.
7. To determine the Penetration value and Softening point of bitumen.
8. To determine the Flash & fire point of bitumen.
9. To determine the Viscosity of bitumen.
10. To determine the Ductility value of bitumen.

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List of Augmented Experiments:

(Any two of the following experiments can be performed)

11. To determine the spot speed
12. Marshall mix design
13. CBR test for soils

References:

1. Highway Engineering, S.K.Khanna & C.E.G.Justo, Nemchand & Bros., 7th edition, 2000.
2. Highway Engineering, S.P.Bindra, Dhanpat Rai &Sons, 4th Edition
3. Traffic Engineering & Transportation Planning, Dr.L.R.Kadyali, Khanna publications, 6th Edition

Web Links:

1. http://nptel.ac.in/courses/105101087/29
2. https://civilblog.org/2015/09/12/7-lab-tests-on-aggregate-to-check-quality-for-use-in-road-work/
3. https://www.aboutcivil.org/marshall-stability-test-astm-d6927-06-standard.html
4. https://www.scribd.com/doc/95424960/List-of-Codes-IRC-Pavement-Materials

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GEOTECHNICAL ENGINEERING-I

VI Semester **L T P C**

Course Code: 171CE6T15 **3 1 0 3**

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1: Interpret the various properties related to soil.
CO 2: Classify the various types of soils.
CO 3: Determine the permeability of different types of soils.
CO 4: Calculate vertical stresses due to applied loads
CO 5: Differentiate the concepts of compaction and consolidation.

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	1	-	-	-	2	-	-	-	-	2	-
CO2	2	1	-	-	-	2	-	-	-	-	2	-
CO3	3	2	-	-	-	2	-	-	-	-	2	-
CO4	3	2	-	-	-	2	-	-	-	-	2	-
CO5	3	2	-	-	-	2	-	-	-	-	2	-

Mapping of Course Outcomes with Program Specific Outcomes:

CO / PSO	PSO 1	PSO 2	PSO 3
CO1	-	1	-
CO2	-	1	-
CO3	-	2	-
CO4	-	2	-
CO5	-	3	-

UNIT-I

Introduction & Index properties of soils:

Soil formation – soil structure and clay mineralogy – Adsorbed water – Mass–volume relationship –Laboratory tests for soil properties –Relative density. Grain size analysis – Sieve and Hydrometer methods – consistency limits and indices – Various Types of soil Classifications – Unified soil classification and I.S. Soil classification – Engineering properties of soils- Definitions.

UNIT-II

Permeability:

Soil water – capillary rise – flow of water through soils – Darcy's law– permeability – Factors affecting –laboratory determination of coefficient of permeability –Permeability of layered systems. Total, neutral and effective stresses

UNIT-III

Seepage through Soils:

Seepage through soils –Flow nets: Characteristics and Uses– quick sand condition.

Stress Distribution in Soils:

Stresses induced by applied loads - Boussinesq's and Westergaard's theories for point loads and areas of different shapes–Newmark's influence chart.

UNIT-IV

Compaction:

Mechanism of compaction – Factors affecting compaction– Effects of compaction on soil properties – Field compaction Equipment – compaction control.

Consolidation:

Stress history of soil –Compressibility of soils– Spring Analogy –Terzaghi's one dimensional consolidation theory–Time rate of consolidation and degree of consolidation – Determination of coefficient of consolidation –Total settlement.

UNIT-V

Shear strength of soils:

Basic mechanism of shear strength – Mohr – Coulomb failure theories – Shear strength determination – Strength tests based on drainage conditions – Shear strength of sands – Critical Void Ratio – Stress-Strain behaviour of clays – Liquefaction.

Text books:

1. Basic and Applied Soil Mechanics, Gopal Ranjan and A.S.R.Rao, New Age International Publishers, 2007.
2. A Text book of Soil Mechanics and Foundation Engineering, K.R.Arora, Standard Publishers & Distributors,2011.
3. Soil Mechanics and Foundation Engineering, V.N.S. Murthy, CBS Publishers, 2009.

Reference books:

1. A Text book of Soil Mechanics and Foundations, B.C.Punmia, Laxmi Publications, 2005.
2. Foundation Analysis & Design, Bowles& J.E., McGraw- Hill,1997.

Web Links:

1. http://nptel.ac.in/courses/105103097/
2. http://nptel.ac.in/courses/105101084/
3. https://easyengineering.net/geotechnical-engineering-soil-mechanics/

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GEOTECHNICAL ENGINEERING LAB

VI Semester	**L**	**T**	**P**	**C**
CourseCode: 171CE6L06	**0**	**0**	**3**	**2**

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1 Apply the knowledge of soil mechanics in the field of civil engineering.
CO 2 Determine the identification of physical properties of various soils.
CO 3 Interpret with permeability characteristics of soils
CO 4 Determine the identification of consolidation properties of clayey soils.
CO 5 Distinguish various types of shear parameters by using UCS test

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	1	-	-	-	2	-	-	-	-	2	-
CO2	2	1	-	-	-	2	-	-	-	-	2	-
CO3	3	2	-	-	-	3	-	-	-	-	3	-
CO4	2	2	-	-	-	2	-	-	-	-	2	-
CO5	2	2	-	-	-	2	-	-	-	-	2	-

Mapping of Course Outcomes with Program Specific Outcomes:

CO / PSO	PSO 1	PSO 2	PSO 3
CO1	-	1	-
CO2	-	1	-
CO3	-	2	-
CO4	-	1	-
CO5	-	1	-

List of Experiments:

1. To determine the water content by oven drying method and specific gravity of soil by using pycnometer.
2. To determine the Atterberg limits.
3. To determine the Gradation analysis by Sieve analysis.
4. To determine the field unit weight by a) Core cutter method b) Sand Replacement method.
5. To determine the permeability by Constant head method.
6. To determine the permeability by Variable head method.
7. To determine the maximum dry density by standard proctor test.
8. To determine the California bearing ratio by CBR test.
9. To determine the shear parameters by Direct Shear test and Vane Shear Test.
10. To determine the shear parameters by Triaxial Compression test.

List of Augmented Experiments:

(Any two experiments to be conducted from the following)

11. To determine the Gradation analysis by Hydrometer analysis.
12. To determine the maximum dry density by Modified proctor test.
13. To determine the Consolidation of the soil.

Reference books:

1. A Text book of Soil Mechanics and Foundation Engineering, K. R. Arora, Standard Publishers & Distributors, 2011.
2. Determination of Soil Properties, J. E. Bowles, McGraw Hill Book Company, 1971.
3. Departmental Lab Manual.

Web Links:

1. http://nptel.ac.in/courses/105103097/
2. http://nptel.ac.in/courses/105101084/
3. https://easyengineering.net/geotechnical-engineering-soil-mechanics/

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Department of Civil Engineering

Syllabus revision Index for the Academic Year 2019-2020 B.Tech Civil Engineering

S.No	Name of the course	Percentage of syllabus change
1	Communicative English-I	90
2	Differential Equations and Linear Algebra	20
3	Engineering Physics	60
4	Engineering Physics lab	60
5	Basic Engineering Workshop	55
6	Chemistry of Materials	70
7	Engineering Chemistry Lab	50
8	Engineering Graphics and Design	55
9	Engineering Mechanics	20
10	Environmental Science	25
11	Management Science	20
12	Transportation Engineering	32.4
13	Construction Technology and Management	33.2
14	Engineering Geology Lab	25
15	Transportation Engineering Lab	20
16	Geotechnical Engineering - I	33.2
17	Geotechnical Engineering Lab	20

ADITYA ENGINEERING COLLEGE

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Department of Humanities & Basic Sciences

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	English-I	Communicative English
Course Code	171HS1T01	191HS1T01
Syllabus	UNIT-I: 1. IN LONDON: M.K.GANDHI (Detailed) 2. G.D. NAIDU (Non-Detailed)	UNIT-I: 1. An Astrologers' Day - R.K. Narayan (Detailed) 2. Bade Bhai Saab - Munshi Prachanda (Non-Detail)
	UNIT-II: 1. THE KNOWLEDGE SOCIETY- APJ ABDUL KALAM (Detailed) 2. G.R. GOPINATH (Non-Detailed)	UNIT-II: 1. Building A New State - A. P. J. Abdul Kalam (Detailed) 2. Morning Bells- Jayashree Mohan Raj (Non-Detail)
	UNIT-III: 1. THE SCIENTIFIC POINT OF VIEW- J.B.S. HALDANE (Detailed) 2. J.C. BOSE (Non-Detailed)	UNIT-III: 1. Water:The Elixer of Life- C. V. Raman (Detailed) 2. The Power of Plate of Rice- Ifeoma Okoye (Non-Detail)
	UNIT-IV: 1. MAN'S PERIL-BERTRAND RUSSELL (Detailed) 2. HOMI JEHANGIR BHABHA (Non-Detailed)	UNIT-IV: 1. The Woodrose-Abburi Chaya Devi (Detailed) 2. The Cop and The Anthem- O. Henry (Non-Detail)
	UNIT-V: 1. LUCK—MARK TWAIN (Detailed) 2. A SHADOW (Non-Detailed)	UNIT-V: 1. Progress- St. John Ervine (Detailed) 2. Dial 000- Barry Rosenberg (Non-Detail)

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Mathematics-I	Differential Equations and Linear Algebra
Course Code	171BS1T01	191BS1T01
Syllabus	**UNIT I: Differential equations of first order and first degree:** Linear differential equations - Bernoulli differential equation - Exact differential equationsEquations reducible to exact (Type-1, Type-2, Type-3, Type-4) Applications: Newton's Law of cooling-Law of natural growth and decay-Orthogonal trajectories.	**UNIT I: Differential Calculus:** Rolle's theorem, Lagrange's theorem, Cauchy Mean Value theorem, Taylor's and Maclaurin's theorems (All theorems Without Proof). Partial Differentiation: Euler's theorem (without proof), Total derivative, Chain rule, Taylor's and Maclaurin's series expansion of functions of two variables, Jacobian, Functional dependence. Applications: Maxima and Minima of functions of several variables without constraints and with constraints (Lagrange's method). ** (SCILAB Exercise: Plot graphs of various single and multivariable functions).
	UNIT II: Linear differential equations of higher order: Linear differential equations of higher order with constant coefficients with RHS term of the type eax, sin ax, cos ax, polynomials in x, e^ax V(x), xV(x)- Method of Variation of parameters, Method of undetermined coefficients. *(MATLAB Exercise: Introduction to MAT LAB commands and Solution of Initial Value Problems using the command 'dsolve') Applications: Electric circuits, simple harmonic motion.	**UNIT II: Differential equations of first order:** Introduction to differential equations, linear differential equation of first order - Bernoulli differential equation - Exact differential equations- Equations reducible to exact, Applications: Orthogonal trajectories, Newton's Law of cooling, RL circuit
	UNIT III: Linear systems of equations: Rank of a matrix - Echelon form-Normal form – Solution of linear systems – Gauss elimination method - Gauss Seidal method. Applications: Finding the current in electrical circuits.	**UNIT III: Linear differential equations of second and higher order:** Linear differential equations of higher order with constant coefficients, Complementary function and Particular integral with RHS term of the type polynomials in x, e^ax, sin ax, cos ax,

	transducers- Non-Destructive Testing-Applications. Crystallography & x-ray diffraction: Basis and lattice – Crystal Systems – Bravais Lattice - Symmetry elements- Unit cellpacking fraction – coordination number- Miller indices – Separation between successive (h k l) planes – Bragg's law-Bragg's x-ray spectrometer.	radiation – population inversion- Einstein's coefficients & Relation between them and their significance - Pumping Mechanisms - Ruby laser – Helium Neon laser – CO2 laserApplications. Sensors:(qualitative description only): Different types of sensors and applications; Strain and Pressure sensors- Piezoelectric, magnetostrictive sensors, Temperature sensor - bimetallic strip, pyroelectric detectors.
	UNIT-V: Magnetism: Classification based on Field, Temperature and order/disorder – atomicorigin – Ferromagnetism-Hysteresis- applications of magnetic materials (Para &Ferro). Dielectrics: Electric Polarization – Dielectric in DC fields – Internal field –Clausius Mossoti Equation – Dielectric loss- Ferroelectric Hysteresis and applications.	UNIT-V Magnetism: Introduction – Magnetic dipole moment – Magnetization-Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr Magneton - Classification of magnetic materials (Dia, Para, and Ferro) – Domain concept of Ferromagnetism - Hysteresis – soft and hard magnetic materials – Applications of Ferromagnetic materials. Dielectrics: Introduction - Dielectric polarization– Dielectric polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative)-Lorentz internal field – Claussius_Mossoti equation- Frequency dependence of polarization - Applications of dielectrics.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Environmental Studies	Environmental Science
Course Code	171HS1T02/171HS2T02	191MC1A01
Syllabus	UNIT –I: Ecosystems: Scope of environmental studies, Structure-Producers, consumers and decomposers Function – Food chain, Food web, Tropic structure and Energy flow in the ecosystem Ecological pyramids, nutrient recycling, primary and secondary production, ecosystem regulation. Ecological succession Terrestrial ecosystem and aquatic ecosystem - Introduction, types, characteristic features.	UNIT- I: Multidisciplinary Nature of Environmental Studies: Definition, Scope and Importance, Need for Public Awareness. Natural Resources: Renewable and non-renewable resources – Natural resources and associated problems.
	UNIT – II: Natural Resources: Natural resources and associated problems Forest resources – Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources Food resources: World food problems, changes caused by non-agriculture activities effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources vs oil and natural gas extraction. Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil	UNIT - II: Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers. Food chains, food webs and ecological pyramids. Biodiversity and Its Conservation: Definition: genetic, species and ecosystem diversity – Biogeographical classification of India – Values of biodiversity. Hot-spots of biodiversity – Threats to biodiversity. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

	erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.	
	UNIT – III: Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity classification Value of biodiversity: consumptive use, productive use, social-Biodiversity at national and local levels. India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts - Endangered and endemic species of India – Conservation of biodiversity	UNIT - III: Environmental Pollution: Definition, Cause, effects and control measures of: a) Air Pollution. b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution.
	UNIT – IV: Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Style. Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e – waste management.	UNIT - IV: Social Issues and The Environment: From Unsustainable to Sustainable development – Urban problems related to Energy &Water. Resettlement and rehabilitation of people, Environmental ethics, Climate change, global warming, acid rain, ozonelayer depletion, nuclear accidents and holocaust. Environment Protection Act – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act-Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.
	UNIT – V: Social Issues and the Environment Urban problems related to energy -Water conservation, rain water harvesting Resettlement and rehabilitation of people; its problems and concerns. Global challenges Environmental ethics: Issues and possible solutions. Environmental Protection Act - Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act -Wildlife Protection Act - Forest Conservation Act-Issues involved in enforcement of environmental legislation. - Public awareness and Environmental management.	UNIT - V: Human Population and The Environment: Population growth, variation among nations. Environment and human health, Human Rights, Value Education. Role of Information Technology in Environment and human health.

N. Mallesu

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Chemistry	Chemistry of Materials
Course Code	171BS1T03	191BS2T06
Syllabus	UNIT- I: High Polymers and Plastics: Polymerization: Introduction- Mechanism of polymerization - Stereo regular polymers - Physical and mechanical properties – Plastics as engineering materials: advantages and limitations – Thermoplastics and Thermosetting plastics – Compounding and fabrication (compression moulding, injection moulding, extrusion moulding and transfer moulding techniques) - Preparation, properties and applications of polyethene, PVC, Bakelite and polycarbonates. Elastomers – Natural rubber- compounding and vulcanization – Synthetic rubbers: Buna S, Buna N, Thiokol – Applications of elastomers. Biodegradable polymers.	UNIT- I: Water Technology: Introduction – Soft Water and hardness of water, types of hardness of water, degree of hardness of water, Units of hardness of water, problems on hardness, Boiler troubles - scale and sludge, Boier corrosion, Industrial water treatment- zeolite and ion-exchange processes. Specifications for drinking water, Bureau of Indian Standards (BIS) and World health organization(WHO) standards, - desalination of brackish water, reverse osmosis (RO) and electrodialysis.
	UNIT - II: Fuel Technology: Fuels:- Introduction – Classification – Calorific value - HCV and LCV – Dulong's formula – Coal — Proximate and ultimate analysis – Significance of the analyses – Liquid fuels – Petroleum- Refining – Cracking – Synthetic petrol –Petrol knocking – Diesel knocking - Octane and Cetane ratings – Anti-knock agents – Power alcohol – Bio-diesel – Gaseous fuels – Natural gas. LPG and CNG – Combustion – Calculation of air for the combustion of a fuel – Flue gas analysis – Orsat apparatus.	UNIT - II: Electrochemical Energy Systems: Introduction-Electrochemical Cell(Galvanic cell), Electrochemical series, Applications, single electrode potential, Hydrogen and Calomel electrode, Nernst Equation for a single electrode ,Concentration Cells(Electrode & Electrolyte),Construction of glass electrode. Batteries – Classical batteries-dry/Leclanche cell,Modern batteries-zinc air, lithium cells-Li MnO2 cell-challenges of battery technology. Fuel cells-Introduction- classification of fuel cells – hydrogen and oxygen fuel cell, propane, and oxygen fuel cell-Merits of fuel cell.
	UNIT - III: Electrochemical Cells and Corrosion: Galvanic cells - Reversible and	UNIT - III: Polymers and Building Materials: Introduction to polymers, functionality of

	irreversible cells – Single electrode potential- Electro chemical series and uses of this series- Standard electrodes (Hydrogen and Calomel electrodes) - Concentration Cells – Batteries: Dry Cell - Li cells - Zinc – air cells. Corrosion:- Definition – Theories of Corrosion (electrochemical) – Formation of galvanic cells by different metals, by concentration cells, by differential aeration and waterline corrosion – Passivity of metals – Pitting corrosion - Galvanic series – Factors which influence the rate of corrosion - Protection from corrosion – Cathodic protection - Protective coatings: – Metallic (cathodic and anodic) coatings - Methods of application on metals (Galvanizing, Tinning, Electroplating, Electroless plating).	monomers, chain growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation (Free radical mechanism for addition ploymerization) Plastics - Thermoplastics and Thermosettings, Preparation, properties, and applications of – PVC, Bakelite. Steel – Types of Steel, chemical composition – applications of alloy steels Cement: Portland cement, constituents, Manufacture of Portland Cement, chemistry of setting and hardening of cement.
	UNIT - IV: Chemistry of Advanced Materials: Nano materials:-Introduction – Sol-gel method - Carbon nano tubes and fullerenes: Types, preparation, properties and applications. Super conductors:-Type – I, Type II – Characteristics and applications Semi conductors: - Preparation of semiconductors, working of diodes and transistors. Green synthesis:-Principles Liquid crystals:-Introduction – Types – Applications Fuel cells: - Introduction - cell representation, H2-O2fuel cell: Design and working, advantages and Limitations. Types of fuel cells: methanol-oxygen fuel cells.	UNIT - IV: Corrosion Engineering: Corrosion: Definition – theories of corrosion, dry corrosion, and electro chemical corrosion – factors affecting corrosion, nature of the metal and nature of the environment. Corrosion controlling methods: Sacrificial and Impressed current cathodic protection, Metallic coatings, anodic coatings, cathodic coating, galvanizing, and tinning, metal cladding, Electroplating –organic coatings, paints (constituents and their functions).
	UNIT - V: Water Technology Hard water:- Reasons for hardness – units of hardness - determination of hardness andalkalinity - Water for steam generation - Boiler troubles – Priming and Foaming, Scale formation, Boiler corrosion, Caustic embrittlement - Internal treatments - Softening of Hard water : Lime – Soda process, Zeolite process and numerical problems based on these processes and Ion Exchange process - Water for drinking purposes- Purification – Sterilization and disinfection : Chlorination, Break point chlorination and other methods – Reverse Osmosis and Electro Dialysis.	UNIT - V: Material Science and Engineering: Nano Materials: Introduction to Nano materials, chemical synthesis of nanomaterials: Solgel method,characterization of nanomateirals by TEM (includes basic principle of TEM), Applications of nanomaterials in wastewater treatment,lubricants, and engines NanoTubes:Carbon nano tubes- Types of CNT's-preparation methods–Arc vapourisation, Laser abiliation and chemical vapour deposition –properties and applications. Band Theory of Solids: Introduction –Explanation of conductors, semiconductors, insulators by Band Theory- Super Conductors-Types-

		Preparation-Propertiesand Applications. Appendix:Introduction to Smart Materials.

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Department of Mechanical Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**Engineering Mechanics**	**Engineering Mechanics**
Course Code	**171ES1T02**	**191ES2T04**
Syllabus	**UNIT- I:** **Introduction to Engineering Mechanics** Basic Concepts **Systems of Forces:** Coplanar Concurrent Forces & Non-Concurrent Forces – Components in Space – Resultant – Moment of Force and its Application – Couples and Resultant of Force Systems. Friction: Introduction, limiting friction and impending motion, Coulomb's laws of dry friction, coefficient of friction, cone of friction.	**UNIT- I:** **Introduction to Engineering Mechanics:** Composition and resolution of forces, parallelogram law, principle of transmissibility, types of force systems - concurrent and concurrent coplanar forces, resultant of coplanar force systems couple, moment of a force Varignon's theorem, concept of free body diagrams, concept of equilibrium of coplanar force systems.
	UNIT- II: **Equilibrium of Systems of Forces:** Free Body Diagrams, Equations of Equilibrium of Coplanar Systems, and Spatial Systems for concurrent forces. Lami's Theorem, Converse of the law of Triangle of forces, Converse of the law of polygon of forces condition of equilibrium.	**UNIT II** **Analysis of Structures:** Introduction to plane trusses, analysis of plane trusses by method of joints and method of sections. **Virtual Work:** Equilibrium of ideal systems, work done by a force, work done by a couple, principle of virtual work.
	UNIT- III: **Centroid:** Centroid of simple figures (from basic principles) – Centroid of composite figures. **Centre of Gravity:** Centre of gravity of simple body (from basic principles), Centre of gravity of composite bodies, Pappus theorems.	**UNIT III:** **Properties of Surfaces and Volumes:** Centroid and center of gravity, derivation of centroids from first moment of area, centroids of composite sections, center of gravity of common volumes - cylinder, cone, sphere, theorem of Pappus. **Moment of Inertia:** Area moment of inertia of plane and composite shapes, parallel axis theorem, perpendicular axis theorem, polar moment of inertia, mass moment of inertia of common volumes -thin plates, thin rod, cylinder, cone, sphere, rectangular prism, radius of gyration.

	UNIT- IV: **Area Moment of Inertia:** Definition – Polar Moment of Inertia, Transfer Theorem, Moment of Inertia of composite figures. **Mass Moment of Inertia:** Moment of Inertia of masses, Transfer formula for Mass Moment of Inertia, Mass Moment of inertia of composite bodies.	**UNIT IV:** **Kinematics:** Fundamentals of kinematics of motion- Rotation of a rigid body about a fixed axis, introduction to plane motion. **Kinetics:** Principles of dynamics - Newton's Laws of motion, D'Alembert's principle in rectilinear translation, Concepts of Friction
	UNIT – V: **Kinematics:** Basics of linear motion. **Kinetics:** Particle and Rigid body in translation – Central force motion – Equations of plane motion – Fixed axis rotation. **Work – Energy Method:** Equations for translation, Work-Energy Applications to particle motion, Connected system-Fixed axis rotation and plane motion. Impulse momentum method.	**UNIT V:** **Applications:** Principle of work and energy-Principle of conservation of energy, Concept of power, Conservation of linear and angular momentum, Principle of momentum and impulse, Types of impact.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**Engineering Workshop& IT Workshop**	**Basic Engineering Workshop**
Course Code	**171ES2L02**	**191ES1L02**
Syllabus	**List of Experiments:** **Carpentry:** 1. T-Lap Joint 2. Cross Lap Joint 3. Dovetail Joint 4. Mortise and Tenon Joint **Fitting:** 1. Vee Fit 2. Square Fit 3. Half Round Fit 4. Dovetail Fit **Black Smithy:** 1. Round rod to Square 2. S-Hook 3. Round Rod to Flat Ring 4. Round Rod to Square headed bolt **House Wiring:** 1. Parallel / Series Connection of three bulbs 2. Stair Case wiring 3. Florescent Lamp Fitting 4. Measurement of Earth Resistance **Tin Smithy:** 1. Taper Tray 2. Square Box without lid 3. Open Scoop 4. Funnel	**List of Experiments:** **Carpentry:** 1. Cross Lap Joint 2. Dovetail Joint 3. T - Joint **Fitting:** 1. Vee Fit 2. Square Fit **House Wiring:** 1. Parallel Connection of three bulbs 2. Series Connection of three bulbs **Tin Smithy:** 1. Taper Tray 2. Funnel 3. Plain Pipe **List of Augmented Experiments:** 1. Stair Case wiring 2. 2. Florescent Lamp Fitting
	Exercise 1: **Identification of peripherals of a computer** Block diagram of the CPU along with the configuration of the each peripheral and its functions.	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Physics Lab	Engineering Physics Lab
Course Code	171BS1L02/171BS2L02	191BS1L01
Syllabus	1. Determination of wavelength of a source-Diffraction Grating-Normal incidence..	1. Determination of Rigidity modulus of a material- Torsional Pendulum....
	2. Newton's rings – Radius of Curvature of Plano - Convex Lens	2. Determination of Young's modulus by method of single cantilever oscillations.
	3. Determination of thickness of a spacer using wedge film and parallel interference fringes	3. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum.
	4. Determination of Rigidity modulus of a material- Torsional Pendulum.	4. Verification of laws of vibrations in stretched strings – Sonometer.
	5. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum	5. Determination of spring constant of springs using coupled oscillators.
	6. Melde's experiment – Transverse and Longitudinal modes by capillary rise method.	6.Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus
	7. Verification of laws of vibrations in stretched strings – Sonometer.	7. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
	8. Determination of velocity of sound – Volume Resonator.	8. Measurement of magnetic susceptibility by Gouy's method.
	. 9. L- C- R Series Resonance Circuit.	9. Determination of ultrasonic velocity in liquid (Acoustic Grating)
	10. Study of I/V Characteristics of Semiconductor diode.	10. Determination of dielectric constant by charging and discharging method
	11. I/V characteristics of Zener diode.	11. Determination of wavelength of Laser by diffraction grating
	12. Characteristics of Thermistor – Temperature Coefficients	12. Determination of particle size using Laser
	13. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.	13. Determeination of Pressure variation using strain Gauge sensor.
	14. Energy Band gap of a Semiconductor p -	14.Determination of Moment of Inertia of a

	n junction.	Fly Wheel
	15. Hall Effect in semiconductors.	**15.Determination of Velocity of sound – Volume Resoantor**
	16. Time constant of CR circuit.	
	17. Determination of wavelength of laser source using diffraction grating.	
	18. Determination of Young's modulus by method of single cantilever oscillations	
	19. Determination of lattice constant – lattice dimensions kit.	
	20. Determination of Planck's constant using photocell.	
	21. Determination of surface tension of liquid	
	22. Polarimeter – Determination of specific rotation of sugar solution..	
	23. Single Slit – Determination of Slit width using laser or Determination of Wavelength of laser	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering /Applied Chemistry Lab	Engineering Chemistry Lab
Course Code	171BS1L01	191BS1L02/191BS2L04
Syllabus	Exercise 1: Introduction to Chemistry laboratory – Molarity, Normality, Primary, secondary standard solutions, Volumetric titrations, Quantitative analysis, Qualitative analysis, etc.	Exercise 1: Determination of Total Hardness of a water sample.
	Exercise 2: Trial experiment - Determination of HCl using standard Na_2CO_3 solution.	Exercise 2: Determination of Dissolved Oxygen in Water Sample.
	Exercise 3: Preparation of Phenol - Formaldehyde resin (Bakelite).	Exercise 3: Determination of Zinc by Complexometric method
	Exercise 4: Determination of $KMnO_4$ using standard Oxalic acid solution.	Exercise 4: P H metric titration of (i) strong acid vs. strong base.
	Exercise 5: Determination of ferrous iron using standard $K_2Cr_2O_7$ solution.	Exercise 5: Determination of Fe (II) in Mohr's salt by potentiometric method
	Exercise 6: Preparation of Bio-Diesel.	Exercise 6: Potentiometry – Titration between strong acid – strong base
	Exercise 7: Determination of temporary and permanent hardness of water using standard EDTA solution.	7: Conductometric titrations(Strong acid vs Strong base).
	Exercise 8: Determination of Copper using standard EDTA solution.	Exercise 8: Preparation of Phenol-Formaldehyde resin.
	Exercise 9: Determination of Iron by a Colorimetric method using thiocyanate as reagent.	Exercise 9: Preparation of Urea-Formaldehyde resin
	Exercise 10: Determination of pH of the given sample solution using pH meter.	Exercise 10: Preparation of bio diesel
	Exercise 11: Conduct metric titration between strong acid and strong base.	Exercise.. Exercise 11: Determination of Vitamin – C.
	Exercise 12: Conduct metric titration between strong acid and weak base.	
	Exercise 13: Potentiometric titration between strong acid and strong base.	
	Exercise 14: Potentiometric titration	

		eax V(x), xV(x)- Method of Variation of parameters, Equations reducible to constant coefficients –Cauchy-Euler equation, Legendre's equation. Application: LCR Circuit ** (SCILAB Exercise: Introduction to SCILAB commands and Solution of Initial Value Problems)
	UNIT IV: Eigen values - Eigen vectors and Quadratic forms: Eigen values - Eigen vectors– Properties of eigen values (without proof) – Cayley -Hamilton theorem (without proof) - Inverse and powers of a matrix by using Cayley - Hamilton theorem- Diagonalization- Quadratic forms- Reduction of quadratic form to canonical form using orthogonal transformation– Nature of the quadratic form. *(MATLAB Exercise: All Basic Operations on matrices are to be implemented using MATLAB including computation of rank, computation of eigen values and eigen vectors)	UNIT IV: System of linear equations, Eigen values and Eigen vectors: Definition of a Vector space, Linear dependence and independence of vectors, Rank of a matrix, Echelon form and Normal form, solving system of Homogenous and Non homogenous linear equations- Gauss Jordon elimination method, Eigen values, Eigen vectors, Properties of eigen values and eigen vectors (without proof) Applications: Free vibrations of a two mass system
	UNIT V: Partial differentiation and Partial differential equations: Homogeneous function-Euler's theorem-Total derivative-Chain rule-Taylor's and Maclaurin's series expansion of functions of two variables– Functional dependence Jacobian. Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions –solutions of first order linear (Lagrange) equation, nonlinear (standard types) equations. Applications: Maxima and Minima of functions of two variables without constraints and Lagrange's method (with constraints). *(MATLAB Exercise: To Plot graphs of various single and multivariable functions using MATLAB and analyze their maxima and minima graphically).	UNIT V: Quadratic forms: Cayley -Hamilton theorem (without proof), Inverse and powers of a matrix by using Cayley - Hamilton theorem, Diagonalization of a matrix, Quadratic forms, Reduction of quadratic form to canonical form using orthogonal transformation, Nature of the quadratic form. **(SCILAB Exercise: Basic Operations on matrices, computation of rank, computation of eigen values and eigen vectors)

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Physics	Engineering Physics
Course Code	171BS2T07	191BS1T02
Syllabus	UNIT-I: Interference: Principle of Superposition – Coherence – Interference in thinfilms (reflection geometry)—Newton's rings – construction and basic principle of Interferometer.	UNIT-I Crystal Structure: Basis and lattice – Crystal Systems – Bravais Lattice - Symmetry elements- Unit cell-packing fraction – coordination number- Miller indices – Separation between successive (h k l) planes – Bragg's law-Bragg's x-ray spectrometer. Crystal Defects:(qualitative description only) Point defects-Schottky, Frenkel defects, Line defects-Edge, screw dislocations
	UNIT-II: Diffraction: Fraunhofer diffraction at single slit - Cases of double slit, N-slits, & circular aperture, Grating equation – Rayleigh criterion of resolving power-Resolving power of a grating, Telescope and Microscopes.	UNIT-II Acoustics: Introduction – Reverberation - Reverberation time - Sabine's formula (Derivation)–absorption coefficient and its determination-factors affecting acoustics of buildings and their remedies. Ultrasonics:Production of ultrasonics by Magnetostriction and piezoelectric methods– Detection of ultrasonics - acoustic grating - Non-Destructive Testing-pulse echo system through transmission and reflection modes- Applications.
	UNIT-III: Polarization: Types of Polarization-production - Nicol Prism -Quarter wave plateand Half Wave plateworking principle of polarimeter (Sacharimeter) Lasers: Characteristics– Stimulated emission – Einstein's Transition Probabilities- Pumping schemes- Ruby laser – Helium Neon laser-CO2 Laser-Applications	UNIT-III Elasticity: Stress, strain, Hooke's law, stress-strain curve, generalized Hooke's law with and without thermal strains for isotropic materials, different types of moduli and their relations, bending of beams – Bending moment of a beam – Depression of cantilever.
	UNIT-IV: Acoustics: Reverberation time - Sabine's formula – Acoustics of concert-hall. Ultrasonics: Production - Ultrasonic	UNIT-IV Laser: Introduction to wave optics & Interferometer-Characteristics– Spontaneous and Stimulated emission of

	Exercise 2: **System Assembling and Disassembling** Disassembling the components of a PC and assemble them back to working condition. **Exercise 3:** **Installation of softwares** Installation of operating Systems: Windows, Linux along with necessary Device Drivers, Installation of application softwares and Tools. **Exercise 4:** **Troubleshooting (Demonstration)** Hardware Troubleshooting: Identification of a problem and fixing a defective PC Software Troubleshooting: Identification of a problem and fixing the PC for any software issues. **Exercise 5:** **Network Configuration and Internet** Configuring TCP/IP, proxy and firewall settings, Internet and World Wide Web- Search Engines, Types of search engines, netiquette, cyber hygiene. **Exercise 6:** **MS-Office / Open Office** a. Word - Formatting, Page Borders, Reviewing, Equations, symbols. b. Spread Sheet - organize data, usage of formula, graphs and charts. c. Power point - features of power point, guidelines for preparing an effective Presentation. d. Access- creation of database, validate data. **Exercise 7:** **LaTeX** LaTeX - basic formatting, handling equations and images.	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**Engineering Drawing**	**Engineering Graphics and Design**
Course Code	**171ES2T03**	**191ES2T02**
Syllabus	**UNIT-I:** **Introduction to Engineering Drawing:** Lettering, Dimensioning, Types of lines. **Geometrical Constructions:** Construction of regular polygons by general method and inscribing circle method. Special methods for pentagon and hexagon. **Conic Sections:** Ellipse, Parabola and Hyperbola by general method (eccentricity method) and special methods. **Scales:** Plain Scale, Diagonal Scale and Vernier Scales.	**Unit-I:** **Introduction to Engineering graphics:** Principles of Engineering Graphics and their significance- conventions in drawing- lettering – BIS Conventions- - Conic sections -Cycloid, epicycloids and hypocycloid-Involutes
	UNIT-II: **Orthographic Projections:** Introduction to orthographic projections, Projections of Points, Projections of Lines.	**UNIT-II:** **Projection of points, lines and planes:** Projection of points in any quadrant, lines inclined to one or both planes, finding true lengths, angle made by line. Projections of regular plane surfaces.
	UNIT-III: **Projections of Planes:** Regular planes perpendicular/parallel to one reference plane and inclined to other reference plane; inclined to both the reference planes.	**UNIT-III:** **Projections of solids:** Projections of regular solids inclined to one or both planes by rotational or auxiliary views method.
	UNIT-IV: **Projections of Solids:** Prisms, Pyramids, Cones and Cylinders with the axis parallel to both the reference planes and axis inclined to one of the reference planes.	**UNIT-IV:** **Computer Aided Drafting** **Introduction to Computer Aided Drafting:** Basic drawing and editing commands- Dimensioning principles and conventional representations, Systems of projections, Conventions and application to orthographic projections

	UNIT-V: **Isometric Projections** Isometric Scale, Isometric Projections, Conversion of Isometric views into Orthographic projections.	**UNIT-V:** **Isometric Projections:** Principles of isometric projection- Isometric scale; Isometric views: lines, planes, figures, simple and compound solids

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Management Science	Management Science
Course Code	R1631011	171HS5T05
Syllabus	UNIT I Introduction to Management: Concept –nature and importance of Management –Generic Functions of Management – Evaluation of Management thought- Theories of Motivation – Decision making process-Designing organization structure- Principles of organization – Organizational typology- International Management: Global Leadership and Organizational behavior Effectiveness(GLOBE) structure	UNIT 1 Introduction to Management: Concept nature and importance of Management, Generic Functions of Management, and Evaluation of Management thought, Theories of Motivation, Decision making process, Designing organization structure, Principles of organization & Organizational typology.
	UNIT II Operations Management: Principles and Types of Management – Work study- Statistical Quality Control- Control charts (P-chart, R-chart, and C-chart) Simple problems- Material Management: Need for Inventory control- EOQ, ABC analysis (simple problems) and Types of ABC analysis (HML, SDE, VED, and FSN analysis).	UNIT 2 Operations Management :Principles and Types of Management, Work study, Statistical Quality Control, Control charts (P-chart, R-chart, and C-chart) Simple problems, Material Management: Need for Inventory control, EOQ, ABC analysis (simple problems) and Types of ABC analysis (HML, SDE, VED, and FSN analysis), Justin- Time(JIT) system, Total Quality Management(TQM), Six sigma, Supply chain management
	UNIT III Functional Management: Concept of HRM, HRD and PMIR- Functions of HR ManagerWage payment plans(Simple Problems) – Job Evaluation and Merit Rating - Marketing Management- Functions of Marketing – Marketing strategies based on product Life Cycle, Channels of distributions. Operationlizing	UNIT 3 Functional Management :Concept of HRM, HRD and PMIR, Functions of HR Manager, Wage payment plans(Simple Problems),Job Evaluation and Merit Rating,Marketing Management, Functions of Marketing, Strategies based on product Life Cycle, Channels of distributions.

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	change through performance management.	
	UNIT IV Project Management: (PERT/CPM): Development of Network – Difference between PERT and CPM Identifying Critical Path- Probability- Project Crashing (Simple Problems)	UNIT 4 Project Management: Development of Network, Difference between PERT and CPM, Identifying Critical Path, Probability, Project Crashing (Simple Problems)
	UNIT V Strategic Management: Vision, Mission, Goals, Strategy – Elements of Corporate Planning Process – Environmental Scanning – SWOT analysis- Steps in Strategy Formulation and Implementation, Generic Strategy Alternatives. Global strategies, theories of Multinational Companies	UNIT 5 Strategic Management :Vision, Mission, Goals, Strategy, Elements of Corporate Planning Process, Environmental Scanning ,SWOT analysis, Steps in Strategy Formulation and Implementation, Generic Strategy Alternatives, Basic concepts of MIS, ERP, Capability Maturity Model(CMM) Levels, Balanced Score Card.
	UNIT VI Contemporary Management Practice: Basic concepts of MIS, MRP, Justin- Time(JIT) system, Total Quality Management(TQM), Six sigma and Capability Maturity Model(CMM) Levies, Supply Chain Management , Enterprise Resource Planning (ERP), Business Process outsourcing (BPO), Business process Re-engineering and Bench Marking, Balanced Score Card.	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Transportation Engineering - II	Transportation Engineering
Course Code	R1631015	171CE5T11
Syllabus	A.RAILWAY ENGINEERING UNIT – I Components of Railway Engineering: Permanent way components – Railway Track Gauge - Cross Section of Permanent Way - Functions of various Components like Rails, Sleepers and Ballast –Rail Fastenings – Creep of Rails- Theories related to creep – Adzing of Sleepers-Sleeper density – Rail joints.	UNIT - I Introduction to Highway Engineering: Highway Development and Planning Highway development in India – Necessity for Highway Planning – Different Road Development Plans – Classification of Roads – Road Network Patterns – Highway Alignment – Factors affecting Alignment – Engineering Surveys. Highway Geometric Design: Importance of Geometric Design – Design controls and Criteria- Highway Cross Section Elements – Sight Distance Elements – Stopping sight Distance – Overtaking Sight Distance and intermediate Sight Distance – Design of Horizontal Alignment – Design of Super elevation and Extra widening – Design of Transition Curves –Design of Vertical alignment-Gradients – Vertical curves.
	UNIT – II Geometric Design of Railway Track: Alignment – Engineering Surveys - Gradients-Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve – safe speed on curves – Transition curve – Compound curves – Reverse curves – Extra clearance on curves – widening of gauge on curves – vertical curves – cheek rails on curves	UNIT - II Traffic Engineering: Basic parameters of traffic –Volume –Speed and density –Traffic volume studies – Data collection and presentation –Speed studies – Data collection and presentation – Parking studies and parking characteristics. road traffic signs –Types and specifications –Road markings –Need for road markings –Types of road markings –Design of traffic signals – Webster method –IRC method

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	UNIT – III Turnouts & Controllers: Track layouts – Switches – Design of Tongue Rails – Crossings – Turnouts – Layout of Turnout – Double Turnout – Diamond crossing – Scissors crossing. Signal Objectives – Classification – Fixed signals – Stop signals – Signalling systems – Mechanical signalling system – Electrical signalling system – System for Controlling Train Movement – Interlocking – Modern signalling Installations.	UNIT – III Intersection Design: Types of intersections –Conflicts at intersections –Types of at-grade intersections channelization – Objectives –Traffic islands and design criteria –Types of grades – Separated intersections – Rotary intersection –Concept of rotary intersection and design criteria- Advantages and disadvantages of rotary intersection.
	B.AIRPORT ENGINEERING UNIT – IV Airport Planning & Design: Airport Master plan – Airport site selection – Air craft characteristics – Zoning laws – Airport classification – Runway orientation – Wind rose diagram – Runway length – Taxiway design – Terminal area and Airport layout – Visual aids and Air traffic control	UNIT - IV Design of Pavements: Types of pavements – Functions and requirements of different components of pavements - Design Factors. Flexible Pavements: Design factors – Flexible Pavement Design Methods – CBR method – IRC method – Burmister method – Mechanistic method – IRC Method for Low volume Flexible pavements. Rigid Pavements: Design Considerations –Wheel load stresses – Temperature stresses – Frictional stresses – Combination of stresses – Design of slabs – Design of Joints – IRC method – Rigid pavements for low volume roads – Continuously Reinforced Cement Concrete Pavements – Roller Compacted Concrete Pavements
	UNIT – V Runway Design: Various Design factors – Design methods for Flexible pavements – Design methods for Rigid pavements – LCN system of Pavement Design – Airfield Pavement Failures – Maintenance and Rehabilitation of Airfield pavements – Evaluation & Strengthening of Airfield pavements – Airport Drainage – Design of surface and subsurface drainage.	UNIT - V Railway Engineering: Permanent way components –Cross section of permanent way –functions of various components like rails –Sleepers and ballast –Rail fastenings – Creep of rails – Theories related to creep – Adzing of sleepers –Sleeper density. gradients –Grade compensation –Cant and negative super elevation –Cantdeficiency. Airport Engineering: Factors affecting selection of site for airport –Aircraft characteristics –Geometric design of runway –Computation of runway length –Correction for runway length – Orientation of runway –Wind rose diagram.
	C.DOCKS & HARBOURS UNIT – VI Planning, Layout, Construction & Maintenance Of Docks & Harbors: Classification of ports – Requirement	

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	of a good port – classification of Harbors – Docks - Dry & wet docks – Transition sheds and workhouses – Layouts; Quays – construction of Quay walls – Wharves – Jetties – Tides - Tidal data and Analysis – Break waters – Dredging – Maintenance of Ports and Harbors – Navigational aids.	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	**Pre-Revision**	**Post-Revision**
Course Title	Construction Technology and Management	CONSTRUCTION TECHNOLOGY AND MANAGEMENT
Course Code	RT41013	171CE5E01
	UNIT- I Construction project management and its relevance – qualities of a project manager – project planning – coordination – scheduling - monitoring – bar charts – milestone charts – critical Path Method – Applications	UNIT –I: Introduction: Steps involved in planning - Objectives – Principles – Advantages - Limitations - Stages of planning - Scheduling - Preparation of construction schedules -Methods of scheduling - Bar charts -Mile stone charts – Controlling - Project work break down.
	UNIT -II Project Evaluation and Review Technique – cost analysis - updating – crashing for optimum cost – crashing for optimum resources – allocation of resources	UNIT – II: Project Management Through Networks: Objectives of network techniques - Fundamentals of network analysis - Events; Activities- Dummies - Types of networks - Choice of network type - Advantages of network techniques over conventional techniques. Program

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Syllabus		Evaluation and Review Technique (PERT): Introduction - Earliest expected time - Latest allowable occurrence time - Slack - Critical path - Probability of completion time for a project.
	UNIT- III Construction equipment – economical considerations – earthwork equipment – Trucks and handling equipment – rear dump trucks – capacities of trucks and handling equipment – calculation of truck production – compaction equipment – types of compaction rollers	UNIT – III: Critical Path Method (CPM): Introduction-Difference between CPM and PERT-Time estimates- Earliest event time-Latest event time- Float- Critical activities and critical path. Cost Control: Direct cost-indirect cost-total project cost- Optimization of cost through networks-Steps involved In optimization of cost- allocation of resources
	UNIT –IV Hoisting and earthwork equipment – hoists – cranes – tractors - bulldozers – graders – scrapers– draglines - clamshell buckets	UNIT – IV: Construction Equipment: Classification of construction equipment-Earth moving equipmentcapacities of trucks and handling equipment-calculation of truck production- Excavation equipment-Hauling equipment- Earth compaction equipment-Hoisting equipment.
	UNIT -V Concreting equipment – crushers – jaw crushers – gyratory crushers – impact crushers – selection of crushing equipment - screening of aggregate – concrete mixers – mixing and placing of concrete – consolidating and finishing	UNIT – V: Aggregate & Concreting Equipment: Crushers & Types of crushers-selection of crushing equipment- concrete mixers- mixing and placing of concrete-consolidating and finishingPiling & Pile driving equipment - form work- fabrication and erection
	UNIT –VI Construction methods – earthwork – piling – placing of concrete – form work – fabrication and erection – quality control and safety engineering	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	ENGINEERING GEOLOGY LAB	Engineering Geology Lab
Course Code	R1631017	171CE5L04
	LIST OF EXPERIMENTS 1. Physical properties of minerals: Mega-scopic identification of a. Rock forming minerals – Quartz group, Feldspar group, Garnet group, Mica group & Talc, Chlorite, Olivine, Kyanite, Asbestos, Tourmelene, Calcite, Gypsum, etc… b. b) Ore forming minerals – Magnetite, Hematite, Pyrite, Pyralusite, Graphite, Chromite, etc… 2. Megascopic description and	List of Experiments: 1. To identify the physical properties of Rock forming minerals – Quartz group, Feldspar group, Garnet group, Mica group & Talc, Chlorite 2. To identify the physical properties of Olivine, Kyanite, Asbestos, Tourmaline, Calcite, Gypsum 3. To identify the physical properties of Ore forming minerals – Magnetite, Hematite, Pyrite, Pyralusite, Graphite, Chromite 4. To identify the physical properties of Igneous rocks – Types of Granite, Pegmatite, Gabbro, Dolerite, Syenite,

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Syllabus	identification of rocks. a) Igneous rocks – Types of Granite, Pegmatite, Gabbro, Dolerite, Syenite, Granite Poryphery, Basalt, etc… b) Sedimentary rocks – Sand stone, Ferrugineous sand stone, Lime stone, Shale, Laterite, Conglamorate, etc… c) Metamorphic rocks – Biotite – Granite Gneiss, Slate, Muscovite & Biotiteschist, Marble, Khondalite, etc… 3. Interpretation and drawing of sections for geological maps showing tilted beds, faults, unconformities etc. 4. Simple Structural Geology problems. 5. Bore hole data. 6. Strength of the rock using laboratory tests. 7. Field work – To identify Minerals, Rocks, Geomorphology& Structural Geology.	Granite Poryphery, Basalt. 5. To identify the physical properties of Sedimentary rocks – Sand stone, Ferruginous sand stone, Lime stone, Shale, Laterite, Conglomerate 6. To identify the physical properties of Metamorphic rocks Granite Gneiss, Slate, Muscovite & Biotite schist, Marble, Khondalite 7. Interpretation of topographical maps and satellite imagery 8. Drawing of cross sections of formations from geological maps showing tilted beds, faults, unconformities 9. Simple Structural Geology problems 10. Field work – To identify Mineral and Rock deposits, Geomorphology& Structural Geology of an area List of Augmented Experiments: (Any two of the following experiments can be performed) 11. Electrical resistivity and seismic survey methods 12. Stratigraphy of India and Andhra Pradesh and borehole data 13. Finding Strike and Dip of geological formations using Brunton Compass

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	**Pre-Revision**	**Post-Revision**
Course Title	Transportation Engineering Lab	Transportation Engineering Lab
Course Code	R1631018	171CE5L05
	I. ROAD AGGREGATES: 1. Aggregate Crushing value 2. Aggregate Impact Test. 3. Specific Gravity and Water Absorption. 4. Attrition Test 5. Abrasion Test. 6. Shape tests II. BITUMINOUS	List of Experiments: 1. To determine the Aggregate crushing value of aggregates 2. To determine the Aggregate impact value of aggregates 3. To determine the Flakiness index and elongation index of aggregates 4. To determine the Deval's

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Syllabus	MATERIALS: 1. Penetration Test. 2. Ductility Test. 3. Softening Point Test. 4. Flash and fire point tests. 5. Stripping Test 6. Viscosity Test. BITUMINOUS MIX: 1. Marshall Stability test. IV. TRAFFIC SURVEYS: 1. Traffic volume study at mid blocks. 2. Traffic Volume Studies (Turning Movements) at intersection. 3. Spot speed studies. 4. Parking study. V. DESIGN & DRAWING: 1. Earthwork calculations for road works. 2. Drawing of road cross sections. 3. Rotors intersection design.	abrasion value of aggregates 5. To determine the Los angles abrasion value of aggregates. 6. To determine the Specific gravity & Water absorption of aggregates. 7. To determine the Penetration value and Softening point of bitumen. 8. To determine the Flash & fire point of bitumen. 9. To determine the Viscosity of bitumen. 10. To determine the Ductility value of bitumen List of Augmented Experiments: (Any two of the following experiments can be performed) 11. To determine the spot speed 12. Marshall mix design 13. CBR test for soils

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Geotechnical Engineering - I	Geotechnical Engineering - I
Course Code	R1632012	171CE6T15
	UNIT – I Introduction: Soil formation – soil structure and clay mineralogy – Adsorbed water – Mass- volume	UNIT-I Introduction & Index properties of soils: Soil formation – soil structure and clay mineralogy – Adsorbed water –

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Syllabus	relationship –Relative density , Mechanism of compaction – factors affecting – effects of compaction on soil properties - compaction control.	Mass–volume relationship –Laboratory tests for soil properties –Relative density. Grain size analysis – Sieve and Hydrometer methods – consistency limits and indices – Various Types of soil Classifications – Unified soil classification and I.S. Soil classification – Engineering properties of soils-Definitions.
	UNIT – II Index Properties Of Soils: Grain size analysis – Sieve and Hydrometer methods – consistency limits and indices – Various Types of soil Classifications – Unified soil classification and I.S. Soil classification.	UNIT-II Permeability: Soil water – capillary rise – flow of water through soils – Darcy's law– permeability – Factors affecting –laboratory determination of coefficient of permeability –Permeability of layered systems. Total, neutral and effective stresses
	UNIT –III Permeability: Soil water – capillary rise – One dimensioned flow of water through soils – Darcy's law-permeability – Factors affecting – laboratory determination of coefficient of permeability –Permeability of layered systems. Total, neutral and effective stresses –quick sand condition – 2-D flow and Laplace's equation - Seepage through soils – Flow nets: Characteristics and Uses.	UNIT-III Seepage through Soils: Seepage through soils –Flow nets: Characteristics and Uses– quick sand condition. Stress Distribution in Soils: Stresses induced by applied loads - Boussinesq's and Westergaa rd's theories for point loads and areas of different shapes–Newmark's influence chart
	UNIT – IV Stress Distribution In Soils: Stresses induced by applied loads - Boussinesq's and Westergaard's theories for point loads and areas of different shapes–Newmark's influence chart – 2:1 stress distribution method.	UNIT-IV Compaction: Mechanism of compaction – Factors affecting compaction– Effects of compaction on soil properties – Field compaction Equipment – compaction control. Consolidation: Stress history of soil – Compressibility of soils– Spring Analogy –Terzaghi's one dimensional consolidation theory–Time rate of consolidation and degree of consolidation – Determination of coefficient of consolidation –Total settlement
	UNIT – V Consolidation: Compressibility of soils – e-p and e-log p curves – Stress history – Concept of consolidation - Spring	UNIT-V Shear strength of soils: Basic mechanism of shear strength – Mohr – Coulomb failure theories – Shear strength determination – Strength tests

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	Analogy - Terzaghi's theory of one-dimensional Consolidation – Time rate of consolidation and degree of consolidation – Determination of coefficient of consolidation (cv) - Over consolidated and normally consolidated clays.	based on drainage conditions – Shear strength of sands – Critical Void Ratio – Stress-Strain behaviour of clays – Liquefaction.
.	UNIT – VI Shear Strength of Soils: Basic mechanism of shear strength - Mohr – Coulomb Failure theories – Stress-Strain behavior of Sands - Critical Void Ratio – Stress-Strain behavior of clays – Shear Strength determination- various drainage conditions.	.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision

Course Title	Geotechnical Engineering Lab	GEOTECHNICAL ENGINEERING LAB
Course Code	R163201C	171CE6L06
Syllabus	LIST OF EXPERIMENTS 1. Specific gravity, G 2. Atterberg's Limits. 3. Field density-Core cutter and Sand replacement methods 4. Grain size analysis by sieving 5. Hydrometer Analysis Test 6. Permeability of soil - Constant and Variable head tests 7. Compaction test 8. Consolidation test (to be demonstrated) 9. Direct Shear test 10. Triaxial Compression test (UU Test) 11. Unconfined Compression test 12. Vane Shear test 13. Differential free swell (DFS) 14. CBR Test At least Ten experiments shall be conducted.	List of Experiments: 1. To determine the water content by oven drying method and specific gravity of soil by usingpycnometer. 2. To determine the Atterberglimits. 3. To determine the Gradation analysis by Sieveanalysis. 4. To determine the field unit weight by a) Core cutter method b) Sand Replacement method. 5. To determine the permeability by Constant headmethod. 6. To determine the permeability by Variable headmethod. 7. To determine the maximum dry density by standard proctor test. 8. To determine the California bearing ratio by CBRtest. 9. To determine the shear parameters by Direct Shear test and Vane ShearTest. 10. To determine the shear parameters by Triaxial Compressiontest. List of Augmented Experiments: (Any two experiments to be conducted from the following) 11. To determine the Gradation analysis by Hydrometer analysis. 12. To determine the maximum dry density by Modified proctor test. 13. To determine the Consolidation of the soil.

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Program Name : B.Tech. in Electrical and Electronics Engineering

Syllabus Revision for the Academic Year 2019-2020				
S.No	**Semester**	**Course Code**	**Course Name**	**% of content revised for the existing year**
1	I	191HS1T01	Communicative English	90
2	I	191BS1T01	Differential Equations and Linear Algebra	20
3	I	191BS1T04	Engineering Chemistry	80
4	I	191ES1T01	Programming for Problem Solving Using C	10
5	I	191HS1L01	Communicative English Lab-I	5
6	I	191BS1L02	Engineering Chemistry Lab	60
7	I	191ES1L01	Programming for Problem Solving Using C Lab	10
8	I	191ES1L02	Basic Engineering workshop	50
9	I	191MC1A01	Environmental Science	25
10	I	191MC1A02	Constitution of India	100
11	II	191BS2T05	Partial Differential Equations and Vector Calculus	40
12	II	191BS2T07	Applied Physics	40
13	II	191ES2T05	Data Structures Through C	100
14	II	191EE2T01	Electrical Circuits Analysis -I	15
15	II	191ES2T06	Basic Civil and MechanicalEngineering	100
16	II	191HS2L02	Communicative English Lab-II	0
17	II	191BS2L05	Applied Physics Lab	40
18	II	191ES2L05	Basic Civil and Mechanical Engineering Lab	100

S.No	Semester	Course Code	Course Name	% of content revised for the existing year
19	II	191ES2L06	Electrical Engineering Workshop	100
20	II	191PR2P01	Engineering Exploration Project	100
21	III	171EE3T02	Electrical Circuit Analysis - II	0
22	III	171EE3T03	Electrical Machines – I	0
23	III	171EE3T04	Basic Electronics Devices and Circuits	0
24	III	171EE3T05	Electromagnetic Fields	0
25	III	171ES3T10	Thermal and Hydro Prime Movers	0
26	III	171HS3T04	Managerial Economics and Financial Analysis	0
27	III	171ES3L04	Thermal and Hydro Prime Movers Lab	0
28	III	171EE3L01	Electrical Circuits Lab	0
29	III	171HS3A09	Professional Ethics and Human Values	0
30	III	171HS3A10	Employability Skills - I	0
31	IV	171EE4T06	Electrical Measurements	0
32	IV	171EE4T07	Electrical Machines - II	0
33	IV	171ES4T24	Digital Circuits and Logic Design	0
34	IV	171EE4T08	Control Systems	0
35	IV	171EE4T09	Power Systems – I	0
36	IV	171HS4T05	Management Science	0
37	IV	171EE4L02	Electronic Devices and Circuits Lab	0
38	IV	171EE4L03	Electrical Machines - I Lab	0
39	IV	171HS4A11	Employability Skills - II	0
40	V	171EE5T10	Power Systems – II	10

S.No	Semester	Course Code	Course Name	% of content revised for the existing year
41	V	171EE5T11	Power Electronics	15
42	V	171EE5T12	Pulse and Digital Circuits	15
43	V	171EE5T13	Signals and Systems	25
44	V	171EE5E01	Renewable Energy Sources	10
45	V	171EE5E02	Modeling and Analysis of Electrical Machines	0
46	V	171EE5E03	Electrical Safety	100
47	V	171HS5T08	Intellectual Property Rights and Patents	5
48	V	171HS5T06	Employability Skills - III	100
49	V	171EE5L04	Electrical Measurements Lab	0
50	V	171EE5L05	Electrical Machines - II Lab	10
51	V	171EE5L06	Control Systems Lab	20
52	V	171EE5S01	MOOCs - I	100
53	VI	171EE6T14	Power Electronic Controllers andDrives	5
54	VI	171EE6T15	Power System Analysis	10
55	VI	171EE6T16	Micro Processor and Micro Controllers	30
56	VI	171EE6T17	Data Structures	15
57	VI	171EE6E04	Computer Architecture	100
58	VI	171EE6E05	Electrical Distribution Systems	0
59	VI	171EE6E06	Distributed Generation and Microgrid	100
60	VI	171EE6E07	Advanced Control Systems	0
61	VI	171EE6E08	PLC and Applications	0
62	VI	171EE6E09	Instrumentation	0
63	VI	171EE6E10	OOPs through JAVA	0

S.No	Semester	Course Code	Course Name	% of content revised for the existing year
64	VI	171HS6T07	Employability Skills - IV	100
65	VI	171EE6L07	Data Structures Lab	0
66	VI	171EE6L08	Power Electronics Lab	20
67	VI	171EE6S02	MOOCs - II	100
68	VII	R1641021	Utilization of Electrical Energy	0
69	VII	R1641022	Linear IC Applications	0
70	VII	R1641023	Power System Operation & Control	15
71	VII	R1641024	Switchgear and Protection	0
72	VII	R164102A	Electrical Machine Modeling and Analysis	100
73	VII	R164102B	Advanced Control Systems	0
74	VII	R164102C	Programmable Logic Controllers and Applications	100
75	VII	R164102D	Instrumentation	0
76	VII	R164102E	Optimization Techniques	30
77	VII	R164102F	Electric Power Quality	0
78	VII	R164102G	Special Electrical Machines	0
79	VII	R1641027	Electrical Simulation Laboratory	0
80	VII	R1641028	Power Systems lab	0
81	VIII	R1642021	Digital Control Systems	0
82	VIII	R1642022	HVDC Transmission	100
83	VIII	R1642023	Electrical Distribution Systems	0
84	VIII	R164202A	High Voltage Engineering	0
85	VIII	R164202B	Flexible Alternating Current Transmission Systems	0
86	VIII	R164202C	Power System Reforms	0

S.No	Semester	Course Code	Course Name	% of content revised for the existing year
87	VIII	R1642025	Seminar	0
88	VIII	R1642026	Project	0
Total number of courses in the academic year 2019-2020				= 88
Number of courses having revision in syllabus content >/= 20% in the academic year 2019-2020				= 30
Percentage of syllabus revision carried out in the academic year 2019-2020 = (30/88)*100				= 34.09%

Program Coordinator

Head of the Department

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PROGRAM STRUCTURE

I SEMESTER

Course Code	Name of the Course	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	Total Hours	
191HS1T01	Communicative English	HSMC	3	0	0	3	3
191BS1T01	Differential Equations and Linear Algebra	BSC	3	0	0	3	3
191BS1T04	Engineering Chemistry	BSC	3	0	0	3	3
191ES1T01	Programming for Problem Solving Using C	ESC	3	0	0	3	3
191HS1L01	Communicative English Lab-I	HSMC	0	0	3	3	1.5
191BS1L02	Engineering Chemistry Lab	BSC	0	0	3	3	1.5
191ES1L01	Programming for Problem Solving Using C Lab	ESC	0	0	3	3	1.5
191ES1L02	Basic Engineering workshop	ESC	0	0	3	3	1.5
191MC1A01	Environmental Science	MC	2	0	0	2	0
191MC1A02	Constitution of India	MC	2	0	0	2	0
		TOTAL	**16**	**0**	**12**	**28**	**18**

II SEMESTER

Course Code	Name of the Course	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	Total Hours	
191BS2T05	Partial Differential Equations and Vector Calculus	BSC	3	0	0	3	3
191BS2T07	Applied Physics	BSC	3	0	0	3	3
191ES2T05	Data Structures Through C	ESC	2	1	0	3	3
191EE2T01	Electrical Circuits Analysis -I	PCC	3	0	0	3	3
191ES2T06	Basic Civil and Mechanical Engineering	ESC	3	0	0	3	3
191HS2L02	Communicative English Lab-II	HSMC	0	0	2	2	1
191BS2L05	Applied Physics Lab	BSC	0	0	3	3	1.5
191ES2L05	Basic Civil and Mechanical Engineering Lab	ESC	0	0	3	3	1.5
191ES2L06	Electrical Engineering Workshop	ESC	0	0	2	2	1
191PR2P01	Engineering Exploration Project	PROJ	0	0	2	2	1
		TOTAL	**14**	**1**	**12**	**27**	**21**

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III SEMESTER

Course Code	Name of the Course	Category	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	Total Hours	
171EE3T02	Electrical Circuit Analysis - II	PC	3	1	0	4	3
171EE3T03	Electrical Machines – I	PC	3	1	0	4	3
171EE3T04	Basic Electronics Devices and Circuits	PC	3	1	0	4	3
171EE3T05	Electromagnetic Fields	PC	3	1	0	4	3
171ES3T10	Thermal and Hydro Prime Movers	ES	3	1	0	4	3
171HS3T04	Managerial Economics and Financial Analysis	HSS	3	1	0	4	3
171ES3L04	Thermal and Hydro Prime Movers Lab	ES	0	0	3	3	2
171EE3L01	Electrical Circuits Lab	PC	0	0	3	3	2
171HS3A09	Professional Ethics and Human Values	HSS	2	0	0	2	0
171HS3A10	Employability Skills - I	HSS	0	0	2	2	0
		TOTAL	**20**	**6**	**8**	**34**	**22**

IV SEMESTER

Course Code	Name of the Course	Category	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	Total Hours	
171EE4T06	Electrical Measurements	PC	3	1	0	4	3
171EE4T07	Electrical Machines - II	PC	3	1	0	4	3
171ES4T24	Digital Circuits and Logic Design	ES	3	1	0	4	3
171EE4T08	Control Systems	PC	3	1	0	4	3
171EE4T09	Power Systems – I	PC	3	1	0	4	3
171HS4T05	Management Science	HSS	3	1	0	4	3
171EE4L02	Electronic Devices and Circuits Lab	PC	0	0	3	3	2
171EE4L03	Electrical Machines - I Lab	PC	0	0	3	3	2
171HS4A11	Employability Skills - II	HSS	0	0	2	2	0
		TOTAL	**18**	**6**	**8**	**32**	**22**

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V SEMESTER

Course Code	Name of the Course	Category	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	Total Hours	
171EE5T10	Power Systems – II	PC	3	1	0	4	3
171EE5T11	Power Electronics	PC	3	1	0	4	3
171EE5T12	Pulse and Digital Circuits	PC	3	1	0	4	3
171EE5T13	Signals and Systems	PC	3	1	0	4	3
---	**Professional Elective - I**	PE	3	1	0	4	3
171HS5T08	Intellectual Property Rights and Patents	HSS	2	0	0	2	1
171HS5T06	Employability Skills - III	HSS	0	0	2	2	1
171EE5L04	Electrical Measurements Lab	PC	0	0	3	3	2
171EE5L05	Electrical Machines - II Lab	PC	0	0	3	3	2
171EE5L06	Control Systems Lab	PC	0	0	3	3	2
171EE5S01	MOOCs - I	SS	0	0	0	0	0
		TOTAL	**17**	**5**	**11**	**33**	**23**

VI SEMESTER

Course Code	Name of the Course	Category	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	Total Hours	
171EE6T14	Power Electronic Controllers and Drives	PC	3	1	0	4	3
171EE6T15	Power System Analysis	PC	3	1	0	4	3
171EE6T16	Micro Processor and Micro Controllers	PC	3	1	0	4	3
171EE6T17	Data Structures	PC	3	1	0	4	3
---	**Professional Elective - II**	PE	3	1	0	4	3
---	**Professional Elective - III**	PE	3	1	0	4	3
171HS6T07	Employability Skills - IV	HSS	0	0	2	2	1
171EE6L07	Data Structures Lab	PC	0	0	3	3	2
171EE6L08	Power Electronics Lab	PC	0	0	3	3	2
171EE6S02	MOOCs - II	SS	0	0	0	0	0
		TOTAL	**18**	**6**	**8**	**32**	**23**

MOOCs – Massive Open Online Courses

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Professional Elective - I (V Semester)

S.No	Course Code	Name of the Course
1	171EE5E01	Renewable Energy Sources
2	171EE5E02	Modeling and Analysis of Electrical Machines
3	171EE5E03	Electrical Safety

Professional Elective – II (VI Semester)

S.No	Course Code	Name of the Course
1	171EE6E04	Computer Architecture
2	171EE6E05	Electrical Distribution Systems
3	171EE6E06	Distributed Generation and Microgrid

Professional Elective – III (VI Semester)

S.No	Course Code	Name of the Course
1	171EE6E07	Advanced Control Systems
2	171EE6E08	PLC and Applications
3	171EE6E09	Instrumentation
4	171EE6E10	OOPs through JAVA

Professional Elective – IV (VII Semester)

S.No	Course Code	Name of the Course
1	171EE7E11	Optimization Techniques
2	171EE7E12	Digital Signal Processing
3	171EE7E13	Special Electrical Machines

Professional Elective – V (VII Semester)

S.No	Course Code	Name of the Course
1	171EE7E14	High Voltage Engineering
2	171EE7E15	Electric Power Quality
3	171EE7E16	EHVAC Transmission

Professional Elective – VI (VIII Semester)

S.No	Course Code	Name of the Course
1	171EE8E17	HVDC Transmission
2	171EE8E18	Flexible AC Transmission Systems
3	171EE8E19	Power System Reforms
4	171EE8E20	Digital Control Systems

Open Elective (VIII Semester)

S.No	CourseCode	Name of the Course
1	171EE8O01	Energy Audit, Conservation and Management
2	171EE8O02	VLSI Design
3	171EE8O03	Unix and Shell Programming
4	171EE8O04	Neural Networks And Fuzzy Logic
5	171EE8O05	Robotics
6	171EE8O06	Vehicular Electric Power Systems
7	171EE8O07	Internet of Things
8	171EE8O08	Cyber Security

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IV Year – I Semester

S. No	Subjects	L	T	P	Credits
1	Utilization of Electrical Energy	4	--	--	3
2	Linear IC Applications	4	--	--	3
3	Power System Operation & Control	4	--	--	3
4	Switchgear and Protection	4	--	--	3
5	**Elective – I:** 1. Electrical Machine Modeling and Analysis 2. Advanced Control Systems 3. Programmable Logic Controllers& Applications 4. Instrumentation	4	--	--	3
6	**Elective – II:** 1. Optimization Techniques 2. Electric Power Quality 3. Special Electrical Machines	4	--	--	3
7	Electrical Simulation Laboratory	--	--	2	2
8	Power Systems & Simulation Laboratory	--	--	2	2
	Total Credits				**22**

IV Year - II Semester

S. No	Subjects	L	T	P	Credits
1	Digital Control Systems	4	--	--	3
2	HVDC Transmission	4	--	--	3
3	Electrical Distribution Systems	4	--	--	3
4	**Elective – III:** 1. High Voltage Engineering 2. Flexible Alternating Current Transmission Systems 3. Power System Reforms	4	--	--	3
5	Seminar	--	3	--	2
6	Project	--	--	--	10
	Total Credits				**24**

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COMMUNICATIVE ENGLISH

(Common to all branches)

I Semester **L T P C**

Course Code:191HS1T01 **3 0 0 3**

Introduction:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training the students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competence of the students of Engineering. As far as the detailed textbooks are concerned, the focus should be on the skills of Listening, Speaking, Reading and Writing. The non-detailed textbooks are meant for extensive reading both to instruct and delight. Hence the focus in the syllabus is primarily on the development of communicative skills and fostering of ideas about the essence of English Communication.

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1: Identify the ways to overcome fear and use of words paradoxically, interpret the developing conditions and the core competences of the state to prioritize education system.

CO 2: Explain about world's most precious natural resources.

CO 3: Explain about importance of unity to aboilish war.

CO 4: Respond well to the changing situations in life with independent knowledge for better decision making.

CO 5: Demonstrate writing and concepts of effective writing skills.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12
CO1	-	-	-	-	-	-	1	-	-	3	-	-
CO2	-	-	-	-	-	-	1	-	-	3	-	-
CO3	-	-	-	-	-	-	-	-	-	3	-	-
CO4	-	-	-	-	-	-	-	-	2	3	-	2
CO5	-	-	-	-	-	-	-	-	1	3	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

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Methodology:

1. The class is to be learner-centered where the learners are to read the texts to get a comprehensive idea of those texts on their own with the help of the peer group and theteacher.
2. Integrated skill development methodology has to be adopted with focus on individual language skills as per thetasks/exercise.
3. The tasks/exercises at the end of each unit should be completed by the learners only and the teacher intervention is permitted as per the complexity of the task/exercise.
4. The teacher is expected to use supplementary material wherever necessary and generate activities/tasks as per the requirement.
5. The teacher is permitted to use lecture method when a completely new concept is introduced in the class.

Recommended Topics:

UNIT-I:

1. An Astrologers' Day - R.K. Narayan (Detailed)
2. Bade Bhai Saab - Munshi Prachanda (Non-Detail)

UNIT-II:

1. Building A New State - A. P. J. Abdul Kalam (Detailed)
2. Morning Bells- Jayashree Mohan Raj (Non-Detail)

UNIT-III:

1. Water:The Elixer of Life- C. V. Raman (Detailed)
2. The Power of Plate of Rice- Ifeoma Okoye (Non-Detail)

UNIT-IV:

1. The Woodrose-Abburi Chaya Devi (Detailed)
2. The Cop and The Anthem- O. Henry (Non-Detail)

UNIT-V:

1. Progress- St. John Ervine (Detailed)
2. Dial 000- Barry Rosenberg (Non-Detail)

Textbooks:

Detailed Textbook: 'Using English' by Orient Black Swan.
Non-Detailed Textbook: 'Life, Language and Culture - Explorations' by Cengage.

Reference Books:

1. Objective English, Pearson Publications.
2. Effective English Communication, Tata Mc Graw-Hill Publishing.
3. Effective Technical English, Scitech.

Weblinks:

1. http://sittingbee.com/an-astrologers-day-r-k-narayan/
2. http://bbrenglishforall.blogspot.com/2014/01/building-new-state-study-material.html
3. https://www.literatureworms.com/2012/10/water-elixir-of-life-by-sircvraman.html
4. http://macon.hol.es/woodrose-abburi-chaya-devi.pdf
5. https://ardhendude.blogspot.com/2013/07/analysis-of-progress-by-st-john-ervine.html

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DIFFERENTIAL EQUATIONS AND LINEAR ALGEBRA

(Common to all branches)

I Semester
Course Code: 191BS1T01

L	T	P	C
3	0	0	3

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1: Apply the concepts of Mean Value theorem, Partial Differentiation and identify the maxima and minima of a given function.
CO 2: Solve the linear differential equations and model various situations involving differential equations of first order.
CO 3: Solve linear differential equations of higher order and model various situations involving second order differential equations.
CO 4: Calculate Rank of a matrix and solve the system of Linear equations and find the Eigen values and Eigen vectors.
CO 5: Compute various powers of a matrix and identify the nature of the quadratic form.

Mapping of Course Outcomes with Program Outcomes:

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO 1	3	2	-	-	-	-	-	-	-	-	-	-
CO 2	3	2	-	-	-	-	-	-	-	-	-	-
CO 3	3	2	-	-	-	-	-	-	-	-	-	-
CO 4	3	2	-	-	-	-	-	-	-	-	-	-
CO 5	3	2	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes:

CO / PSO	PSO1	PSO2
CO 1	-	-
CO 2	-	-
CO 3	-	-
CO 4	-	-
CO 5	-	-

UNIT I:

Differential Calculus:
Rolle's theorem, Lagrange's theorem, Cauchy Mean Value theorem, Taylor's and Maclaurin's theorems (All theorems Without Proof)
Partial Differentiation: Euler's theorem (without proof), Total derivative, Chain rule, Taylor's and Maclaurin's series expansion of functions of two variables, Jacobean, Functional dependence.
Applications:
Maxima and Minima of functions of several variables without constraints and with constraints (Lagrange's method).
**(SCILAB Exercise: Plot graphs of various single and multivariable functions).

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UNIT II:

Differential Equations of First Order:

Introduction to differential equations, linear differential equation of first order - Bernoulli differential equation - Exact differential equations- Equations reducible to exact,

Applications:

Orthogonal trajectories, Newton's Law of cooling, RL circuit.

UNIT III:

Linear Differential Equations of Second and Higher Order:

Linear differential equations of higher order with constant coefficients, Complementary function and Particular integral with RHS term of the type polynomials in x, e^{ax}, sin ax, cos ax, e^{ax} V(x), xV(x)- Method of Variation of parameters, Equations reducible to constant coefficients –Cauchy-Euler equation, Legendre's equation.

Application: LCR Circuit.

** (SCILAB Exercise: Introduction to SCILAB commands and Solution of Initial Value Problems).

UNIT IV:

System of Linear Equations, Eigen Values and Eigen Vectors:

Definition of a Vector space, Linear dependence and independence of vectors, Rank of a matrix, Echelon form and Normal form, solving system of Homogenous and Non homogenous linear equations- Gauss Jordon elimination method, Eigen values, Eigen vectors, Properties of eigen values and eigen vectors (without proof).

Applications:

Free vibrations of a two mass system.

UNIT V:

Quadratic Forms:

Cayley -Hamilton theorem (without proof), Inverse and powers of a matrix by using Cayley - Hamilton theorem, Diagonalization of a matrix, Quadratic forms, Reduction of quadratic form to canonical form using orthogonal transformation, Nature of the quadratic form.

**(SCILAB Exercise: Basic Operations on matrices, computation of rank, computation of eigen values and eigen vectors).

**Not to be examined.

Text Books:

1. Advanced Engineering Mathematics, R.K.Jain, S.R.K.Iyenkar, Alpha Science Publications.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10^{th} Edition, Wiley India.
3. B.S.Grewal, Higher Engineering Mathematics, 43^{rd} Edition, Khanna Publishers.
4. P.Sivaramakrishna Das, C.Vijayakumari, Engineering Mathematics, Pearson Publications.

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ENGINEERING CHEMISTRY

(Common to EEE& IT)

I Semester	**L T P C**
Course Code: 191BS1T04	**3 0 0 3**

Course Outcomes

At end of the Course, Student will be able to:

CO 1: Compare the quality of drinking water and problems associated with hard water.
CO 2: Explain the fundamentals and applications of Electrochemical Energy Systems.
CO 3: Explain the fundamentals and applications of Advance materials.
CO 4: Explain about renewable energy sources and their manufacturing methods
CO 5: Summarize the importance of Nano materials and Green chemistry.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-
CO4	2	-	-	-	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO/ PSO	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

UNIT- I:

Water Technology:

Introduction –Soft Water and hardness of water, types of hardness of water, degree of hardness of water, Units of hardness of water, problems on hardness, Boiler troubles -scale and sludge, Boiler corrosion, Industrial water treatment- zeolite and ion-exchange processes.

Specifications for drinking water, Bureau of Indian Standards (BIS) and World health organization(WHO) standards, - desalination of brackish water, reverse osmosis (RO) and electrodialysis.

UNIT - II:

Electrochemical Energy Systems:

Introduction-Electrochemical Cell (Galvanic cell), Electrochemical series, Applications, single electrode potential, Hydrogen and Calomel electrode, Nernst Equation for a single electrode, Concentration Cells (Electrode & Electrolyte), Construction of glass electrode.

Batteries – Classical batteries-dry/Leclanche cell, Modern batteries-zinc air, lithium Cells-Li MnO_2 cell- challenges of battery technology. Fuel cells- Introduction- classification of fuel cells – hydrogen and oxygen fuel cell, propane and oxygen fuel Cell-Merits of fuel cell.

UNIT - III:

Polymer Chemistry:

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation (Free radical mechanism for addition ploymerization)

Plastics - Thermoplastics and Thermo settings, Preparation, properties and applications of – PE, PVC, Bakelite, Teflon and Nylon-6, 6.

Elastomers–Buna-S, Buna-N–preparation, properties and applications.

Conducting polymers – polyacetylene, polyaniline – mechanism of conduction and applications.

UNIT - IV:

Energy Sources and Applications:

INTRODUCTION- sources of renewable energy –Hydro power, Biomass and Biofuels Solar energy – Introduction - Physical and Chemical properties of Silicon- Preparation of Semi conductors - Doping of Silicon- p and n type semi conductors- PV cell / solar cell- Working &Manufacturing of Photovoltaic Cells using Chemical Vapor Deposition Technique- applications of solar energy.

Fuels: Introduction- classification- liquid fuels- Refining of petroleum-cracking-Reforming-Gaseous fuels-LPG & CNG Applications.

UNIT - V:

Material Science and Engineering:

Nanomaterials: Introduction to nanomaterial: nanoparticles, nanocluster, carbon nanotube (CNT) and nanowires. Chemical synthesis of nanomaterials: sol-gel method. Characterization: Principle and applications of scanning electron microscope (SEM) and transmission electron microscope (TEM).

Nano Tubes: CARBON nano tubes- Types of CNT's-preparation methods –Arc discharge, Laser abiliation and chemical vapour deposition –properties and applications.

Green Chemistry: Introduction, priniciples of green chemistry. (Ex: Solvent, Catalyst, Reactant).

Band Theory of Solids: Introduction –Explanation of conductors, semi conductors, Insulators by Band Theory- Super conductors-Types-Preparation-Properties and Applications.

Appendix: Introduction to Molecular Machines and Molecular Switches

Text Books:

1. P.C. Jain and M. Jain, Engineering Chemistry, 16/e, Dhanapat Rai & Sons, (2014).
2. B.K. Sharma, Engineering Chemistry, Krishna Prakasham, (2014).
3. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.

Reference Books:

1. Sashi Chawla, A Textbook of Engineering Chemistry, Dhanapath Rai and sons, (2003).
2. B.S Murthy and P. Shankar, A Text Book of Nano Science and Nano Technology, University Press (2013).
3. S.S. Dara, A Textbook of Engineering Chemistry, S. Chand & Co, (2010).

Web Links:

1. http://www.nptelvideos.in/2012/11/chemistry-of-materials
2. http://www.nptelvideos.com/lecture.php?id=2946
3. http://www.nptelvideos.com/lecture.php?id=2922
4. http://www.nptelvideos.com/lecture.php?id=2954

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ENGINEERING CHEMISTRY LAB

(Common to EEE& IT)

I Semester **L T P C**
Course Code: 191BS1L02 **0 0 3 1.5**

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Demonstrate Complexometric titrations by volumetric analysis.
CO 2: Demonstrate Acid – Base titrations by instrumental analysis.
CO 3: Estimate Vitamin C using volumetric analysis
CO 4: Prepare polymer like Bakelite.
CO 5: Prepare alternative fuel like Bio-Diesel.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	1	1	-	1
CO2	2	-	-	-	-	-	-	-	1	1	-	1
CO3	2	-	-	-	-	-	-	-	1	1	-	1
CO4	2	-	-	-	-	-	-	-	1	1	-	1
CO5	2	-	-	-	-	-	1	-	1	1	-	1

Mapping of Course Outcomes with Program Specific Outcomes

CO/PO	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

Introduction to Chemistry laboratory – Molarity, Normality, Primary, secondary standard solutions, Volumetric titrations, Quantitative analysis, Qualitative analysis, etc.

List of Experiments:

Experiment 1:
Determination of Total Hardness of a water sample.

Experiment 2:
Determination of Dissolved Oxygen in Water Sample.

Experiment 3:
Determination of Zinc by Complexometric method

Experiment 4:
P^H metric titration of (i) strong acid vs. strong base.

Experiment 5:
Determination of Fe (II) in Mohr's salt by potentiometric method.

Experiment 6:
Potentiometry – Titration between strong acid – strong base

Experiment 7:
Conductometric titrations (Strong acid vs Strong base).

Experiment 8:
Preparation of Phenol- Formaldehyde resin.

Experiment 9:
Preparation of Urea-Formaldehyde resin.

Experiment 10:
Preparation of bio diesel.

LIST OF AUGMENTED EXPERIMENTS
(Any two of the following experiments can be performed)

Experiment 1:
Determination of Vitamin – C.

Experiment 2:
Determination of percentage Moisture content in a coal sample.

Experiment 3:
Determination of acid value and saponification value of a given lubricant.

Experiment 4:
Determination of viscosity of a liquid.

Experiment 5:
Estimation of Calcium in port land Cement.

Reference Books:

1. A Textbook of Quantitative Analysis, Arthur J. Vogel.
2. Dr. Jyotsna Cherukuris (2012) Laboratory Manual of engineering chemistry - II, VGS Techno Series.
3. Chemistry Practical Manual, Lorven Publications K. Mukkanti (2009). Practical Engineering Chemistry, B.S. Publication.

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ENVIRONMENTAL SCIENCE
(Common to all branches)

I Semester	**L**	**T**	**P**	**C**
Course Code: 191MC1A01	**2**	**0**	**0**	**0**

Course Outcomes: At the end of the Course, Student will be able to:

CO1: Outline the natural resources and their importance for the sustenance of the life
CO2: Explain about the biodiversity of India, threats and its conservation methods
CO3: Illustrate various attributes of the pollution, impacts and measures to control the pollution along with waste management practices
CO4: Describe social issues of both rural and urban environment to combat the challenges and the legislations of India in environmental protection
CO5: Explain the population growth and its implications

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	1	2	-	-	-	-	-
CO2	-	-	-	-	-	1	2	-	-	-	-	-
CO3	-	-	-	-	-	1	2	-	-	-	-	-
CO4	-	-	-	-	-	1	2	-	-	-	-	-
CO5	-	-	-	-	-	1	2	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes:

CO/PSO	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

UNIT- I:

Multidisciplinary Nature of Environmental Studies:

Definition, Scope and Importance, Need for Public Awareness.

Natural Resources: Renewable and non-renewable resources – Natural resources and associated problems.

UNIT - II:

Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers. Food chains, food webs and ecological pyramids.

Biodiversity and Its Conservation: Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Values of biodiversity. Hot-spots of biodiversity – Threats to biodiversity. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

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UNIT - III:

Environmental Pollution: Definition, Cause, effects and control measures of:

a) Air Pollution.
b) Water pollution
c) Soil pollution
d) Marine pollution
e) Noise pollution

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution.

UNIT - IV:

Social Issues and The Environment: From Unsustainable to Sustainable development – Urban problems related to Energy &Water. Resettlement and rehabilitation of people, Environmental ethics, Climate change, global warming, acid rain, ozonelayer depletion, nuclear accidents and holocaust. Environment Protection Act – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act-Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

UNIT - V:

Human Population and The Environment: Population growth, variation among nations. Environment and human health, Human Rights, Value Education. Role of Information Technology in Environment and human health.

Text Books:

1. Text book of Environmental Studies for Under Graduate Courses by Erach Bharucha for University Grants Commission, Universities Press.
2. Environmental Studies by Palaniswamy – Pearson education.
3. Environmental Studies by Dr.S. Azeem Unnisa, Academic Publishing Company.

Reference Books:

1. Text book of Environmental Science by Deeksha Dave and E. SaiBaba Reddy, Cengage Publications.
2. Text book of Environmental Sciences and Technology by M. Anji Reddy, B.S Publication.
3. Comprehensive Environmental studies by J.P. Sharma, Laxmi publications.
4. Environmental sciences and engineering – J. Glynn Henry and Gary W. Heinke – Prentice hall of India Private limited.
5. A Text Book of Environmental Studies by G.R. Chatwal, Himalaya Publishing House
6. Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela - Prentice hall of India Private limited.

Web Links:

1 https://www.youtube.com/watch?v=mOwyPENHhbc
2 https://www.youtube.com/watch?v=_mgvsPnCYj4
3 https://www.youtube.com/watch?v=L5B-JMnBIyQ
4 https://www.youtube.com/watch?v=3RDGV5i82_Q

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BASIC ENGINEERING WORKSHOP

(Common to all branches)

I Semester **L T P C**
Course Code: 191ES1L02 **0 0 3 1.5**

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1 : Prepare carpentry joints using carpentry tools
CO 2 : Develop various fitting joints using fitting tools.
CO 3 : Develop component drawings for making the sheet metal models.
CO 4 : Prepare sheet metal models using drawings and tin smithy tools
CO 5 : Experiment with the various house wiring connections.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	1	-	-	-	-	-	-	-	1	-	-	1
CO2	1	-	-	-	-	-	-	-	1	-	-	1
CO3	1	-	-	-	-	-	-	-	1	-	-	1
CO4	1	-	-	-	-	-	-	-	1	-	-	1
CO5	1	-	-	-	-	-	-	-	1	-	-	1

Mapping of Course Outcomes with Program Specific Outcomes

CO/PSO	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

List of Experiments:

Carpentry:

1. Cross Lap Joint
2. Dovetail Joint
3. T - Joint

Fitting:

4. Vee Fit
5. Square Fit

House Wiring:

6. Parallel Connection of three bulbs
7. Series Connection of three bulbs

Tin Smithy:

8. Taper Tray
9. Funnel
10. Plain Pipe

List of Augmented Experiments:

(Student can perform any one of the following experiments)

1. Stair Case wiring
2. Florescent Lamp Fitting

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Reference Books:

1. Engineering Workshop by Dr. A. B. Srinivasa Rao, AMIGO Books.
2. Manual on Workshop practice by Dr.P. Kannaiah & Dr.K.L. Narayana, Scitech publications.

Web Links:

1. http://tite.ac.in/index.php/departments/mechanical-engineering/workshop
2. https://www.gopracticals.com/basic-engineering/workshop/

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PARTIAL DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

(Common to CE, EEE, ME, Min.E, PT&Ag.E)

II Semester **L T P C**
Course Code: 191BS2T05 **3 0 0 3**

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Solve improper integrals using beta and gamma functions.
CO 2: Solve partial differential equations of first order.
CO 3: Compute the double integral over a region and triple integral over a volume.
CO 4: Calculate the gradient of a scalar function, divergence and curl of a vector function.
CO 5: Apply line, surface and volume integrals.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO/PSO	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

UNIT - I:
Special Functions:
Beta and Gamma functions, Properties, Relation between Beta and Gamma functions, Evaluation of improper integrals.

UNIT II:
Partial Differential Equations:
Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, Solutions of first order linear partial differential equations, nonlinear partial differential equations (standard types), Homogeneous linear partial differential equations with constant coefficients.

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UNIT III:
Multiple Integrals:
Double integrals, Change of order of integration, Change of variables, Double integral in polar coordinates, Triple integrals, Finding Area and Volume as a double integral.

UNIT IV:
Vector Differentiation:
Introduction, Gradient of a scalar field, Directional Derivative, Divergence of a vector field, Curl of a vector field, Solenoidal and irrotational fields, Conservative force field, Scalar potential, Laplace operator, Vector identities.

UNIT V:
Vector Integration:
Introduction, Line integral, Work done, Surface and volume integrals, Green's theorem, Stokes theorem and Gauss Divergence theorem (All theorems without proof) and related problems.

Text Books:

1. Advanced Engineering Mathematics, R.K.Jain, S.R.K.Iyenkar, Alpha Science Publications.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India.
3. B.S.Grewal, Higher Engineering Mathematics, 43rdEdition, Khanna Publishers.
4. P.Sivaramakrishna Das, C.Vijayakumari, Engineering Mathematics, Pearson Publications.

Reference Books:

1. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press.
2. Dass H.K., Rajnish Verma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, Delhi.
3. Higher engineering mathematics by John Bird, 5th edition Elsevier Limited, 2006.

Web Links:

1. https://nptel.ac.in/courses/111107108/25
2. https://nptel.ac.in/courses/111103021/
3. https://nptel.ac.in/courses/111105122/
4. http://mathworld.wolfram.com
5. https://www.khanacademy.org

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APPLIED PHYSICS

(Common to EEE & IT)

II Semester **L T P C**
Course Code: 191BS2T07 **3 0 0 3**

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1: Apply the principles of interference and diffraction to design and enhance the resolving power of various optical instruments.

CO 2: Explain the fundamental concepts of Quantum behaviour of matter.

CO 3: Classify the solids based on energy band structure.

CO 4: Explain the basic concepts of Semi-Conductors and Identify the type of semiconductors using Hall Effect.

CO 5: Explain about magnetic and dielectric properties of different materials.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	2	1	-	-	-	-	-	-	-	-	-	-
CO3	2	1	-	-	-	-	-	-	-	-	-	-
CO4	2	1	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

UNIT-I

Wave Optics: Principle of Superposition - Interference of light - Conditions for sustained Interference - Interference in thin films (reflected geometry) - Newton's Rings (reflected geometry).

Diffraction - Fraunhofer Diffraction - Diffraction due to Single slit (quantitative), Double slit, N -slits and circular aperture (qualitative) – Intensity distribution curves - Diffraction Grating – Grating spectrum – missing order– resolving power – Rayleigh's criterion – Resolving powers of Microscope, Telescope and grating (qualitative).

UNIT-II

Quantum Mechanics: Introduction – Matter waves – de Broglie's hypothesis – Davisson-Germer experiment – G.P. Thomson experiment – Heisenberg's Uncertainity Principle –interpretation of wave function – Schröedinger Time Independent and Time Dependent wave equations – Particle in a potential box.

UNIT-III

Free Electron Theory: Introduction – Classical free electron theory (merits and demerits only) - Quantum Free electron theory – electrical conductivity based on quantum free electron theory – Fermi Dirac distribution function – Temperature dependence of Fermi-Dirac distribution function - expression for Fermi energy -Density of states.

BAND THEORY OF SOLIDS Bloch's theorem (qualitative) – Kronig-Penney model(qualitative) – energy bands in crystalline solids – E Vs K diagram – classification of crystalline solids – effective mass of electron – m^* Vs K diagram - concept of hole.

UNIT-IV

Semiconductor Physics: Introduction– Intrinsic semi conductors - density of charge carriers - Electrical conductivity – Fermi level – extrinsic semiconductors - p-type & n-type - Density of charge carriers - Dependence of Fermi energy on carrier concentration and temperature – Hall effect- Hall coefficient - Applications of Hall effect - Drift and Diffusion currents – Einstein's equation.

UNIT-V

Magnetism: Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr magneton – Classification of magnetic materials: Dia, para & Ferro – Domain concept of Ferromagnetism - Hysteresis – soft and hard magnetic materials – applications of Ferromagnetic material.

Dielectrics: Introduction - Dielectic polarization – Dielectric Polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative) – Lorentz Internal field – Claussius- Mossoti equation - Frequency dependence of polarization – Applications of dielectrics.

Text Books:

1. "A Text book of Engineering Physics" by M.N. Avadhanulu, P.G.Kshirsagar – S.Chand Publications, 2017.
2. "Engineering Physics" by D.K.Bhattacharya and Poonam Tandon, Oxford press (2015).
3. "Engineering Physics" by R.K Gaur. and S.L Gupta., - Dhanpat Rai publishers, 2012.

Reference Books:

1. "Engineering Physics" by M.R. Srinivasan, New Age international publishers -2009.
2. "Optics" by AjoyGhatak, 6th Edition McGraw Hill Education- 2017.
3. Engineering Physics by Mani naidu – Peasrson Publications – 2017.

Web Links:

1. http://nptel.ac.in/courses/122107035/11
2. http://nptel.ac.in/courses/115102023/
3. https://phet.colorado.edu/en/simulations/category/physics
4. http://physicsgecg.blogspot.in/p/reading-materials.html
5. https://sites.google.com/site/physicsbysureshsaganti/hom

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APPLIED PHYSICS LAB

(Common to EEE & IT)

II Semester	**L T P C**
Course Code: 191BS2L05	**0 0 3 1.5**

Course Outcomes:

At the end of Course, Student will be able to:

CO 1 : Use spectrometer, travelling microscope for making measurements.
CO 2 : Determine energy gap of a semiconductor, draw characteristic curves to estimate thermal coefficient of a thermistor, Zener diode.
CO 3 : Determine the dielectric constant and resistivity.
CO 4 : Determine wavelength of source and width of the narrow slits.
CO 5 : Find the strength of magnetic field.

Mapping of Course outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	1	-	-	1
CO2	2	2	-	-	-	-	-	-	1	-	-	1
CO3	3	1	-	-	-	-	-	-	1	-	-	1
CO4	3	2	-	-	-	-	-	-	1	-	-	1
CO5	3	2	-	-	-	-	-	-	1	-	-	1

Mapping of Course outcomes with Program Specific Outcomes:

CO/PSO	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

LIST OF EXPERIMENTS

1. Determination of wavelength of a Source-Diffraction Grating-Normal incidence.
2. Newton's rings – Radius of Curvature of Plano - Convex Lens.
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.
5. Energy Band gap of a Semiconductor p - n junction.
6. Characteristics of Thermistor – Temperature Coefficients
7. Determination of dielectric constant by charging and discharging method
8. Determination of resistivity of semiconductor by Four probe method.
9. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
10. Measurement of magnetic susceptibility by Quincke's method.

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LIST OF AUGMENTED EXPERIMENTS

(Any two of the following experiments can be performed)

1. Dispersive power of diffraction grating.
2. Resolving Power of telescope
3. Resolving power of grating
4. Determination of Hall voltage and Hall coefficients of a given semiconductor using Hall effect.
5. Variation of dielectric constant with temperature.
6. Determine the Young's Modulus of the material of the bar subjected to uniform bending.
7. Determine the Young's Modulus of the material of the bar subjected to non-uniform bending
8. V-I characteristics of P-N Junction Diode.
9. V-I characteristics and Breakdown voltage of Zener Diode

Reference Books:

1. Engineering Physics Lab Manual by Dr.C.V. Madhusudhana Rao, V. Vasanth Kumar, Scitech Publications.
2. Laboratory Manual Cum Record for Engineering Physics I & II by Dr.Y. Aparna, Dr.K. Venkateswara Rao, VGS Technoseries.

APPLIED PHYSICS - VIRTUAL LAB – ASSIGNMENTS

LIST OF EXPERIMENTS

1. Hall Effect
2. Crystal Structure
3. Brewster's angle
4. Numerical Aperture of Optical fiber
5. Photoelectric Effect
6. LASER – Beam Divergence and Spot size
7. Michelson's interferometer
8. Black body radiation
9. Flywheel –moment of inertia
10. AC Sonometer
11. Resistivity by four probe method
12. Newton's rings –Refractive index of liquid

Web Link:

URL: www.vlab.co.in

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SIGNALS AND SYSTEMS

V Semester L T P C
Course Code: 171EE5T13 3 1 0 3

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1 : Classify the signals into different categories.
CO 2 : Demonstrate the spectral characteristics of signals using Fourier analysis.
CO 3 : Apply convolution and correlation for signal generation and signal extraction.
CO 4 : Identify system characteristics in time domain and frequency domain.
CO 5 : Analyze sampling process and reconstruction of signals.
CO 6 : Apply Laplace and Z- transform techniques for the analysis of continuous-time and discrete-time signals and Systems.

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO 1	3	2	1	1	-	-	-	-	-	-	-	-
CO 2	3	1	1	2	-	-	-	-	-	-	-	-
CO 3	3	1	1	2	-	-	-	-	-	-	-	-
CO 4	3	1	1	2	-	-	-	-	-	-	-	-
CO 5	2	1	1	3	-	-	-	-	-	-	-	-
CO 6	1	3	1	1	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes:

CO/PSO	PSO1	PSO 2
CO 1	1	-
CO 2	1	-
CO 3	1	-
CO 4	1	-
CO 5	1	-
CO 6	1	-

UNIT I

Signals: Introduction, Representation of signals, Elementary signals, Basic Operations on signals, Classification of Signals.

Signal Analysis: Analogy between vectors and signals, Orthogonal vector space, Orthogonal signal space, Signal approximation by a set of mutual orthogonal signals, mean square error, Closed or complete set of orthogonal functions, Orthogonality in complex functions.

UNIT II

Fourier Series: Representation of periodic signals using Fourier series, Trigonometric Fourier series and Exponential Fourier series, properties of Fourier series, Complex Fourier spectrum.

Fourier Transforms: Deriving Fourier transform(FT) from Fourier series, Existence of Fourier transform, Fourier transform of standard signals, properties of Fourier transforms, Fourier transform of periodic signals, Fourier transforms involving impulse signal and Signum signal.

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UNIT III

Convolution and Correlation of Signals: Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Convolution properties of Fourier transforms. Signal Comparison: Cross correlation and auto correlation of signals, properties of correlation function, Energy density spectrum, Power density spectrum, Relation between auto correlation function and energy/power spectral density function, Relation between convolution and correlation.

UNIT IV

Signal Transmission Through LTI Systems: Classification of systems, Linear time invariant (LTI) system, Impulse response of LTI systems, Properties of LTI systems, Transfer function of an LTI system, Filter characteristics of linear systems, Distortion less transmission through a system, Signal bandwidth, system bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Paley-Wiener criterion for physical realization, relationship between bandwidth and rise time.

Sampling: Sampling, Sampling theorem – Graphical and analytical proof for Band Limited Signals, effect of under sampling – Aliasing, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, Sampling of Band Pass signals.

UNIT V

Laplace Transforms: Review of Laplace transform (LT) , Existence of Laplace transform, Concept of region of convergence (ROC) for Laplace transforms, constraints on ROC for various classes of signals, Properties of Laplace transforms, relation between LTs, and FT of a signal, Inverse Laplace transform, Laplace transform using waveform synthesis.

Z–Transforms: Z-Transform of a discrete time signal, Distinction between Laplace, Fourier and Z-transforms, Region of convergence in Z-Transform, constraints on ROC for various classes of discrete signals, Properties of Z-transforms, properties of Z-transforms, Inverse Z-transform.

Text Books:

1. Signals and Systems, Anand Kumar, PHI, 4th Edition.
2. Signals and Systems, A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edition.
3. Signals, Systems & Communications, B.P. Lathi, BS Publications.

Reference Books:

1. Signals & Systems, Simon Haykin and Van Veen, Wiley, 2nd Edition.
2. Fundamentals of Signals and Systems, Michel J. Robert, MGH International Edition.
3. Signals and Systems, K Raja Rajeswari, B VisweswaraRao, PHI.
4. Signals and Systems, T K Rawat, Oxford University press.

Web Links:

1. http://nptel.ac.in/courses/117104074/
2. http://nptel.ac.in/courses/117101055/
3. https://www.tutorialspoint.com//signals_and_systems/index.htm
4. https://www.mathworks.com/support/learn-with-matlab-tutorials.html
5. https://ocw.mit.edu/resources/res-6-007-signals-and-systems-spring-2011

CONTROL SYSTEMS LAB

V Semester L T P C

Course Code: 171EE5L06 0 0 3 2

Course Outcomes:
At the end of the Course, Student will be able to:

- CO 1: Analyze the performance and working of Magnetic amplifier, D.C and A.C servo motors
- CO 2: Design of different types of controllers like PI, PID and compensator's like Lag, Lead and lead – lag
- CO 3: Understand the Control of temperature using PID controller
- CO 4: Determine the transfer function of DC machine
- CO 5: Analyze the fundamentals and application of PLC in electrical Domain

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO 1	-	2	3	-	-	-	-	-	1	-	-	-
CO 2	-	2	3	-	-	-	-	-	1	-	-	-
CO 3	-	2	3	-	-	-	-	-	1	-	-	-
CO 4	-	2	3	-	-	-	-	-	1	-	-	-
CO 5	2	-	3	-	-	-	-	-	1	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes:

CO/PSO	PSO1	PSO 2
CO 1	2	-
CO 2	2	-
CO 3	2	-
CO 4	2	-
CO 5	2	-

List of experiments:

1. To determine time response of Second order system.
2. To study the characteristics of Synchros - Transmitter and receiver.
3. To study the characteristics of stepper motor using Programmable logic controller.
4. To study the effect of feedback on DC servo motor.
5. To study the effect of P, PD, PI, PID Controller on a second order systems.
6. To Draw the magnitude and phase plots of lag and lead compensators.
7. To study the DC position control system.
8. To determine the transfer function of DC motor.
9. To study temperature controller using PID.
10. To draw the load Characteristics of magnetic amplifiers.

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List of Augmented experiments:
(Any two of the following experiments can be performed)

1. To draw the speed - torque characteristics of AC servo motor.
2. To draw the speed - torque characteristics of DC servo motor.
3. To study the Potentiometer as an error detector.
4. Verification of logic gates using PLC.
5. To simulate root locus using MATLAB.
6. To simulate Bode plot using MATLAB

Reference Books:

1. Modern Control Engineering, Kotsuhiko Ogata, Prentice Hall of India.
2. Control Systems, Manik Dhanesh N, Cengage publications.
3. Control Systems Engineering, I.J.Nagarath and M.Gopal, Newage International Publications, 5th Edition.
4. Control Systems Engineering, S.Palani, Tata McGraw Hill Publications.

Web Links:

1. https://www.electrical4u.com/mathematical-modelling-of-various-system /
2. http://engineering.electrical-equipment.org/panel-building/time-domain-analysis-of-control-systems.htm
3. http://www.cds.caltech.edu/~murray/amwiki/index.php/Frequency_Domain_Analysis
4. https://www.electrical4u.com/state-space-analysis-of-control-system/

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MICRO PROCESSOR AND MICRO CONTROLLERS

VI Semester L T P C

Course Code: 171EE6T16 3 1 0 3

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1 : Analyze the generalized concepts of microprocessors.

CO 2 : Demonstrate programming proficiency using the various addressing modes and instructions.

CO 3 : Explain the basic concepts of interfacing memory and peripheral devices to a microprocessor.

CO 4 : Develop the internal architecture of microcontroller systems, including counters, timers, ports, and memory.

CO 5 : Explain the circuits for various applications using microcontrollers.

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO 1	2	3	2	1	-	-	-	-	-	-	-	-
CO 2	3	2	2	1	-	-	-	-	-	-	-	-
CO 3	2	3	2	1	-	-	-	-	-	-	-	-
CO 4	3	2	2	1	-	-	-	-	-	-	-	-
CO 5	3	2	2	-	-	-	-	-	-	-	-	1

Mapping of Course Outcomes with Program Specific Outcomes:

CO/PSO	PSO1	PSO 2
CO 1	1	-
CO 2	1	-
CO 3	1	-
CO 4	1	-
CO 5	1	-

UNIT I:

Introduction to microprocessor architecture:

Introduction and evolution of Microprocessors, Architecture of 8086, Register Organization of 8086, Memory organization of 8086, General bus operation of 8086, Introduction to 80286,80386 and 80486 and Pentium.

UNIT II:

Minimum and maximum mode operations:

Instruction set, addressing modes, assembler directives, Minimum and Maximum mode operations of 8086, 8086 Control signal interfacing, Read and write cycle timing diagrams.

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UNIT III:

8086 interfacing:

Semiconductor memories interfacing (RAM, ROM), Intel 8259 programmable interrupt controller, Intel 8237a DMA controller, Intel 8255 programmable peripheral interface, Intel 8279 programmable keyboard/display controller, keyboard interfacing, stepper motor, A/D and D/A converters.

UNIT IV:

Introduction to 8051 micro controllers:

Overview of 8051 Micro Controller, Architecture, Register set, I/O ports and Memory Organization, Interrupts, Timers and Counters, Serial Communication.

PIC architecture:

Block diagram of basic PIC 18 micro controller, registers I/O ports.

UNIT V:

Cyber physical systems and industrial applications of 8051:

Applications of Micro Controllers, interfacing 8051 to LED's, Push button, Relay's and Latch Connections, Keyboard Interfacing, Interfacing Seven Segment Display, ADC and DAC Interfacing.

Text books:

1. Advanced Micro Processors and Interfacing, K.M. Bhurchandi, A.K. Ray, Tata McGraw Hill, 3rdEdition, 2012.
2. Microprocessors and Interfacing, Douglas V Hall, McGraw Hill, 2ndEdition, 2005.
3. The 8051 Micro Controller Architecture, Programming and Applications, Kenneth J Ayala, Thomson Publishers, 3rdEdition, 2004.

References Books:

1. PIC Microcontroller and Embedded Systems, Muhammad Ali Mazidi, Rolind D.Mckinlay, Danny causey, Pearson Publisher, 3rd Edition, 2008.
2. Microcontrollers Theory and Applications,Ajay V. Deshmukh, Tata McGraw Hill, 2005.
3. Microcontrollers Principles and Applications, Ajit Pal, PHI Learning Pvt Ltd, 2011.

Web Links:

1. www.nptel.ac.in/.../IISc.../Microprocessors%20and%20Microcontrollers/.../M1L3.pdf
2. https://www.coursehero.com/file/22270579/Minimum-and-Maximum-Modes/
3. https://edutechlearners.com/download/MP/8255%20&%20IO%20Interfacing.pdf

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POWER ELECTRONICS LAB

VI Semester **L T P C**
Course Code: 171EE6L08 **0 0 3 2**

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Explain the characteristics of various power electronic devices and analyze gate drive circuits of IGBT.
CO 2: Analyze the performance of single–phase and three–phase full–wave bridge converters with both resistive and inductive loads.
CO 3: Explain the operation of single phase AC voltage regulator with resistive and inductive loads.
CO 4: Explain the working principle of Buck converter & Boost converter.
CO 5: Explain the working principle of single–phase square wave inverter and PWM inverter.

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	3	2	1	-	-	-	-	-	2	-	-	-
CO2	3	1	2	-	-	-	-	-	2	-	-	-
CO3	3	2	1	-	-	-	-	-	2	-	-	-
CO4	2	1	3	-	-	-	-	-	2	-	-	-
CO5	1	2	3	-	-	-	-	-	2	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes:

CO / PSO	PSO1	PSO 2
CO1	1	-
CO2	2	-
CO3	2	-
CO4	2	-
CO5	2	-

List of experiments:

1. Study of Characteristics of Thyristor, MOSFET & IGBT.
2. Design and development of a firing circuit for Thyristor.
3. Design and development of gate drive circuits for IGBT.
4. Single -Phase half controlled converter with R and RL load
5. Single -Phase fully controlled bridge converter with R and RL loads
6. Single -Phase AC Voltage Regulator with R and RL Loads
7. Single -Phase square wave bridge inverter with R and RL Loads
8. Three- Phase fully controlled converter with RL–load.
9. Design and verification of voltages gain of Boost converter in Continuous Conduction Mode (CCM) and Discontinuous Conduction Mode (DCM).
10. Design and verification of voltages ripple in buck converter in CCM operation.

List of Augmented experiments:
(Any two of the following experiments can be performed)

1. Single -phase PWM inverter with sine triangle PWM technique.
2. 12. 3- Phase AC-AC voltage regulator with R-load.

3. Simulation of Buck, Boost and Buck-Boost converter.
4. Simulation of SPWM controlled Three-phase voltage source inverter.
5. Simulation of 3 phase half and full wave converter with R, RL, RLE and RE loads. Plot the waveforms for Voltage across and current through the switch.
6. Closed Loop simulation- Buck/Boost DC-DC converter.

Reference Books:

1. M.H.Rashid: Power Electronics-Circuits, Devices and Applications, 3rd Edition, PHI, 2005.
2. Ned Mohan, T.M. Undeland and William P.Robbins: Power Electronics: Converters and Applications, 3rd Edition, John Wiley & Sons, 2009.

Web Links:

1. https://www.electrical4u.com/characteristics-of-thyristor/
2. https://www.electrical4u.com/dual-converter
3. http://jntuk-coeerd.in/

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IV Year – I SEMESTER	L	T	P	C
	4	0	0	3

OPTIMIZATION TECHNIQUES
(Elective – II)

Preamble:

Optimization techniques have gained importance to solve many engineering design problems by developing linear and nonlinear mathematical models. The aim of this course is to educate the student to develop a mathematical model by defining an objective function and constraints in terms of design variables and then apply a particular mathematical programming technique. This course covers classical optimization techniques, linear programming, nonlinear programming and Genetic & Partial Swarm Optimization algorithms.

Learning Objectives:

- To define an objective function and constraint functions in terms of design variables, and then state the optimization problem.
- To state single variable and multi variable optimization problems, without and with constraints.
- To explain linear programming technique to an optimization problem, define slack and surplus variables, by using Simplex method.
- To study and explain nonlinear programming techniques, unconstrained or constrained, and define exterior and interior penalty functions for optimization problems.
- To introduce evolutionary programming techniques.
- To introduce basic principles of Genetic Algorithms and Partial Swarm Optimization methods.

UNIT – I:

Introduction and Classical Optimization Techniques:

Statement of an Optimization problem – design vector – design constraints – constraint surface – objective function – objective function surfaces – classification of Optimization problems.

UNIT – II:

Classical Optimization Techniques

Single variable Optimization – multi variable Optimization without constraints – necessary and sufficient conditions for minimum/maximum – multivariable Optimization with equality constraints.Solution by method of Lagrange multipliers – multivariable Optimization with inequality constraints – Kuhn – Tucker conditions.

UNIT – III:

Linear Programming

Standard form of a linear programming problem – geometry of linear programming problems – definitions and theorems – solution of a system of linear simultaneous equations – pivotal reduction of a general system of equations – motivation to the simplex method – simplex algorithm - Duality in Linear Programming – Dual Simplex method.

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UNIT – IV:

Nonlinear Programming:

Unconstrained cases - One – dimensional minimization methods: Classification, Fibonacci method and Quadratic interpolation method - Univariate method, Powell's method and steepest descent method.

Constrained cases - Characteristics of a constrained problem, Classification, Basic approach of Penalty Function method; Basic approaches of Interior and Exterior penalty function methods.Introduction to convex Programming Problem.

UNIT – V:

Introduction to Evolutionary Methods:

Evolutionary programming methods - Introduction to Genetic Algorithms (GA)– Control parameters –Number of generation, population size, selection, reproduction, crossover and mutation – Operator selection criteria – Simple mapping of objective function to fitness function – constraints – Genetic algorithm steps – Stopping criteria –Simple examples.

UNIT – VI:

Introduction to Swarm Intelligence Systems:

Swarm intelligence programming methods - Basic Partial Swarm Optimization – Method – Characteristic features of PSO procedure of the global version – Parameters of PSO (Simple PSO algorithm – Operators selection criteria – Fitness function constraints) – Comparison with other evolutionary techniques – Engineering applications of PSO.

Learning Outcomes:

The student should be able to:

- State and formulate the optimization problem, without and with constraints, by using design variables from an engineering design problem.
- Apply classical optimization techniques to minimize or maximize a multi-variable objective function, without or with constraints, and arrive at an optimal solution.
- Formulate a mathematical model and apply linear programming technique by using Simplex method. Also extend the concept of dual Simplex method for optimal solutions.
- Apply gradient and non-gradient methods to nonlinear optimization problems and use interior or exterior penalty functions for the constraints to derive the optimal solutions.
- Able to apply Genetic algorithms for simple electrical problems.
- Able to solve practical problems using PSO.

Text Books

1. "Engineering optimization: Theory and practice"-by S. S.Rao, New Age International (P) Limited, 3rd edition, 1998.
2. Soft Computing with Matlab Programming by N.P.Padhy&S.P.Simson, Oxford University Press – 2015

Reference Books:

1. "Optimization methods in operations Research and Systems Analysis" by K.V.Mital and C.Mohan, New Age International (P) Limited, Publishers, 3rd edition, 1996.
2. Genetic Algorithms in search, optimization, and Machine Learning by David E.Goldberg,ISBN:978-81-7758-829-3, Pearsonby Dorling Kindersley (India) Pvt. Ltd.
3. "Operations Research: An Introduction" by H.A.Taha, PHI pvt. Ltd., 6th edition.
4. Linear Programming by G.Hadley.

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Syllabus revision Index for 2019-2020

S. No	Name of the course	Percentage of syllabus change
1	Communicative English	90
2	Differential Equations and Linear Algebra	20
3	Engineering Chemistry	80
4	Engineering Chemistry Lab	50
5	Environmental Science	25
6	Basic Engineering workshop	50
7	Partial Differential Equations and Vector Calculus	40
8	Applied Physics	40
9	Applied Physics Lab	60
10	Signals and Systems	25
11	Control Systems Lab	25
12	Micro Processor and Micro Controllers	30
13	Power Electronics Lab	20
14	Optimization Techniques	30

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	English-I	Communicative English
Course Code	17HS1T01	19HS1T01
Syllabus	UNIT-I: 1. IN LONDON: M.K.GANDHI (Detailed) 2. G.D. NAIDU (Non-Detailed)	UNIT-I: 1. An Astrologers' Day - R.K. Narayan (Detailed) 2. Bade Bhai Saab - Munshi Prachanda (Non-Detail)
	UNIT-II: 1. THE KNOWLEDGE SOCIETY- APJ ABDUL KALAM (Detailed) 2. G.R. GOPINATH (Non-Detailed)	UNIT-II: 1. Building A New State - A. P. J. Abdul Kalam (Detailed) 2. Morning Bells- Jayashree Mohan Raj (Non-Detail)
	UNIT-III: 1. THE SCIENTIFIC POINT OF VIEW- J.B.S. HALDANE (Detailed) 2. J.C. BOSE (Non-Detailed)	UNIT-III: 1. Water:The Elixer of Life- C. V. Raman (Detailed) 2. The Power of Plate of Rice- Ifeoma Okoye (Non-Detail)
	UNIT-IV: 1. MAN'S PERIL-BERTRAND RUSSELL (Detailed) 2. HOMI JEHANGIR BHABHA (Non-Detailed)	UNIT-IV: 1. The Woodrose-Abburi Chaya Devi (Detailed) 2. The Cop and The Anthem- O. Henry (Non-Detail)
	UNIT-V: 1. LUCK—MARK TWAIN (Detailed) 2. A SHADOW (Non-Detailed)	UNIT-V: 1. Progress- St. John Ervine (Detailed) 2. Dial 000- Barry Rosenberg (Non-Detail)

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Mathematics-I	Differential Equations and Linear Algebra
Course Code	171BS1T01	191BS1T01
Syllabus	UNIT I: Differential equations of first order and first degree: Linear differential equations - Bernoulli differential equation - Exact differential equationsEquations reducible to exact (Type-1, Type-2, Type-3, Type-4) Applications: Newton's Law of cooling-Law of natural growth and decay-Orthogonal trajectories.	UNIT I: Differential Calculus: Rolle's theorem, Lagrange's theorem, Cauchy Mean Value theorem, Taylor's and Maclaurin's theorems (All theorems Without Proof). Partial Differentiation: Euler's theorem (without proof), Total derivative, Chain rule, Taylor's and Maclaurin's series expansion of functions of two variables, Jacobian, Functional dependence. Applications: Maxima and Minima of functions of several variables without constraints and with constraints (Lagrange's method). ** (SCILAB Exercise: Plot graphs of various single and multivariable functions).
	UNIT II: Linear differential equations of higher order: Linear differential equations of higher order with constant coefficients with RHS term of the type eax, sin ax, cos ax, polynomials in x, e^ax V(x), xV(x)-Method of Variation of parameters, Method of undetermined coefficients. *(MATLAB Exercise: Introduction to MAT LAB commands and Solution of Initial Value Problems using the command 'dsolve') Applications: Electric circuits, simple harmonic motion.	UNIT II: Differential equations of first order: Introduction to differential equations, linear differential equation of first order - Bernoulli differential equation - Exact differential equations- Equations reducible to exact, Applications: Orthogonal trajectories, Newton's Law of cooling, RL circuit
	UNIT III: Linear systems of equations: Rank of a matrix - Echelon form-Normal form – Solution of linear systems – Gauss elimination method - Gauss Seidal method. Applications: Finding the current in electrical circuits.	UNIT III: Linear differential equations of second and higher order: Linear differential equations of higher order with constant coefficients, Complementary function and Particular integral with RHS term of the type polynomials in x, e^ax, sin ax, cos ax,

		eax V(x), xV(x)- Method of Variation of parameters, Equations reducible to constant coefficients –Cauchy-Euler equation, Legendre's equation. Application: LCR Circuit ** (SCILAB Exercise: Introduction to SCILAB commands and Solution of Initial Value Problems)
	UNIT IV: Eigen values - Eigen vectors and Quadratic forms: Eigen values - Eigen vectors– Properties of eigen values (without proof) – Cayley -Hamilton theorem (without proof) - Inverse and powers of a matrix by using Cayley - Hamilton theorem- Diagonalization- Quadratic forms- Reduction of quadratic form to canonical form using orthogonal transformation– Nature of the quadratic form. *(MATLAB Exercise: All Basic Operations on matrices are to be implemented using MATLAB including computation of rank, computation of eigen values and eigen vectors)	UNIT IV: System of linear equations, Eigen values and Eigen vectors: Definition of a Vector space, Linear dependence and independence of vectors, Rank of a matrix, Echelon form and Normal form, solving system of Homogenous and Non homogenous linear equations- Gauss Jordon elimination method, Eigen values, Eigen vectors, Properties of eigen values and eigen vectors (without proof) Applications: Free vibrations of a two mass system
	UNIT V: Partial differentiation and Partial differential equations: Homogeneous function-Euler's theorem-Total derivative- Chain rule-Taylor's and Maclaurin's series expansion of functions of two variables– Functional dependence Jacobian. Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions –solutions of first order linear (Lagrange) equation, nonlinear (standard types) equations. Applications: Maxima and Minima of functions of two variables without constraints and Lagrange's method (with constraints). *(MATLAB Exercise: To Plot graphs of various single and multivariable functions using MATLAB and analyze their maxima and minima graphically).	UNIT V: Quadratic forms: Cayley -Hamilton theorem (without proof), Inverse and powers of a matrix by using Cayley - Hamilton theorem, Diagonalization of a matrix, Quadratic forms, Reduction of quadratic form to canonical form using orthogonal transformation, Nature of the quadratic form. **(SCILAB Exercise: Basic Operations on matrices, computation of rank, computation of eigen values and eigen vectors)

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Applied Chemistry	Engineering Chemistry
Course Code	171BS1T05/171BS2T05	191BS1T04/191BS2T09
Syllabus	UNIT - I: High Polymers and Plastics: Polymerization: Introduction- Mechanism of polymerization - Stereo regular polymers - Physical and mechanical properties – Plastics as engineering materials: advantages and limitations – Thermoplastics and Thermosetting plastics – Compounding and fabrication (compression moulding, injection moulding, extrusion moulding and transfer moulding techniques)- Preparation, properties and applications of polyethene, PVC, Bakelite and polycarbonates. Elastomers – Natural rubber- compounding and vulcanization – Synthetic rubbers: Buna S, Buna N, Thiokol – Applications of elastomers. Biodegradable polymers.	UNIT- I Water Technology: Introduction – Soft Water and hardness of water, types of hardness of water, degree of hardness of water, Units of hardness of water, problems on hardness, Boiler troubles - scale and sludge, Boiler corrosion, Industrial water treatment- zeolite and ion exchange processes. Specifications for drinking water, Bureau of Indian Standards (BIS) and World health organization(WHO) standards, - desalination of brackish water, reverse osmosis (RO) and electrodialysis.
	UNIT - II: Fuel Technology: Fuels:- Introduction – Classification – Calorific value - HCV and LCV – Dulong's formula – Coal — Proximate and ultimate analysis – Significance of the analyses – Liquid fuels – Petroleum- Refining – Cracking – Synthetic petrol –Petrol knocking – Diesel knocking - Octane and Cetane ratings – Anti-knock agents – Power alcohol – Bio-diesel – Gaseous fuels-— Natural gas. LPG and CNG – Combustion – Calculation of air for the combustion of a fuel – Flue gas analysis – Orsat apparatus.	UNIT - II Electrochemical Energy Systems: Introduction-Electrochemical Cell(Galvanic cell), Electrochemical series, Applications, single electrode potential, Hydrogen and Calomel electrode, Nernst Equation for a single electrode, Concentration Cells(Electrode & Electrolyte),Construction of glass electrode. Batteries – Classical batteries-dry/Leclanche cell,Modern batteries-zinc air, lithium cells-Li MnO_2 cell- challenges of battery technology. Fuel cells- Introduction- classification of fuel cells – hydrogen and oxygen fuel cell, propane and oxygen fuel cell-Merits of fuel cell.
	UNIT - III: Electrochemical Cells and Corrosion: Galvanic cells - Reversible and	Unit-III Polymer Chemistry: Introduction to polymers, functionality of monomers, chain

	irreversible cells – Single electrode potential- Electro chemical series and uses of this series- Standard electrodes (Hydrogen and Calomel electrodes) - Concentration Cells – Batteries: Dry Cell - Li cells - Zinc – air cells. Corrosion:- Definition – Theories of Corrosion (electrochemical) – Formation of galvanic cells by different metals, by concentration cells, by differential aeration and waterline corrosion – Passivity of metals – Pitting corrosion - Galvanic series – Factors which influence the rate of corrosion - Protection from corrosion – Cathodic protection - Protective coatings: – Metallic (cathodic and anodic) coatings - Methods of application on metals (Galvanizing, Tinning, Electroplating, Electroless plating).	growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation (Free radical mechanism for addition ploymerization) Plastics - Thermoplastics and Thermosettings, Preparation, properties and applications of – PE,PVC, Bakelite, Teflon and Nylon-6, 6. Elastomers–Buna-S, Buna-N–preparation, properties and applications. Conducting polymers – polyacetylene, polyaniline – mechanism of conduction and applications.
	UNIT - IV: Chemistry of Advanced Materials: Nano materials:-Introduction – Sol-gel method - Carbon nano tubes and fullerenes: Types, preparation, properties and applications. Super conductors: -Type –I, Type II – Characteristics and applications Semiconductors: - Preparation of semiconductors, working of diodes and transistors. Green synthesis: -Principles Liquid crystals:-Introduction – Types – Applications Fuel cells: - Introduction - cell representation, H2-O2fuel cell: Design and working, advantages and Limitations. Types of fuel cells: methanol-oxygen fuel cells.	UNIT - IV Energy Sources And Applications: Introduction- sources of renewable energy –Hydro power, Biomass and Bio-fuels Solar energy – Introduction - Physical and Chemical properties of Silicon- Preparation of Semi-conductors - Doping of Silicon- p and n type semi-conductors PV cell / solar cell- Working & Manufacturing of Photovoltaic Cells using Chemical Vapor Deposition Technique-applications of solar energy. Fuels: Introduction- classification- liquid fuels- Refining of petroleum- cracking-Reforming Gaseous fuels-LPG & CNG Applications.
	UNIT - V: Non-Conventional Energy Sources: Solar Energy: - Introduction, application of solar energy, conversion of solar energy (Thermal conversion & photo conversion) – photovoltaic cell: design, working and its importance Non-conventional energy sources: (i) Hydropower include setup a hydropower plant (schematic diagram) (ii) Geothermal energy: Introduction-schematic diagram of a geothermal power plant (iii) Tidal and wave power: Introduction- Design and working-movement of tides and their effect on sea level. (iv) Ocean thermal energy: Introduction, closed-cycle, ocean thermal energy conversion (OTEC), open	UNIT - V Material Science And Engineering: Nanomaterials: Introduction to nanomaterial: nanoparticles, nanocluster, carbon nanotube (CNT) and nanowires. Chemical synthesis of nanomaterials: sol-gel method. Characterization: Principle and applications of scanning electron microscope (SEM) and transmission electron microscope (TEM). NanoTubes: Carbon nano tubes- Types of CNT's- preparation methods –Arc discharge, Laser abiliation and chemical vapour deposition – properties and applications. Green Chemistry: Introduction, priniciples of green chemistry (Ex: Solvent, Catalyst, Reactant) Band Theory of Solids:

	cycle OTEC, hybrid OTEC, schematic diagram and explanation. (v) Biomass and biofuels.	Introduction –Explanation of conductors, semi conductors, Insulators by Band Theory- Super conductors-Types-Preparation-Properties and Applications. Appendix: Introduction to Molecular Machines and Molecular Switches

Dr Padma. S

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M.V.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering /Applied Chemistry Lab	Engineering Chemistry Lab
Course Code	17IBS1L01	19IBS1L02/19IBS2L04
Syllabus	Exercise 1: Introduction to Chemistry laboratory – Molarity, Normality, Primary, secondary standard solutions, Volumetric titrations, Quantitative analysis, Qualitative analysis, etc.	Exercise 1: Determination of Total Hardness of a water sample.
	Exercise 2: Trial experiment - Determination of HCl using standard Na_2CO_3 solution.	Exercise 2: Determination of Dissolved Oxygen in Water Sample.
	Exercise 3: Preparation of Phenol - Formaldehyde resin (Bakelite).	Exercise 3: Determination of Zinc by Complexometric method
	Exercise 4: Determination of $KMnO_4$ using standard Oxalic acid solution.	Exercise 4: P H metric titration of (i) strong acid vs. strong base.
	Exercise 5: Determination of ferrous iron using standard $K_2Cr_2O_7$ solution.	Exercise 5: Determination of Fe (II) in Mohr's salt by potentiometric method
	Exercise 6: Preparation of Bio-Diesel.	Exercise 6: Potentiometry – Titration between strong acid – strong base
	Exercise 7: Determination of temporary and permanent hardness of water using standard EDTA solution.	7: Conductometric titrations(Strong acid vs Strong base).
	Exercise 8: Determination of Copper using standard EDTA solution.	Exercise 8: Preparation of Phenol-Formaldehyde resin.
	Exercise 9: Determination of Iron by a Colorimetric method using thiocynate as reagent.	Exercise 9: Preparation of Urea-Formaldehyde resin
	Exercise 10: Determination of pH of the given sample solution using pH meter.	Exercise 10: Preparation of bio diesel
	Exercise 11: Conduct metric titration between strong acid and strong base.	Exercise.. Exercise 11: Determination of Vitamin – C.
	Exercise 12: Conduct metric titration between strong acid and weak base.	
	Exercise 13: Potentiometric titration between strong acid and strong base.	
	Exercise 14: Potentiometric titration	

	between strong acid and weak base.	
	Exercise 15: Determination of Zinc using standard EDTA solution.	
	Exercise 16: Determination of Vitamin – C.	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Environmental Studies	Environmental Science
Course Code	171HS1T02/171HS2T02	191MC1A01
Syllabus	UNIT –I: Ecosystems: Scope of environmental studies, Structure-Producers, consumers and decomposers Function – Food chain, Food web, Tropic structure and Energy flow in the ecosystem Ecological pyramids, nutrient recycling, primary and secondary production, ecosystem regulation. Ecological succession Terrestrial ecosystem and aquatic ecosystem - Introduction, types, characteristic features.	UNIT- I: Multidisciplinary Nature of Environmental Studies: Definition, Scope and Importance, Need for Public Awareness. Natural Resources: Renewable and non-renewable resources – Natural resources and associated problems.
	UNIT – II: Natural Resources: Natural resources and associated problems Forest resources – Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources Food resources: World food problems, changes caused by non-agriculture activities effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources vs oil and natural gas extraction. Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil	UNIT - II: Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers. Food chains, food webs and ecological pyramids. Biodiversity and Its Conservation: Definition: genetic, species and ecosystem diversity – Biogeographical classification of India – Values of biodiversity. Hot-spots of biodiversity – Threats to biodiversity. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

	erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.	
	UNIT – III: Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity classification Value of biodiversity: consumptive use, productive use, social-Biodiversity at national and local levels. India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts - Endangered and endemic species of India – Conservation of biodiversity	UNIT - III: Environmental Pollution: Definition, Cause, effects and control measures of: a) Air Pollution. b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution.
	UNIT – IV: Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Style. Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e – waste management.	UNIT - IV: Social Issues and The Environment: From Unsustainable to Sustainable development – Urban problems related to Energy &Water. Resettlement and rehabilitation of people, Environmental ethics, Climate change, global warming, acid rain, ozonelayer depletion, nuclear accidents and holocaust. Environment Protection Act – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act-Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.
	UNIT – V: Social Issues and the Environment Urban problems related to energy -Water conservation, rain water harvesting Resettlement and rehabilitation of people; its problems and concerns. Global challenges Environmental ethics: Issues and possible solutions. Environmental Protection Act - Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act -Wildlife Protection Act - Forest Conservation Act-Issues involved in enforcement of environmental legislation. - Public awareness and Environmental management.	UNIT - V: Human Population and The Environment: Population growth, variation among nations. Environment and human health, Human Rights, Value Education. Role of Information Technology in Environment and human health.

N. Malleswari
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Department of Mechanical Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**Engineering Workshop& IT Workshop**	**Basic Engineering Workshop**
Course Code	**171ES2L02**	**191ES1L02**
Syllabus	**Trade:** **Carpentry:** 1. T-Lap Joint 2. Cross Lap Joint 3. Dovetail Joint 4. Mortise and Tenon Joint **Fitting:** 1. Vee Fit 2. Square Fit 3. Half Round Fit 4. Dovetail Fit **Black Smithy:** 1. Round rod to Square 2. S-Hook 3. Round Rod to Flat Ring 4. Round Rod to Square headed bolt **House Wiring:** 1. Parallel / Series Connection of three bulbs 2. Stair Case wiring 3. Florescent Lamp Fitting 4. Measurement of Earth Resistance **Tin Smithy:** 1. Taper Tray 2. Square Box without lid 3. Open Scoop 4. Funnel	**List of Experiments:** **Carpentry:** 1. Cross Lap Joint 2. Dovetail Joint 3. T - Joint **Fitting:** 1. Vee Fit 2. Square Fit **House Wiring:** 1. Parallel Connection of three bulbs 2. Series Connection of three bulbs **Tin Smithy:** 1. Taper Tray 2. Funnel 3. Plain Pipe **List of Augmented Experiments:** 1. Stair Case wiring 2. 2. Florescent Lamp Fitting
	Exercise 1: **Identification of peripherals of a computer** **Block diagram of the CPU along with the configuration of the each peripheral and its functions.** **Exercise 2:**	

		System Assembling and Disassembling **Disassembling the components of a PC and assemble them back to working condition.** **Exercise 3:** **Installation of softwares** **Installation of operating Systems: Windows, Linux along with necessary Device Drivers, Installation of application softwares and Tools.** **Exercise 4:** **Troubleshooting (Demonstration)** **Hardware Troubleshooting: Identification of a problem and fixing a defective PC Software Troubleshooting: Identification of a problem and fixing the PC for any software issues.** **Exercise 5:** **Network Configuration and Internet** **Configuring TCP/IP, proxy and firewall settings, Internet and World Wide Web- Search Engines, Types of search engines, netiquette, cyber hygiene.** **Exercise 6:** **MS-Office / Open Office** **a. Word - Formatting, Page Borders, Reviewing, Equations, symbols.** **b. Spread Sheet - organize data, usage of formula, graphs and charts.** **c. Power point - features of power point, guidelines for preparing an effective Presentation.** **d. Access- creation of database, validate data.** **Exercise 7:** **LaTeX** **LaTeX - basic formatting, handling equations and images.**	

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Department of Humanities & Basic Sciences

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	MATHEMATICS-III	Partial Differential Equations and Vector Calculus
Course Code	171BS2T06	191BS2T05
Syllabus	UNIT - I: Laplace transforms: Laplace transforms of standard functions-First Shifting theorem, Change of scale, Multiplication with t, Division by t - Transforms of derivatives and integrals – Unit step function –Dirac's delta function, Periodic functions.	UNIT - I: Special Functions: Beta and Gamma functions, Properties, Relation between Beta and Gamma functions, Evaluation of improper integrals.
	UNIT- II: Inverse Laplace transforms: Inverse Laplace transforms – Convolution theorem (without proof), Second shifting theorem. *(MATLAB Exercise: Computing Laplace transform off (t) using symbolic toolbox, Solving initial value problems using 'dsolve') Applications: Evaluating improper integrals, solving initial value problems using Laplace transforms.	UNIT II: Partial Differential Equations: Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, Solutions of first order linear partial differential equations, nonlinear partial differential equations (standard types), Homogeneous linear partial differential equations with constant coefficients.
	UNIT - III: Multiple integrals and Beta, Gamma functions: Multiple integrals: Double and triple integrals – Change of variables – Change of order of integration, Beta and Gamma functions- Properties - Relation between Beta and Gamma functions Applications: Finding Areas and Volumes.	UNIT III: Multiple Integrals: Double integrals, Change of order of integration, Change of variables, Double integral in polar coordinates, Triple integrals,Finding Area and Volume as a double integral
	UNIT - IV: Vector Differentiation: Gradient - Directional Derivatives - Divergence- Curl - Laplacian operator - Vector identities. Applications: Equation of continuity, potential surfaces	UNIT IV: Vector Differentiation: Introduction, Gradient of a scalar field, Directional Derivative, Divergence of a vector field, Curl of a vector field, Solenoidal and irrotational fields, Conservative force field, Scalar potential, Laplace operator, Vector identities.
	UNIT - V: Vector Integration: Line integral – Work done - Surface and volume integrals,	UNIT V: Vector Integration: Introduction, Line integral, Work done, Surface and

	Green's Theorem, Stokes Theorem and Gauss Divergence theorem (without proof) and related problems.	volume integrals, Green's theorem, Stokes theorem and Gauss Divergence theorem (All theorems without proof) and related problems.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Applied Physics	Applied Physics
Course Code	171BS1T04/171BS2T04	191BS1T03/191BS2T07
Syllabus	UNIT-I: Interference: Principle of Superposition – Coherence– Interference in thin films (reflection geometry) – Newton's rings – construction and working principle of Interferometer.	UNIT-I Wave Optics: Principle of Superposition - Interference of light - Conditions for sustained Interference - Interference in thin films (reflected geometry) - Newton's Rings (reflected geometry). Diffraction - Fraunhofer Diffraction - Diffraction due to Single slit (quantitative), Double slit, N -slits and circular aperture (qualitative) – Intensity distribution curves - Diffraction Grating – Grating spectrum – missing order– resolving power – Rayleigh's criterion – Resolving powers of Microscope, Telescope and grating (qualitative).
	UNIT-II: Diffraction: Fraunhofer diffraction at single slit – Cases of double slit, N-slits, & circular aperture, grating equation – Rayleigh criterion of resolving power- Resolving power of a grating, Telescope and Microscopes	UNIT-II Quantum Mechanics: Introduction – Matter waves – de Broglie's hypothesis – Davisson-Germer experiment – G.P. Thomson experiment – Heisenberg's Uncertainity Principle –interpretation of wave function – Schröedinger Time Independent and Time Dependent wave equations – Particle in a potential box.
	UNIT-III: Polarization: Types of Polarization – Methods of production – Nicol Prism – Quarter wave plate and Half Wave plate-working principle of polarimeter (Sacharimeter). LASERS: Characteristics– Stimulated emission – Einstein's Transition Probabilities Pumping schemes- Ruby laser – Helium Neon laser-CO2 Laser-Applications	. UNIT-III Free Electron Theory: Introduction – Classical free electron theory (merits and demerits only) - Quantum Free electron theory – electrical conductivity based on quantum free electron theory – Fermi Dirac distribution function – Temperature dependence of Fermi Dirac distribution function - expression for Fermi energy -Density of states. BAND THEORY OF SOLIDS Bloch's theorem (qualitative) – Kronig-Penney model(qualitative) – energy

		bands in crystalline solids – E Vs K diagram – classification of crystalline solids – effective mass of electron – m* Vs K diagram - concept of hole.
	UNIT-IV: Quantum Mechanics: Introduction –Matter waves – Schrödinger Time Independent and Time Dependent wave equations – Particle in a box. FREE ELECTRON THEORY: Defects of classical free electron theory –Quantum Free electron theory – concept of Fermi Energy..	UNIT-IV Semiconductor Physics: Introduction– Intrinsic semi conductors - density of charge carriers - Electrical conductivity – Fermi level – extrinsic semiconductors - p-type & ntype - Density of charge carriers - Dependence of Fermi energy on carrier concentration and temperature – Hall effect- Hall coefficient - Applications of Hall effect - Drift and Diffusion currents – Einstein's equation.
	UNIT-V: Band Theory of Solids: Bloch's theorem (qualitative) – Kronig – Penney model (Qualitative) – energy bands in crystalline solids – classification of crystalline solids– effective mass of electron & concept of hole. Semiconductor Physics: Conduction – Density of carriers in Intrinsic and Extrinsic semiconductors – Drift & Diffusion – relevance of Einstein's equation- Hall effect in semiconductors.–	UNIT-V Magnetism: Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr magneton – Classification of magnetic materials: Dia, para & Ferro – Domain concept of Ferromagnetism - Hysteresis – soft and hard magnetic materials – applications of Ferromagnetic material. Dielectrics: Introduction - Dielectic polarization – Dielectric Polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative) – Lorentz Internal field – Claussius- Mossoti equation - Frequency dependence of polarization – Applications of dielectrics.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Physics Lab	Applied Physics Lab
Course Code	171BS1L02/171BS2L02	191BS1L03/191BS2L05
Syllabus	1. Determination of wavelength of a source-Diffraction Grating-Normal incidence..	1. Determination of wavelength of a source-Diffraction Grating-Normal incidence..
	2. Newton's rings – Radius of Curvature of Plano - Convex Lens	2. Newton's rings – Radius of Curvature of Plano - Convex Lens
	3. Determination of thickness of a spacer using wedge film and parallel interference fringes	3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
	4. Determination of Rigidity modulus of a material- Torsional Pendulum.	4. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus
	5. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum	5. Energy Band gap of a Semiconductor p - n junction
	6. Melde's experiment – Transverse and Longitudinal modes by capillary rise method.	6. Characteristics of Thermistor – Temperature Coefficients
	7. Verification of laws of vibrations in stretched strings – Sonometer.	7. Determination of dielectric constant by charging and discharging method
	8. Determination of velocity of sound – Volume Resonator.	8. Determination of resistivity of semiconductor by Four probe method
	. 9. L- C- R Series Resonance Circuit.	. 9. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
	10. Study of I/V Characteristics of Semiconductor diode.	10. Measurement of magnetic susceptibility by Quincke's method
	11. I/V characteristics of Zener diode.	11. Dispersive power of diffraction grating.
	12. Characteristics of Thermistor – Temperature Coefficients	12. Resolving Power of telescope
	13. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.	13. Resolving power of grating
	14. Energy Band gap of a Semiconductor p -	14. Determination of Hall voltage and Hall

	n junction.	coefficients of a given semiconductor using Hall-effect.
	15. Hall Effect in semiconductors.	15. Variation of dielectric constant with temperature
	16. Time constant of CR circuit.	
	17. Determination of wavelength of laser source using diffraction grating.	
	18. Determination of Young's modulus by method of single cantilever oscillations	
	19. Determination of lattice constant – lattice dimensions kit.	
	20. Determination of Planck's constant using photocell.	
	21. Determination of surface tension of liquid	
	22. Polarimeter – Determination of specific rotation of sugar solution..	
	23. Single Slit – Determination of Slit width using laser or Determination of Wavelength of laser	

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Department of Electrical and Electronics Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**Signals and Systems**	**Signals and Systems**
Course Code	**R1631023**	**171EE5T13**
	UNIT- I: Introduction: Definition of Signals and Systems, Classification of Signals, Classification of Systems, Operations on signals: time-shifting, time-scaling, amplitude-shifting, amplitude-scaling. Problems on classification and characteristics of Signals and Systems. Complex exponential and sinusoidal signals, Singularity functions and related functions: impulse function, step function signum function and ramp function. Analogy between vectors and signals, orthogonal signal space, Signal approximation using orthogonal functions, mean square error, closed or complete set of orthogonal functions, Orthogonality in complex functions.	**UNIT I Signals:** Introduction, Representation of signals, Elementary signals, Basic Operations on signals, Classification of Signals. **Signal Analysis:** Analogy between vectors and signals, Orthogonal vector space, Orthogonal signal space, Signal approximation by a set of mutual orthogonal signals, mean square error, Closed or complete set of orthogonal functions, Orthogonality in complex functions.
Syllabus	**UNIT –II: Fourier Series and Fourier Transform:** Fourier series representation of continuous time periodic signals, properties of Fourier series, Dirichlet's conditions, Trigonometric Fourier series and Exponential Fourier series, Complex Fourier spectrum. Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Fourier transform of periodic signals,	**UNIT II Fourier Series:** Representation of periodic signals using Fourier series, Trigonometric Fourier series and Exponential Fourier series, properties of Fourier series, Complex Fourier spectrum. **Fourier Transforms**: Deriving Fourier transform (FT) from Fourier series, Existence of Fourier transform, Fourier transform of standard signals, properties of Fourier transforms, Fourier transform of periodic signals, Fourier transforms

	properties of Fourier transforms, Fourier transforms involving impulse function and Signum function. Introduction to Hilbert Transform.	involving impulse signal and Signum signal.
	UNIT –III: Sampling Theorem – Graphical and analytical proof for Band Limited Signals, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, effect of under sampling – Aliasing, Introduction to Band Pass sampling.	**UNIT III Convolution and Correlation of Signals:** Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Convolution properties of Fourier transforms. Signal Comparison: Cross correlation and auto correlation of signals, properties of correlation function, Energy density spectrum, Power density spectrum, Relation between auto correlation function and energy/power spectral density function, Relation between convolution and correlation.
	UNIT-IV: Analysis Of Linear Systems: Linear system, impulse response, Response of a linear system, Linear time invariant (LTI) system, Linear time variant (LTV) system, Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, system bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Poly-Wiener criterion for physical realization, relationship between bandwidth and rise time. Cross-correlation and auto-correlation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between auto correlation function and energy/power spectral density function. Relation between convolution and correlation, Detection of periodic signals	**UNIT IV Signal Transmission Through LTI Systems:** Classification of systems, Linear time invariant (LTI) system, Impulse response of LTI systems, Properties of LTI systems, Transfer function of an LTI system, Filter characteristics of linear systems, Distortion less transmission through a system, Signal bandwidth, system bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Paley-Wiener criterion for physical realization, relationship between bandwidth and rise time. **Sampling:** Sampling, Sampling theorem – Graphical and analytical proof for Band Limited Signals, effect of under sampling – Aliasing, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, Sampling of Band Pass signals.

	UNIT –V: Laplace Transforms: Review of Laplace transforms, Partial fraction expansion, Inverse Laplace transform, Concept of region of convergence (ROC) for Laplace transforms, constraints on ROC for various classes of signals, Properties of L.T's, Relation between L.T's, and F.T. of a signal. Laplace transform of certain signals using waveform synthesis.	**UNIT V Laplace Transforms:** Review of Laplace transform (LT) , Existence of Laplace transform, Concept of region of convergence (ROC) for Laplace transforms, constraints on ROC for various classes of signals, Properties of Laplace transforms, relation between LTs, and FT of a signal, Inverse Laplace transform, Laplace transform using waveform synthesis. **Z–Transforms:** Z-Transform of a discrete time signal, Distinction between Laplace, Fourier and Z-transforms, Region of convergence in Z-Transform, constraints on ROC for various classes of discrete signals, Properties of Z-transforms, properties of Z-transforms, Inverse Z-transform.
	UNIT –VI: Z–Transforms: Fundamental difference between continuous-time and discrete-time signals, discrete time signal representation using complex exponential and sinusoidal components, Periodicity of discrete time using complex exponential signal, Concept of Z- Transform of a discrete sequence. Distinction between Laplace, Fourier and Z transforms. Region of convergence in Z-Transform, constraints on ROC for various classes of signals, Inverse Z-transform, properties of Z-transforms.	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Control Systems Lab	Control Systems Lab
Course Code	R1631027	171EE5L06
Syllabus	1.Time response of Second order system 2.Characteristics of Synchros 3.Programmable logic controller – characteristics of stepper motor 4.Effect of feedback on DC servo motor 5.Effect of P, PD, PI, PID Controller on a second order systems 6.Lag and lead compensation – Magnitude and phase plot 7.DC position control system 8.Transfer function of DC motor 9.Temperature controller using PID 10.Characteristics of magnetic amplifiers 11.Characteristics of AC servo motor 12.Characteristics of DC servo motor 13.Potentiometer as an error detector	1.To determine time response of Second order system. 2.To study the characteristics of Synchros - Transmitter and receiver. 3.To study the characteristics of stepper motor using Programmable logic controller. 4.To study the effect of feedback on DC servo motor. 5.To study the effect of P, PD, PI, PID Controller on a second order systems. 6.To Draw the magnitude and phase plots of lag and lead compensators. 7.To study the DC position control system. 8.To determine the transfer function of DC motor. 9.To study temperature controller using PID. 10.To draw the load Characteristics of magnetic amplifiers. **Augmented experiments:** 1.To draw the speed - torque characteristics of AC servo motor. 2.To draw the speed - torque characteristics of DC servo motor. 3.To study the Potentiometer as an error detector. 4.Verification of logic gates using PLC. 5.To simulate root locus using MATLAB. 6.To simulate Bode plot using MATLAB

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**Micro Processors and Micro controllers**	**Micro Processor and Micro Controllers**
Course Code	**R1632023**	**171EE6T16**
Syllabus	**UNIT–I: Introduction to Microprocessor Architecture** Introduction and evolution of Microprocessors– Architecture of 8086–Register Organization of 8086–Memory organization of 8086–General bus operation of 8086–Introduction to 80286–80386 and 80486 and Pentium.	**UNIT I: Introduction to microprocessor architecture:** Introduction and evolution of Microprocessors, Architecture of 8086, Register Organization of 8086, Memory organization of 8086, General bus operation of 8086, Introduction to 80286,80386 and 80486 and Pentium.
	UNIT–II: Minimum and Maximum Mode Operations Instruction set, addressing modes– Minimum and Maximum mode operations of 8086–8086 Control signal interfacing–Read and write cycle timing diagrams.	**UNIT II: Minimum and maximum mode operations:** Instruction set, addressing modes, assembler directives, Minimum and Maximum mode operations of 8086, 8086 Control signal interfacing, Read and write cycle timing diagrams.
	UNIT–III: I/O Interface 8255 PPI– Architecture of 8255–Modes of operation– Interfacing I/O devices to 8086 using 8255–Interfacing A to D converters–Interfacing D to A converters– Stepper motor interfacing– Static memory interfacing with 8086–DMA controller (8257)–Architecture– Interfacing 8257 DMA controller– Programmable Interrupt Controller (8259)–Command words and operating modes of 8259–Interfacing of 8259–Keyboard/display controller (8279)–Architecture–Modes of operation–Command words of	**UNIT III: 8086 interfacing:** Semiconductor memories interfacing (RAM, ROM), Intel 8259 programmable interrupt controller, Intel 8237a DMA controller, Intel 8255 programmable peripheral interface, Intel 8279 programmable keyboard/display controller, keyboard interfacing, stepper motor, A/D and D/A converters.

	8279– Interfacing of 8279.	
	UNIT–IV: Introduction to 8051 Micro Controller Overview of 8051 Micro Controller–Architecture– Register set–I/O ports and Memory Organization–Interrupts–Timers and Counters–Serial Communication.	**UNIT IV: Introduction to 8051 micro controller:** Overview of 8051 Micro Controller, Architecture, Register set, I/O ports and Memory Organization, Interrupts, Timers and Counters, Serial Communication. **PIC architecture:** Block diagram of basic PIC 18 micro controller, registers I/O ports.
	UNIT– V: PIC Architecture Block diagram of basic PIC 18 micro controller, registers I/O ports.	**UNIT V: Cyber physical systems and industrial applications of 8051:** Applications of Micro Controllers, Interfacing 8051 to LED's, Push button, Relay's and Latch Connections, Keyboard Interfacing, Interfacing Seven Segment Display, ADC and DAC Interfacing.
	UNIT– VI: Programming in C for PIC: Data types, I/O programming, logical operations, data conversion	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	**Pre-Revision**	**Post-Revision**
Course Title	**Power Electronics Lab**	**Power Electronics Lab**
Course Code	**R1632026**	**171EE6L08**
Syllabus	1.Study of Characteristics of Thyristor, MOSFET & IGBT. 2.Design and development of a firing circuit for Thyristor. 3.Design and development of gate drive circuits for IGBT. 4.Single -Phase Half controlled converter with R and RL load 5.Single -Phase fully controlled bridge converter with R and RL loads 6.Single -Phase AC Voltage Regulator with R and RL Loads 7.Single -Phase square wave bridge inverter with R and RL Loads 8.Three- Phase fully controlled converter with RL–load. 9.Design and verification of voltages gain of Boost converter in Continuous Conduction Mode(CCM) and Discontinuous Conduction Mode(DCM). 10.Design and verification of voltages ripple in buck converter in CCM operation. 11.Single -phase PWM inverter with sine triangle PWM technique. 12.3-phase AC-AC voltage regulator with R-load.	1.Study of Characteristics of Thyristor, MOSFET & IGBT. 2.Design and development of a firing circuit for Thyristor. 3.Design and development of gate drive circuits for IGBT. 4.Single -Phase half-controlled converter with R and RL load 5.Single -Phase fully controlled bridge converter with R and RL loads 6.Single -Phase AC Voltage Regulator with R and RL Loads 7.Single -Phase square wave bridge inverter with R and RL Loads 8.Three- Phase fully controlled converter with RL–load. 9.Design and verification of voltages gain of Boost converter in Continuous Conduction Mode (CCM) and Discontinuous Conduction Mode (DCM). 10.Design and verification of voltages ripple in buck converter in CCM operation. Augmented experiments: 1.Single -phase PWM inverter with sine triangle PWM technique. 2.3- Phase AC-AC voltage regulator with R-load. 3.Simulation of Buck, Boost and Buck-Boost converter. 4.Simulationof SPWM controlled Three-phase voltage source inverter.

		5.Simulation of 3 phase half and full wave converter with R, RL, RLE and RE loads. Plot the waveforms for Voltage across and current through the switch. 6.Closed Loop simulation- Buck/Boost DC-DC converter.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**Optimization Techniques**	**Optimization Techniques**
Course Code	**RT41030**	**R164102E**
Syllabus	**UNIT – I: Introduction and Classical Optimization Techniques:** Statement of an Optimization problem – design vector – design constraints – constraint surface – objective function – objective function surfaces – classification of Optimization problems.	**UNIT- I Introduction and Classical Optimization Techniques:** Statement of an Optimization problem, design vector, design constraints, constraint surface, objective function and objective function surfaces – classification of Optimization problems.
	UNIT – II: Classical Optimization Techniques Single Variable Optimization – multi variable Optimization without constraints – necessary and sufficient conditions for minimum/maximum – multivariable Optimization with equality constraints. Solution by method of Lagrange multipliers – multivariable Optimization with inequality constraints – Kuhn – Tucker conditions.	**UNIT- II Classical Optimization Techniques:** Single variable Optimization, multi variable Optimization without constraints, necessary and sufficient conditions for minimum/maximum, multivariable Optimization with equality constraints. Solution by method of Lagrange multipliers, multivariable Optimization with inequality constraints – Kuhn – Tucker conditions.
	UNIT – III: Linear Programming: Standard form of a linear programming problem – geometry of linear programming problems – definitions and theorems – solution of a system of linear simultaneous equations – pivotal reduction of a general system of equations – motivation to the simplex method – simplex algorithm - Duality in Linear Programming – Dual Simplex method.	**UNIT- III Linear Programming:** Standard form of a linear programming problem, geometry of linear programming problems, definitions and theorems, solution of a system of linear simultaneous equations, pivotal reduction of a general system of equations, motivation to the simplex method, simplex algorithm, Duality in Linear Programming and Dual Simplex method.
	UNIT – IV: Transportation Problem	**UNIT- IV Nonlinear Programming:** Unconstrained cases One-dimensional

	Finding initial basic feasible solution by north – west corner rule, least cost method and Vogel's approximation method – testing for optimality of balanced transportation problems – Special cases in transportation problem.	minimization methods: Classification, Fibonacci method and Quadratic interpolation method, Univariate method, Powell's method and steepest descent method. **Constrained cases-**Characteristics of a constrained problem, Classification, Basic approach of Penalty Function method, Basic approaches of Interior and Exterior penalty function methods. Introduction to convex Programming Problem.
	UNIT – V: Nonlinear Programming: Unconstrained cases - One – dimensional minimization methods: Classification, Fibonacci method and Quadratic interpolation method - Univariate method, Powell's method and steepest descent method. **Constrained cases** - Characteristics of a constrained problem, Classification, Basic approach of Penalty Function method; Basic approaches of Interior and Exterior penalty function methods. Introduction to convex Programming Problem.	**UNIT – V: Introduction to Evolutionary Methods:** Evolutionary programming methods - Introduction to Genetic Algorithms (GA)– Control parameters –Number of generation, population size, selection, reproduction, crossover and mutation – Operator selection criteria – Simple mapping of objective function to fitness function – constraints – Genetic algorithm steps – Stopping criteria – Simple examples.
	UNIT – VI: Dynamic Programming: Dynamic programming multistage decision processes – types – concept of sub optimization and the principle of optimality – computational procedure in dynamic programming – examples illustrating the calculus method of solution - examples illustrating the tabular method of solution.	**UNIT – VI: Introduction to Swarm Intelligence Systems:** Swarm intelligence programming methods - Basic Partial Swarm Optimization – Method – Characteristic features of PSO procedure of the global version – Parameters of PSO (Simple PSO algorithm – Operators selection criteria – Fitness function constraints) – Comparison with other evolutionary techniques – Engineering applications of PSO.

Kamesh
Course Coordinator

Head of the Department
Head of The Department
Dept. Of Electrical & Electronics Engineering
Aditya Engineering College (A9)

ADITYA ENGINEERING COLLEGE

An Autonomous Institutuion

Approved by AICTE • Permanently Affiliated to JNTUK • Accredited by NAAC with 'A' Grade

Recognised by UGC under sections 2(f) and 12(B) of UGC Act, 1956

Aditya Nagar, ADB Road, Surampalem - 533437, Near Kakinada, E.G.Dt., Ph:99498 76662

Program Name : B.Tech. in Mechanical Engineering

Syllabus Revision for the Academic Year 2019-2020

S.No	Semester	Course Code	Course Name	% of content revised for the existing year
1	I	191HS1T01	Communicative English	90
2	I	191BS1T01	Differential Equations and Linear Algebra	20
3	I	191BS1T02	Engineering Physics	60
4	I	191ES1T01	Programming for problem solving using C	0
5	I	191HS1L01	Communicative English Lab-I	0
6	I	191BS1L01	Engineering Physics Lab	60
7	I	191ES1L01	Programming for problem solving using C Lab	0
8	I	191ES1L02	Basic Engineering Workshop	72
9	I	191MC1A01	Environment Science	50
10	I	191MC1A02	Constitution of India	100
11	II	191BS2T05	Partial Differential equations and vector calculus	40
12	II	191BS2T06	Chemistry of Materials	70
13	II	191ES2T02	Engineering Graphics and design	45
14	II	191ES2T03	Essential Electrical and Electronics Engineering	0
15	II	191ES2T04	Engineering Mechanics	20
16	II	191HS2L02	Communicative English Lab-II	0
17	II	191BS2L04	Engineering Chemistry Lab	50

S.No	Semester	Course Code	Course Name	% of content revised for the existing year
18	II	191ES2L03	Essential Electrical and Electronics Engineering Lab	0
19	II	191ES2L07	Mechanical Engineering Workshop	100
20	II	191PR2P01	Engineering Exploration Project	100
21	III	171ES3T13	Metallurgy & Materials Science	0
22	III	171ES3T11	Mechanics of Solids	0
23	III	171ES3T12	Thermodynamics	0
24	III	171HS3T04	Managerial Economics and Financial Analysis	0
25	III	171ES3T14	Fluid Mechanics & Hydraulic Machinery	0
26	III	171ME3T01	Computer Aided Engineering Drawing Practice	0
27	III	171ES3L05	Basic Electrical And Electronics Engg. Lab	0
28	III	171ES3L06	Mechanics of Solids and Metallurgy Lab	0
29	III	171HS3A09	Professional Ethics &Human Values	0
30	III	171HS3A10	Employability skills-I	0
31	IV	171ME4T02	Kinematics of Machinery	0
32	IV	171ME4T03	Thermal Engineering -I	0
33	IV	171ME4T04	Production Technology	0
34	IV	171ME4T05	Design of Machine members-I	0
35	IV	171ME4T06	Industrial Engineering and Management	0
36	IV	171ME4T07	Machine Drawing	0
37	IV	171HS4T08	Intellectual Property rights and patents	0
38	IV	171ME4L01	Production Technology Lab	0

S.No	Semester	Course Code	Course Name	% of content revised for the existing year
39	IV	171ES4L07	Fluid mechanics and Hydraulic Machinery Lab	0
40	IV	171HS4A11	Employability Skills -II	0
41	V	171ME5T08	Dynamics of Machinery	0
42	V	171ME5T09	Metal Cutting and Machine Tools	0
43	V	171ME5T10	Thermal Engineering -II	0
44	V	171ME5T11	Design of Machine members-II	20
45	V	171ME5T12	Operations Research	0
46	V	171ME5E01	Automobile Engineering	36
47	V	171ME5E02	Mechanical Vibrations	100
48	V	171ME5E03	Additive Manufacturing	0
49	V	171HS5T06	Employability Skills -III	100
50	V	171ME5L02	Theory of Machines Lab	0
51	V	171ME5L03	Thermal Engineering Lab	28
52	V	171ME5S01	MOOCS-I	0
53	VI	171ME6T13	Heat Transfer	0
54	VI	171ME6T14	Refrigeration and Air Conditioning	0
55	VI	171ME6T15	Metrology and Instrumentation	48
56	VI	171ME6E04	Robotics	0
57	VI	171ME6E05	Design for Manufacturing	0
58	VI	171ME6E06	Non Destructive Evaluation	20
59	VI	171ME6E07	Unconventional Machining Processes	0

S.No	Semester	Course Code	Course Name	% of content revised for the existing year
60	VI	171ME6E08	Industrial Hydraulics and Pnuematics	15
61	VI	171ME6E09	Quality &Reliability Engineering	0
62	VI	171HS6T07	Employability Skills-IV	100
63	VI	171ME6L04	Machine Tools Lab	20
64	VI	171ME6L05	Heat Transfer Lab	0
65	VI	171ME6L06	Metrology & Instrumentation Lab	24
66	VI	171ME6S02	MOOCS-II	0
67	VII	R1641031	Mechatronics	0
68	VII	R1641032	CAD/CAM	0
69	VII	R1641033	Finite Element Methods	0
70	VII	R1641034	Power Plant Engineering	0
71	VII	R164103A	Computational Fluid Dynamics	0
72	VII	R164103B	Condition Monitoring	0
73	VII	R164103C	Additive Manufacturing	0
74	VII	R164103D	Advanced Materials	0
75	VII	R164103E	Design for Manufacture	0
76	VII	R164103F	Gas Dynamics and Jet Propulsion	0
77	VII	R1641037	CAD/CAM Lab	20
78	VII	R1641038	Mechatronics Lab	100
79	VIII	R1642031	Production Planning and Control	0
80	VIII	R1642032	Unconventional Machining Processes	0

S.No	Semester	Course Code	Course Name	% of content revised for the existing year
81	VIII	R1642033	Automobile Engineering	0
82	VIII	R164203A	Thermal Equipment Design	100
83	VIII	R164203B	Non Destructive Evaluation	16
84	VIII	R164203C	Quality &Reliability Engineering	0
85	VIII	R1642036	Project	0
Total number of courses in the academic year 2019-2020				= 85
Number of courses having revision in syllabus content >/= 20% in the academic year 2019-2020				= 27
Percentage of syllabus revision carried out in the academic year 2019-2020 = (49/135)*100				= 31.76

Program Coordinator

Head of the Department

Head of the Department
Department of Mechanical Engineering
Aditya Engineering College (A)
SURAMPALEM-533 437

PROGRAM STRUCTURE

I SEMESTER

Course Code	Name of the Course	Course Component	Periods/Week				Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	Total Hours	
191HS1T01	Communicative English	HSMC	3	0	0	3	3
191BS1T01	Differential Equations and Linear Algebra	BSC	3	0	0	3	3
191BS1T02	Engineering Physics	BSC	3	0	0	3	3
191ES1T01	Programming for Problem Solving Using C	ESC	3	0	0	3	3
191HS1L01	Communicative English Lab-I	HSMC	0	0	3	3	1.5
191BS1L01	Engineering Physics Lab	BSC	0	0	3	3	1.5
191ES1L01	Programming for Problem Solving Using C Lab	ESC	0	0	3	3	1.5
191ES1L02	Basic Engineering Workshop	ESC	0	0	3	3	1.5
191MC1A01	Environmental Science	MC	2	0	0	2	0
191MC1A02	Constitution of India	MC	2	0	0	2	0
		TOTAL	**16**	**0**	**12**	**28**	**18**

II SEMESTER

Course Code	Name of the Course	Course Component	Periods/Week				Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	Total Hours	
191BS2T05	Partial Differential Equations and Vector Calculus	BSC	3	0	0	3	3
191BS2T06	Chemistry of Materials	BSC	3	0	0	3	3
191ES2T02	Engineering Graphics and Design	ESC	1	0	3	4	2.5
191ES2T03	Essential Electrical and Electronics Engineering	ESC	3	0	0	3	3
191ES2T04	Engineering Mechanics	ESC	3	0	0	3	3
191HS2L02	Communicative English Lab-II	HSMC	0	0	2	2	1
191BS2L04	Engineering Chemistry Lab	BSC	0	0	3	3	1.5
191ES2L03	Essential Electrical and Electronics Engineering Lab	ESC	0	0	3	3	1.5
191ES2L07	Mechanical Engineering Workshop	ESC	0	0	3	3	1.5
191PR2P01	Engineering Exploration Project	PROJ	0	0	2	2	1
		TOTAL	**13**	**0**	**16**	**29**	**21**

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III SEMESTER

Course Code	Course Title	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practical (P)	Total Hours	
171ES3T13	Metallurgy and Material Science	ES	3	1	---	4	3
171ES3T11	Mechanics of Solids	ES	3	1	---	4	3
171ES3T12	Thermodynamics	ES	3	1	---	4	3
171HS3T04	Managerial Economics and Financial Analysis	HSS	3	1	---	4	3
171ES3T14	Fluid Mechanics and Hydraulic Machinery	ES	3	1	---	4	3
171ME3T01	Computer Aided Engineering Drawing Practice	PC	3	---	3	6	3
171ES3L05	Basic Electrical and Electronics Lab	ES	---	---	3	3	2
171ES3L06	Mechanics of Solids and Metallurgy Lab	ES	---	---	3	3	2
171HS3A09	Professional Ethics and Human Values	HSS	2	---	---	2	---
171HS3A10	Employability Skills - I	HSS	2	---	---	2	---
		TOTAL	22	5	9	36	22

IV SEMESTER

Course Code	Course Title	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practical (P)	Total Hours	
171ME4T02	Kinematics of Machinery	PC	3	1	---	4	3
171ME4T03	Thermal Engineering - I	PC	3	1	---	4	3
171ME4T04	Production Technology	PC	3	1	---	4	3
171ME4T05	Design of Machine Members - I	PC	3	1	---	4	3
171ME4T06	Industrial Engineering and Management	PC	3	1	---	4	3
171ME4T07	Machine Drawing	PC	3	---	3	6	3
171HS4T08	Intellectual Property Rights and Patents	HSS	2	---	---	2	1
171ME4L01	Production Technology Lab	PC	---	---	3	3	2
171ES4L07	Fluid Mechanics And Hydraulic Machinery Lab	ES	---	---	3	3	2
171HS4A11	Employability Skills - II	HSS	2	---	---	2	---
		TOTAL	22	5	09	36	23

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V SEMESTER

Course Code	Course Title	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practical (P)	Total Hours	
171ME5T08	Dynamics of Machinery	PC	3	1	---	4	3
171ME5T09	Metal Cutting and Machine Tools	PC	3	1	---	4	3
171ME5T10	Thermal Engineering – II	PC	3	1	---	4	3
171ME5T11	Design of Machine Members – II	PC	3	1	---	4	3
171ME5T12	Operations Research	PC	3	1	---	4	3
---	Professional Elective – I	PE	3	1	---	4	3
171HS5T06	Employability Skills – III	HSS	2	---	---	2	1
171ME5L02	Theory of Machines Lab	PC	---	---	3	3	2
171ME5L03	Thermal Engineering Lab	PC	---	---	3	3	2
171ME5S01	MOOCs – I	SS	---	---	---	---	---
		TOTAL	20	6	6	32	23

VI SEMESTER

Course Code	Course Title	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practical (P)	Total Hours	
171ME6T13	Heat Transfer	PC	3	1	---	4	3
171ME6T14	Refrigeration and Air – Conditioning	PC	3	1	---	4	3
171ME6T15	Metrology and Instrumentation	PC	3	1	---	4	3
---	Professional Elective – II	PE	3	1	---	4	3
---	Professional Elective – III	PE	3	1	---	4	3
171HS6T07	Employability Skills - IV	HSS	2	---	---	2	1
171ME6L04	Machine Tools Lab	PC	---	---	3	3	2
171ME6L05	Heat Transfer Lab	PC	---	---	3	3	2
171ME6L06	Metrology / Instrumentation Lab	PC	---	---	3	3	2
171ME6S02	MOOCs – II	SS	---	---	---	---	---
		TOTAL	17	5	09	31	22

MOOCs – Massive Open Online Courses

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Surampalem

Professional Elective – I (V Semester)

S.No	Course Code	Name of the Course
1	171ME5E01	Automobile Engineering
2	171ME5E02	Mechanical Vibrations
3	171ME5E03	Additive Manufacturing

Professional Elective – II (VI Semester)

S.No	Course Code	Name of the Course
1	171ME6E04	Robotics
2	171ME6E05	Design for Manufacturing
3	171ME6E06	Non-Destructive Evaluation

Professional Elective – III (VI Semester)

S.No	Course Code	Name of the Course
1	171ME6E07	Unconventional Machining Processes
2	171ME6E08	Industrial Hydraulics and Pneumatics
3	171ME6E09	Quality and Reliability Engineering

Professional Elective – IV (VII Semester)

S.No	Course Code	Name of the Course
1	171ME7E10	Computational Fluid Dynamics
2	171ME7E11	Green Engineering Systems
3	171ME7E12	Nano Materials and Technology

Professional Elective – V (VII Semester)

S.No	Course Code	Name of the Course
1	171ME7E13	Gas Dynamics
2	171ME7E14	Condition Monitoring
3	171ME7E15	Flexible Manufacturing Systems

Professional Elective – VI (VIII Semester)

S.No	Course Code	Name of the Course
1	171ME8E16	Production Planning and Control
2	171ME8E17	Advanced Materials
3	171ME8E18	Thermal Equipment Design

Open Elective (VIII Semester)

S.No	Course Code	Name of the Course
1	171ME8O01	Java Programming
2	171ME8O02	Electrical Safety Management
3	171EE8O04	Neural Networks And Fuzzy Logic
4	171CE8O02	Database Management Systems
5	171ME8O03	Entrepreneur Resource Planning
6	171ME8O04	Computer Graphics

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IV Year - I Semester

S. NO	Subjects	L	T	P	Credits
1	Mechatronics	4	--	--	3
2	CAD/CAM	4	--	--	3
3	Finite Element Methods	4	--	--	3
4	Power Plant Engineering	4	--	--	3
5	**Elective I** 1. Computational Fluid Dynamics 2. Condition Monitoring 3. Additive Manufacturing	4	--	--	3
6	**Elective II** 1. Advanced Materials 2. Design for Manufacture 3. Gas Dynamics & Jet Propulsion	4	--	--	3
7	CAD/CAM Lab	--	--	2	2
8	Mechatronics Lab	--	--	2	2
Total Credits					**22**

IV Year - II Semester

S. No.	Subjects	L	T	P	Credits
1	Production Planning and Control	4	--	--	3
T 2	Unconventional Machining Processes	4	--	--	3
3	Automobile Engineering	4	--	--	3
4	**Elective III** 1. Thermal Equipment Design 2. Non Destructive Evaluation 3. Quality and Reliability Engineering	4	--	--	3
5	Seminar	--	3	--	2
6	Project	--	--	--	10
Total Credits					**24**

Total Course Credits = 48+44 + 42 + 46 = 180

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COMMUNICATIVE ENGLISH

(Common to all branches)

I Semester **L T P C**
Course Code:191HS1T01 **3 0 0 3**

Introduction:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training the students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competence of the students of Engineering. As far as the detailed textbooks are concerned, the focus should be on the skills of Listening, Speaking, Reading and Writing. The non-detailed textbooks are meant for extensive reading both to instruct and delight. Hence the focus in the syllabus is primarily on the development of communicative skills and fostering of ideas about the essence of English Communication.

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1: Identify the ways to overcome fear and use of words paradoxically, interpret the developing conditions and the core competences of the state to prioritize education system.
CO 2: Explain about world's most precious natural resources.
CO 3: Explain about importance of unity to abolish war.
CO 4: Respond well to the changing situations in life with independent knowledge for better decision making.
CO 5: Demonstrate writing and concepts of effective writing skills.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12
CO1	-	-	-	-	-	-	1	-	-	3	-	-
CO2	-	-	-	-	-	-	1	-	-	3	-	-
CO3	-	-	-	-	-	-	-	-	-	3	-	-
CO4	-	-	-	-	-	-	-	-	2	3	-	2
CO5	-	-	-	-	-	-	-	-	1	3	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO1	PSO2
CO1	-	
CO2	-	
CO3	-	
CO4	-	
CO5	-	

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Methodology:

1. The class is to be learner-centered where the learners are to read the texts to get a comprehensive idea of those texts on their own with the help of the peer group and the teacher.
2. Integrated skill development methodology has to be adopted with focus on individual language skills as per the tasks/exercise.
3. The tasks/exercises at the end of each unit should be completed by the learners only and the teacher intervention is permitted as per the complexity of the task/exercise.
4. The teacher is expected to use supplementary material wherever necessary and generate activities/tasks as per the requirement.
5. The teacher is permitted to use lecture method when a completely new concept is introduced in the class.

Recommended Topics:

UNIT-I:

1. An Astrologers' Day - R.K. Narayan (Detailed)
2. Bade Bhai Saab - Munshi Prachanda (Non-Detail)

UNIT-II:

1. Building A New State - A. P. J. Abdul Kalam (Detailed)
2. Morning Bells- Jayashree Mohan Raj (Non-Detail)

UNIT-III:

1. Water: The Elixer of Life- C. V. Raman (Detailed)
2. The Power of Plate of Rice- Ifeoma Okoye (Non-Detail)

UNIT-IV:

1. The Woodrose-Abburi Chaya Devi (Detailed)
2. The Cop and The Anthem- O. Henry (Non-Detail)

UNIT-V:

1. Progress- St. John Ervine (Detailed)
2. Dial 000- Barry Rosenberg (Non-Detail)

Textbooks:

Detailed Textbook: 'Using English' by Orient Black Swan.
Non-Detailed Textbook: 'Life, Language and Culture - Explorations' by Cengage.

Reference Books:

1. Objective English, Pearson Publications.
2. Effective English Communication, Tata Mc Graw-Hill Publishing.
3. Effective Technical English, Scitech.

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DIFFERENTIAL EQUATIONS AND LINEAR ALGEBRA
(Common to all branches)

I Semester **L T P C**
Course Code: 191BS1T01 **3 0 0 3**

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Apply the concepts of Mean Value theorem, Partial Differentiation and identify the maxima and minima of a given function.
CO 2: Solve the linear differential equations and model various situations involving differential equations of first order.
CO 3: Solve linear differential equations of higher order and model various situations involving second order differential equations.
CO 4: Calculate Rank of a matrix and solve the system of Linear equations and find the Eigen values and Eigen vectors.
CO 5: Compute various powers of a matrix and identify the nature of the quadratic form.

Mapping of Course Outcomes with Program Outcomes:

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-

Mapping of Course outcomes with program specific outcomes

CO / PSO	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

UNIT I:
Differential Calculus:
Rolle's theorem, Lagrange's theorem, Cauchy Mean Value theorem, Taylor's and Maclaurin's theorems (All theorems Without Proof).
Partial Differentiation: Euler's theorem (without proof), Total derivative, Chain rule, Taylor's and Maclaurin's series expansion of functions of two variables, Jacobian, Functional dependence.
Applications:
Maxima and Minima of functions of several variables without constraints and with constraints (Lagrange's method).
** (SCILAB Exercise: Plot graphs of various single and multivariable functions).

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UNIT II:

Differential equations of first order:
Introduction to differential equations, linear differential equation of first order - Bernoulli differential equation - Exact differential equations- Equations reducible to exact,
Applications:
Orthogonal trajectories, Newton's Law of cooling, RL circuit.
UNIT III:
Linear differential equations of second and higher order:
Linear differential equations of higher order with constant coefficients, Complementary function and Particular integral with RHS term of the type polynomials in x, e^{ax}, sin ax, cos ax, e^{ax} V(x), xV(x)- Method of Variation of parameters, Equations reducible to constant coefficients –Cauchy-Euler equation, Legendre's equation.
Application: LCR Circuit
** (SCILAB Exercise: Introduction to SCILAB commands and Solution of Initial Value Problems)

UNIT IV:
System of linear equations, Eigen values and Eigen vectors:
Definition of a Vector space, Linear dependence and independence of vectors, Rank of a matrix, Echelon form and Normal form, solving system of Homogenous and Non homogenous linear equations- Gauss Jordon elimination method, Eigen values, Eigen vectors, Properties of eigen values and eigen vectors (without proof)
Applications:
Free vibrations of a two mass system

UNIT V:
Quadratic forms:
Cayley -Hamilton theorem (without proof), Inverse and powers of a matrix by using Cayley -Hamilton theorem, Diagonalization of a matrix, Quadratic forms, Reduction of quadratic form to canonical form using orthogonal transformation, Nature of the quadratic form.
**(SCILAB Exercise: Basic Operations on matrices, computation of rank, computation of eigen values and eigen vectors)
**Not to be examined

Textbooks:

1. Advanced Engineering Mathematics, R.K.Jain, S.R.K.Iyenkar, Alpha Science Publications.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India.
3. B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
4. P.Sivaramakrishna Das, C.Vijayakumari, Engineering Mathematics, Pearson Publications.

Reference Books:

1. D.G.Zill, MICHAIL R CULTER, Advanced Engineering Mathematics 3rd Edition Norosa Publications 2009.
2. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press.
3. Peter O'neil, Advanced Engineering Mathematics, Cengage Learning.
4. Glyn James, Advanced modern engineering mathematics, Pearson education.

ENGINEERING PHYSICS
(Common to CE, ME, Min.E, PT, Ag.E)

I Semester **L T P C**
Course Code: 191BS1T02 **3 0 0 3**

Course Outcomes:
At the end of the Course, Student will be able to:

- CO 1: Explain the basic concepts of crystal structure and X-ray diffraction Techniques.
- CO 2: Apply the knowledge of acoustics to improve acoustic quality of concert halls and understand the concepts of flaw detection techniques using ultrasonics.
- CO 3: Apply the structure- property relationship exhibited by solid materials within the elastic limit.
- CO 4: Explain the basic concepts of LASERs along with its Engineering applications and familiarize with types of sensors for various engineering applications.
- CO 5: Explain about magnetic and dielectric properties of different materials.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	2	1	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	2	1	-	-	-	-	-	-	-	-	-	-
CO5	2	1	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

UNIT-I

Crystal Structure : Basis and lattice – Crystal Systems – Bravais Lattice - Symmetry elements- Unit cell-packing fraction – coordination number- Miller indices – Separation between successive (h k l) planes – Bragg's law-Bragg's x-ray spectrometer.

Crystal Defects: (qualitative description only) Point defects-Schottky, Frenkel defects, Line defects-Edge, screw dislocations.

UNIT-II

Acoustics: Introduction – Reverberation - Reverberation time - Sabine's formula (Derivation)–absorption coefficient and its determination- factors affecting acoustics of buildings and their remedies.

Ultrasonics: Production of ultrasonics by Magnetostriction and piezoelectric methods – Detection of ultrasonics - acoustic grating - Non-Destructive Testing- pulse echo system through transmission and reflection modes - Applications.

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UNIT-III

Elasticity: Stress, strain, Hooke's law, stress-strain curve, generalized Hooke's law with and without thermal strains for isotropic materials, different types of moduli and their relations, bending of beams – Bending moment of a beam – Depression of cantilever.

UNIT-IV

Laser: Introduction to wave optics & Interferometer-Characteristics–Spontaneous and Stimulated emission of radiation – population inversion - Einstein's coefficients & Relation between them and their significance - Pumping Mechanisms - Ruby laser – Helium Neon laser – CO_2 laser-Applications.

Sensors: (qualitative description only): Different types of sensors and applications; Strain and Pressure sensors- Piezoelectric, magnetostrictive sensors, Temperature sensor - bimetallic strip, pyroelectric detectors.

UNIT-V

Magnetism: Introduction – Magnetic dipole moment – Magnetization-Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr Magneton - Classification of magnetic materials (Dia, Para and Ferro) – Domain concept of Ferromagnetism - Hysteresis – soft and hard magnetic materials – Applications of Ferromagnetic materials.

Dielectrics: Introduction - Dielectric polarization – Dielectric polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative)-Lorentz internal field – Claussius_Mossoti equation- Frequency dependence of polarization - Applications of dielectrics.

Textbooks:

1. "Text book of Engineering Physics" by P G Kshirsagar & M N Avadhanulu, S Chand & Company Ltd
2. "Engineering Physics" by R K Gaur and S L Gupta, Dhanpat Rai Publications.
3. "Sensor and Transducers" by Ian R Sinclair, Elsevier (Newnes) 3rd Eds.

Reference Books:

1. "Engineering Physics" by M R Srinivasan, New Age International Publishers.
2. "Lectures on Physics" by Richard P Feynman, Pearson Publishers, New Millennium Eds.
3. "Lasers and Non-linear Optics" by B B Laud, New Age International Publishers (3rd Eds.).

Weblinks:

1. http://nptel.ac.in/courses/122107035/11
2. http://nptel.ac.in/courses/115102023/
3. https://phet.colorado.edu/en/simulations/category/physics
4. http://physicsgecg.blogspot.in/p/reading-materials.html
5. https://sites.google.com/site/physicsbysureshsaganti/home

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ENGINEERING PHYSICS LAB
(Common to CE, ME, Min.E, PT, Ag.E)

I Semester **L T P C**
Course Code: 191BS1L01 **0 0 3 1.5**

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1 : Determine the rigidity and young's modulus to understand material properties.
CO 2 : Determine Acceleration due to Gravity and Radius of Gyration and spring constant by oscillatory mechanics.
CO 3 : Find the strength of the magnetic field.
CO 4 : Determine wave length of unknown source, particle size using lasers.
CO 5 : Determination of velocity of sound, moment of inertia.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	2	-	-	1
CO2	3	2	-	-	-	-	-	-	2	-	-	1
CO3	2	1	-	-	-	-	-	-	2	-	-	1
CO4	3	2	-	-	-	-	-	-	2	-	-	1
CO5	3	2	-	-	-	-	-	-	2	-	-	1

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

LIST OF EXPERIMENTS:
(Any 10 of the following listed experiments)

1. Determination of Rigidity modulus of a material- Torsional Pendulum.
2. Determination of Young's modulus by method of single cantilever oscillations.
3. Determination of Acceleration due to Gravity and Radius of Gyration - Compound Pendulum.
4. Verification of laws of vibrations in stretched strings – Sonometer.
5. Determination of spring constant of springs using coupled oscillators.
6. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus
7. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
8. Measurement of magnetic susceptibility by Gouy's method.
9. Determination of ultrasonic velocity in liquid (Acoustic Grating)
10. Determination of dielectric constant by charging and discharging method
11. Determination of wavelength of Laser by diffraction grating
12. Determination of particle size using Laser.
13. Determination of Pressure variation using strain Gauge sensor.

14. Determination of Moment of Inertia of a Fly Wheel.
15. Determination of Velocity of sound –Volume Resonator.

LIST OF AUGMENTED EXPERIMENTS

16 to 19 (Any two of the following experiments can be performed)

16. Determine the Young's Modulus of the material of the bar subjected to uniform bending
17. Determine the Young's Modulus of the material of the bar subjected to non-uniform bending
18. V-I characteristics of P-N junction Diode.
19. V-I characteristics and Breakdown voltage of Zener Diode

Reference Books:

1. Engineering Physics Lab Manual by Dr.C.V.Madhusudhana Rao, V.Vasanth Kumar, Scitech Publications.
2. Laboratory Manual cum Record for Engineering Physics I & II by Dr.Y.Aparna, Dr.K.Venkateswara Rao, VGS Techno series.

ENGINEERING PHYSICS - VIRTUAL LAB – ASSIGNMENTS

LIST OF EXPERIMENTS

1. Hall Effect
2. Crystal Structure
3. Brewster's angle
4. Numerical Aperture of Optical fiber
5. Photoelectric Effect
6. LASER – Beam Divergence and Spot size
7. Michelson's interferometer
8. Black body radiation
9. Flywheel – moment of inertia
10. AC Sonometer
11. Resistivity by four probe method
12. Newton's rings –Refractive index of liquid

Weblinks:

1. www.vlab.co.in

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ENVIRONMENTAL SCIENCE
(Common to all branches)

I Semester
Course Code: 191MC1A01

L	T	P	C
2	0	0	0

Course Outcomes

At the end of the Course, Student will be able to:

CO1: Outline the natural resources and their importance for the sustenance of the life
CO2: Explain about the biodiversity of India, threats and its conservation methods
CO3: Illustrate various attributes of the pollution, impacts and measures to control the pollution along with waste management practices
CO4: Describe social issues of both rural and urban environment to combat the challenges and the legislations of India in environmental protection
CO5: Explain the population growth and its implications

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	-	-	-	-	-	1	2	-	-	-	-	-
CO2	-	-	-	-	-	1	2	-	-	-	-	-
CO3	-	-	-	-	-	1	2	-	-	-	-	-
CO4	-	-	-	-	-	1	2	-	-	-	-	-
CO5	-	-	-	-	-	1	2	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO/PSO	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

UNIT- I:

Multidisciplinary Nature of Environmental Studies:

Definition, Scope and Importance, Need for Public Awareness.

Natural Resources: Renewable and non-renewable resources – Natural resources and associated problems.

UNIT - II:

Ecosystem, Biodiversity and Its Conservation:

Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers. Food chains, food webs and ecological pyramids.

Biodiversity And Its Conservation: Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Values of biodiversity. Hot-spots of biodiversity – Threats to biodiversity. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT - III:

Environmental Pollution and Solid Waste Management:

Environmental Pollution: Definition, Cause, effects and control

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measures of:

a. AirPollution.
b. Waterpollution
c. Soilpollution
d. Marine pollution
e. Noise pollution

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution.

UNIT - IV:

Social Issues and the Environment: From Unsustainable to Sustainable development – Urban problems related to Energy &Water. Resettlement and rehabilitation of people, Environmental ethics, Climate change, global warming, acid rain, ozone layerdepletion, nuclear accidents and holocaust. Environment Protection Act – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution)Act-Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

UNIT - V:

Human population and the environment: Population growth, variation among nations. Environment and human health, Human Rights, Value Education. Role of Information Technology in Environment and human health.

Textbooks:

1. TextbookofEnvironmentalStudies for UndergraduateCoursesbyErachBharuchafor University Grants Commission, Universities Press.
2. Environmental Studies by Palaniswamy – Pearson education.
3. Environmental Studies by Dr.S.Azeem Unnisa, Academic Publishing Company.

Reference Books:

1. TextbookofEnvironmentalSciencebyDeeksha DaveandE.SaiBaba Reddy,Cengage Publications.
2. TextbookofEnvironmentalSciencesand TechnologybyM.AnjiReddy,BSPublication.
3. Comprehensive Environmental studies by J.P.Sharma, Laxmipublications.
2. Environmental sciences and engineering – J. Glynn Henry and Gary W. Heinke – Prentice hall of India Privatelimited.
3. A Text Book of Environmental Studies by G.R.Chatwal, Himalaya PublishingHouse.
4. IntroductiontoEnvironmentalengineeringandsciencebyGilbertM. Mastersand Wendell P. Ela - Prentice hall of India Privatelimited.

Weblinks:

1 https://www.youtube.com/watch?v=mOwyPENHhbc
2 https://www.youtube.com/watch?v=_mgvsPnCYj4
3 https://www.youtube.com/watch?v=L5B-JMnBIyQ
4 https://www.youtube.com/watch?v=3RDGV5i82_Q

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BASIC ENGINEERING WORKSHOP
(Common to all branches)

I Semester **L T P C**
Course Code: 191ES1L02 **0 0 3 1.5**

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1 : Prepare carpentry joints using carpentry tools
CO 2 : Develop various fitting joints using fitting tools.
CO 3 : Develop component drawings for making the sheet metal models.
CO 4 : Prepare sheet metal models using drawings and tin smithy tools
CO 5 : Experiment with the various house wiring connections.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	1	-	-	-	-	-	-	-	1	-	-	1
CO2	1	-	-	-	-	-	-	-	1	-	-	1
CO3	1	-	-	-	-	-	-	-	1	-	-	1
CO4	1	-	-	-	-	-	-	-	1	-	-	1
CO5	1	-	-	-	-	-	-	-	1	-	-	1

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1	PSO 2
CO1	1	-
CO2	1	-
CO3	1	-
CO4	1	-
CO5	1	-

List of Experiments:

Carpentry:
1. Cross Lap Joint
2. Dovetail Joint
3. T - Joint

Fitting:
4. Vee Fit
5. Square Fit

House Wiring:
6. Parallel Connection of three bulbs
7. Series Connection of three bulbs

Tin Smithy:
8. Taper Tray
9. Funnel
10. Plain Pipe

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List of Augmented Experiments:
(Student can perform any one of the following experiments)
1. Stair Case wiring
2. Florescent Lamp Fitting

Reference Books:

1. Engineering Workshop by Dr. A. B. Srinivasa Rao, AMIGO Books.
2. Manual on Workshop practice by Dr. P.Kannaiah & Dr. K.L.Narayana, Scitech publications.

Weblinks:

1. http://tite.ac.in/index.php/departments/mechanical-engineering/workshop
2. https://www.gopracticals.com/basic-engineering/workshop/

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PARTIAL DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS
(Common to CE, EEE, ME, Min.E, PT & Ag.E)

	L	T	P	C
II Semester				
Course Code: 191BS2T05	3	0	0	3

Course Outcomes:
At the end of the Course, Student will be able to:

- CO 1: Solve improper integrals using beta and gamma functions.
- CO 2: Solve partial differential equations of first order.
- CO 3: Compute the double integral over a region and triple integral over a volume.
- CO 4: Calculate the gradient of a scalar function, divergence and curl of a vector function.
- CO 5: Apply line, surface and volume integrals.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-

Mapping of Course outcomes with program specific outcomes

CO/PSO	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

UNIT - I:

Special Functions:
Beta and Gamma functions, Properties, Relation between Beta and Gamma functions, Evaluation of improper integrals.

UNIT II:

Partial Differential Equations:
Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, Solutions of first order linear partial differential equations, nonlinear partial differential equations (standard types), Homogeneous linear partial differential equations with constant coefficients.

UNIT III:

Multiple Integrals:
Double integrals, Change of order of integration, Change of variables, Double integral in polar coordinates, Triple integrals, Finding Area and Volume as a double integral.

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UNIT IV:

Vector Differentiation:

Introduction, Gradient of a scalar field, Directional Derivative, Divergence of a vector field, Curl of a vector field, Solenoidal and irrotational fields, Conservative force field, Scalar potential, Laplace operator, Vector identities.

UNIT V:

Vector Integration:

Introduction, Line integral, Work done, Surface and volume integrals, Green's theorem, Stokes theorem and Gauss Divergence theorem (All theorems without proof) and related problems.

Textbooks:

1. Advanced Engineering Mathematics, R.K.Jain, S.R.K.Iyenkar, Alpha Science Publications.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley- India.
3. B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
4. P.Sivaramakrishna Das, C.Vijayakumari, Engineering Mathematics, Pearson Publications.

Reference Books:

1. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press.
2. Dass H.K., Rajnish Verma. Er.,Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd,Delhi.
3. Higher engineering mathematics by John Bird, 5th edition Elsevier Limited, 2006.

Weblinks:

1. https://nptel.ac.in/courses/111107108/25
2. https://nptel.ac.in/courses/111103021/
3. https://nptel.ac.in/courses/111105122/
4. http://mathworld.wolfram.com
5. https://www.khanacademy.org

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CHEMISTRY OF MATERIALS
(Common to CE, ME, Min.E, PT& Ag.E)

II Semester **L T P C**
Course Code: 191BS2T06 **3 0 0 3**

Course Outcomes
At the end of the Course, Student will be able to:

CO 1: Compare the quality of drinking water and problems associated with hard water.
CO 2: Explain the fundamentals and applications of Electrochemical energy systems.
CO 3: Explain fundamentals and applications of polymers and building materials.
CO 4: Explain the fundamentals and controlling methods of corrosion.
CO 5: Explain the properties and applications of Nano materials, conductors, Semiconductors and Super conductors.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	-	-	-	-	-	-	-	-	-
CO3	2	-	-	-	-	-	-	-	-	-	-	-
CO4	2	-	-	-	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO/PO	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

UNIT- I:
Water Technology:
Introduction –Soft Water and hardness of water, types of hardness of water, degree of hardness of water, Units of hardness of water, problems on hardness, Boiler troubles - scale and sludge, Boiler corrosion, Industrial water treatment- zeolite and ion-exchange processes.
Specifications for drinking water, Bureau of Indian Standards (BIS) and World health organization(WHO) standards, - desalination of brackish water, reverse osmosis (RO) and electro dialysis.

UNIT - II:
Electrochemical Energy Systems:
Introduction-Electrochemical Cell(Galvanic cell), Electrochemical series, Applications, single electrode potential, Hydrogen and Calomel electrode, Nernst Equation for a single electrode ,Concentration Cells(Electrode & Electrolyte),Construction of glass electrode.
Batteries – Classical batteries-dry/Leclanche cell, Modern batteries-zinc air, lithium cells-Li MnO_2 cell- challenges of battery technology. Fuel cells- Introduction- classification of fuel cells – hydrogen and oxygen fuel cell, propane, and oxygen fuel cell-Merits of fuel cell.

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UNIT - III:

Polymers and Building Materials:

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation (Free radical mechanism for addition polymerization)

Plastics - Thermoplastic and Thermosetting, Preparation, properties, and applications of – PVC, Bakelite.

Steel – Types of Steel, chemical composition – applications of alloy steels

Cement: Portland cement, constituents, Manufacture of Portland Cement, chemistry of setting and hardening of cement.

UNIT - IV:

Corrosion Engineering:

Corrosion: Definition – theories of corrosion, dry corrosion, and electro chemical corrosion – factors affecting corrosion, nature of the metal and nature of the environment.

Corrosion controlling methods: Sacrificial and Impressed current cathodic protection, Metallic coatings, anodic coatings, cathodic coating, galvanizing, and tinning, metal cladding, Electroplating –organic coatings, paints (constituents and their functions).

UNIT - V:

Material Science and Engineering:

Nano Materials: Introduction to Nano materials, chemical synthesis of nanomaterials: Sol-gel method, characterization of nanomaterials by TEM (includes basic principle of TEM), Applications of nanomaterials in wastewater treatment, lubricants, and engines

Nanotubes: Carbon Nano tubes- Types of CNT's-preparation methods–Arc vaporization, Laser abiliation and chemical vapour deposition –properties and applications.

Band Theory of Solids: Introduction –Explanation of conductors, semiconductors, Insulators by Band Theory- Super Conductors-Types-Preparation-Properties and Applications.

Appendix: Introduction to Smart Materials.

Textbooks:

1.P.C. Jain and M. Jain, Engineering Chemistry, 16/e, Dhanapat Rai & Sons, (2014).
2.B.K. Sharma, Engineering Chemistry, Krishna Prakasham, (2014).
3. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.

Reference Books:

1. Sashi Chawla, A Textbook of Engineering Chemistry, Dhanapath Rai and sons, (2003).
2. B.S Murthy and P. Shankar, A Textbook of Nanoscience and Nanotechnology, University Press (2013).
3. S.S. Dara, A Textbook of Engineering Chemistry, S. Chand& Co, (2010).

Weblinks:

1 http://www.nptelvideos.in/2012/11/chemistry-of-materials
2 http://www.nptelvideos.com/lecture.php?id=2946
3 http://www.nptelvideos.com/lecture.php?id=2922
4 http://www.nptelvideos.com/lecture.php?id=2954

ENGINEERING GRAPHICS AND DESIGN
(Common to CE, ME, ECE, CSE, IT, Min.E, PT & Ag.E)

II Semester
Course Code: 191ES2T02

L	T	P	C
1	0	3	2.5

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Make use of fundamentals of Engineering Drawing to sketch basic curves, conic sections, cycloid, epicycloid, hypocycloid and involute.
CO 2: Apply the principles of orthographic projections for points, lines and planes.
CO 3: Apply the principles of orthographic projections for solids.
CO 4: Apply the AutoCAD software for the orthographic projection of the machine parts.
CO 5: Apply the AutoCAD software for the isometric projection of the machine parts.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	1	-	-	-	-	-	-	-	-	1	-	1
CO2	1	-	-	-	-	-	-	-	-	1	-	1
CO3	1	-	-	-	-	-	-	-	-	1	-	1
CO4	1	-	-	-	3	-	-	-	-	1	-	1
CO5	1	-	-	-	3	-	-	-	-	1	-	1

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO1	PSO2
CO1	1	-
CO2	1	-
CO3	1	-
CO4	1	-
CO5	1	-

CONVENTIONAL DRAFTING

Unit-I

Introduction to Engineering graphics: Principles of Engineering Graphics and their significance- conventions in drawing- lettering – BIS Conventions- - Conic sections -Cycloid, epicycloids and hypocycloid-Involutes

UNIT-II

Projection of points, lines and planes: Projection of points in any quadrant, lines inclined to one or both planes, finding true lengths, angle made by line. Projections of regular plane surfaces.

UNIT-III

Projections of solids: Projections of regular solids inclined to one or both planes by rotational or auxiliary views method.

COMPUTER AIDED DRAFTING

UNIT-IV

Introduction to Computer Aided Drafting: Basic drawing and editing commands- Dimensioning principles and conventional representations, Systems of projections, Conventions and application to orthographic projections

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UNIT-V

Isometric Projections: Principles of isometric projection- Isometric scale; Isometric views: lines, planes, figures, simple and compound solids

Textbooks:

1. N.D.Bhatt, Engineering Drawing, 53rd Edition, Charotar Publishers, 2016.
2. K.L.Narayana & P.Kannaiah, Engineering Drawing, 3rd Edition, Scitech Publishers, Chennai, 2012.

Reference Books:

1. Dhanajay A Jolhe, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2009.
2. Shah and Rana, Engineering Drawing, 2/e, Pearson Education, 2009.
3. Venugopal, Engineering Drawing and Graphics, 3/e, New Age Publishers, 2000.
4. K.C.John, Engineering Graphics, 2/e, PHI, 2013.
5. Basant Agarwal & C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2008.

Note:

1. Manual and Computer Aided Drafting classes can be held in alternative weeks for optimal utilization of computer facilities.
2. External examinations to be conducted both manual and computer mode with equal weightage of marks.

Weblinks:

1. https://www.wiziq.com/tutorials/engineering-drawing
2. www.me.umn.edu/courses
3. YouTube: http-sewor,Carleton.cag,kardos/88403/drawings.html conic sections-online, red woods.edu

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ENGINEERING MECHANICS
(Common to CE, ME, Min.E, PT, Ag.E)

II Semester
Course Code: 191ES2T04

L	T	P	C
3	0	0	3

Course Outcomes:
At the end of the Course, Students will be able to

- CO 1: Determine the resultant force and moment for a given force system.
- CO 2: Solve the member forces in trusses.
- CO 3: Apply concept of Virtual work to find the work done by force and couple.
- CO 4: Solve the centre of gravity and moment of inertia for various geometric shapes
- CO 5: Determine the displacement, velocity and acceleration relations in dynamic systems
- CO 6: Apply the concepts of kinematics, kinetics, work - energy and impulse - momentum methods to particle motion.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	2	2	-	-	-	-	-	-	-	-	-	-
CO2	1	2	-	-	-	-	-	-	-	-	-	-
CO3	1	2	-	-	-	-	-	-	-	-	-	-
CO4	2	2	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-
CO6	3	2	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO1	PSO2
CO1	3	-
CO2	3	-
CO3	3	-
CO4	3	-
CO5	3	-
CO6	3	-

UNIT I

Introduction to Engineering Mechanics: Composition and resolution of forces, parallelogram law, principle of transmissibility, types of force systems - concurrent and concurrent coplanar forces, resultant of coplanar force systems couple, moment of a force Varignon's theorem, concept of free body diagrams, concept of equilibrium of coplanar force systems.

UNIT II

Analysis of Structures: Introduction to plane trusses, analysis of plane trusses by method of joints and method of sections.

Virtual Work: Equilibrium of ideal systems, work done by a force, work done by a couple, principle of virtual work.

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UNIT III

Properties of Surfaces and Volumes: Centroid and center of gravity, derivation of centroids from first moment of area, centroids of composite sections, center of gravity of common volumes - cylinder, cone, sphere, theorem of Pappus.

Moment of Inertia: Area moment of inertia of plane and composite shapes, parallel axis theorem, perpendicular axis theorem, polar moment of inertia, mass moment of inertia of common volumes -thin plates, thin rod, cylinder, cone, sphere, rectangular prism, radius of gyration.

UNIT IV

Kinematics: Fundamentals of kinematics of motion- Rotation of a rigid body about a fixed axis, introduction to plane motion.

Kinetics: Principles of dynamics - Newton's Laws of motion, D'Alembert's principle in rectilinear translation, Concepts of Friction

UNIT V

Applications: Principle of work and energy- Principle of conservation of energy, Concept of power, Conservation of linear and angular momentum, Principle of momentum and impulse, Types of impact.

Textbooks:

1. Engineering Mechanics- Statics and Dynamics- A.Nelson, Mc Graw Hill publishers.
2. S.Timoshenko, DH Young, JV Rao, Sukumar Pati, Engineering Mechanics (in SI units), 5/e, McGraw Hill, 2013.
3. N H Dubey, Engineering Mechanics: Statics and Dynamics, McGraw Hill, 2014.

Reference Books:

1. Basudeb Bhattacharya., Engineering Mechanics, 2/e, Oxford University Press (India), 2015.
2. Irving Shames, G K M Rao, Engineering Mechanics: Statics and Dynamics, 4/e, Pearson, 2009.
3. K L Kumar, Veenu Kumar, Engineering Mechanics, 4/e, Tata McGraw Hill, 2010.
4. S Bhavikatti, Engineering Mechanics, 4/e, New Age International, 2008.

Weblinks:

1. https://www.iitg.ac.in/rkbc/me101/Presentation/L01-03.pdf
2. https://www.hzg.de/imperia/md/content/hzg/institut_fuer_werkstoffforschung/wms/eng_mech_2006.pdf

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ENGINEERING CHEMISTRY LAB
(Common to CE, ME, ECE, CSE, Min.E, PT&Ag. E)

IISemester **L T P C**
Course Code:191BS2L04 **0 0 3 1.5**

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1 : Demonstrate Acid –Complexometric titrations by volumetric analysis.
CO 2 : Demonstrate Acid – Base titrations by instrumental analysis.
CO 3 : Estimate Vitamin C using volumetric analysis
CO 4 : Prepare polymer like Bakelite.
CO 5 : Prepare alternative fuel like Bio-Diesel.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	1	1	-	1
CO2	2	-	-	-	-	-	-	-	1	1	-	1
CO3	2	-	-	-	-	-	-	-	1	1	-	1
CO4	2	-	-	-	-	-	-	-	1	1	-	1
CO5	2	-	-	-	-	-	1	-	1	1	-	1

Mapping of Course Outcomes with Program Specific Outcomes

CO/PO	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

Introduction to Chemistry laboratory – Molarity, Normality, Primary, secondary standard solutions, Volumetric titrations, Quantitative analysis, Qualitative analysis, etc.

Exercise 1:
Determination of Total Hardness of a water sample.

Exercise 2:
Determination of Dissolved Oxygen in Water Sample.

Exercise 3:
Determination of Zinc by Complexometric method

Exercise 4:
P^H metric titration of Strong acid Vs Strong base.

Exercise 5:
Determination of Fe (II) in Mohr's salt by potentiometric method.

Exercise 6:
Potentiometry – Titration between strong acid – strong base

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Exercise 7:
Conductometric titrations (Strong acid vs Strong base).

Exercise 8:
Preparation of Phenol- Formaldehyde resin.

Exercise 9:
Preparation of Urea-Formaldehyde resin.

Exercise 10:
Preparation of bio diesel.

Exercise 11:
Determination of Vitamin – C.

LIST OF AUGMENTED EXPERIMENTS
12 to 15 (Any two of the following experiments can be performed)

Exercise 12:
Determination of percentage Moisture content in a coal sample.

Exercise 13:
Determination of acid value and saponification value of a given lubricant.

Exercise 14:
Determination of viscosity of a liquid.

Exercise 15:
Estimation of Calcium in port land Cement.

Reference Books:

1. A Textbook of Quantitative Analysis, Arthur J. Vogel.
2. Dr. Jyotsna Cherukuris (2012) Laboratory Manual of engineering chemistry - II, VGS Techno Series.
3. Chemistry Practical Manual, Lorven Publications K. Mukkanti (2009). Practical Engineering Chemistry, B.S.Publication.

DESIGN OF MACHINE MEMBERS – II

V Semester

Course Code: 171ME5T11

L	T	P	C
3	1	0	3

Course Outcomes

At the end of the Course, Student will be able to:

CO 1: Classify the various types of bearings.

CO 2: Analyze the various engine parts like connecting rod, piston, and etc.

CO 3: Identify the various stresses in curved beam.

CO 4: Explain the power transmission systems and power screw.

CO 5: Inspect the various load factors, strength of spur and helical gear drives.

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	2	1	-	-	2	-	-	-	-	-	-	-
CO2	3	2	2	-	-	-	-	-	-	-	-	-
CO3	3	2	1	-	-	2	-	-	-	-	-	-
CO4	3	2	-	-	-	2	-	-	-	-	-	-
CO5	3	2	2	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes:

CO / PSO	PSO 1	PSO 2
CO1	1	-
CO2	1	-
CO3	2	-
CO4	1	-
CO5	1	-

UNIT I

Bearings:

Classification of bearings- applications, types of journal bearings, lubrication, bearing modulus, full and partial bearings, clearance ratio, heat dissipation of bearings, bearing materials, journal bearing design, ball and roller bearings, static loading of ball & roller bearings.

UNIT II

Engine Parts:

Connecting Rod, Thrust in connecting rod, stress due to whipping action on connecting rod ends, cranks and crank shafts, strength and proportions of over hung and center cranks, crank pins, crank shafts. Pistons, forces acting on piston, construction design and proportions of piston, cylinder, cylinder liners

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UNIT III

Design of Curved Beams:

Introduction, stresses in curved beams, expression for radius of neutral axis for rectangular, circular, trapezoidal and T-section, design of crane hooks, C clamps.

UNIT IV

Power Transmissions Systems, Pulleys:

Introduction, Belt and rope drives, Selection of belt drives, types of belt drives, Transmission of power by belt and rope drives, Velocity ratio of belt drives, slip of belt, creep of belt, Tension for flat belt drive, angle of contact, centrifugal tension, maximum tension of belt, transmission efficiencies, belts flat and V types ropes - pulleys for belt and rope drives, materials, chain drives –length, angular speed ratio, classification of chains.

Design of Power Screws:

Design of screw, square ACME, buttress screws, design of nut, compound screw, differential screw, ball screw possible failures.

UNIT V

Spur & Helical Gear Drives:

Spur gears- helical gears load concentration factor dynamic load factor, surface compressive strength bending strength (lewis equation) design analysis of spur gears estimation of centre distance, module and face width, check for plastic deformation.

Design Data book allowed in the examination.

Text Books:

1. Machine Design, V.Bandari, TMH Publishers, 3rd Edition
2. Design Data , PSG College of Technology, Kalaikathir Achchagam Publishers, 2nd Edition
3. Machine Design, Pandya & Shaw, Charotar publishers, 20th Edition

Reference Books:

1. Machine Design ,R.L. Norton , McGraw-Hill Series, 5th Edition
2. Design data hand book for Mechanical Engineers, K.Mahadevan, CBS Publishers, 4th Edition
3. Mechanical Engineering Design, JE Shigley, McGraw-Hill Series,10th Edition
4. A text book of Machine Design, P.C.Sharma, Khanna Publishers,2009

Web Links:

1. http://nptel.ac.in/courses/112105124/
2. http://freevideolectures.com/Course/2363/Design-of-Machine-Elements-I/36

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AUTOMOBILE ENGINEERING
(Professional Elective-I)

V Semester L T P C

Course Code: 171ME5E01 3 1 0 3

Course Outcomes:
At the end of the Course, Student will be able to:

CO1: Summarize the Vehicle Chassis Layouts of 4-wheelers and Motor Vehicle Act.
CO2: Identify the different constructional and working principles of Un- Sprung components of the given vehicle.
CO3: Identify the different constructional and working principles sprung components of the given vehicle.
CO4: Summarize the functionalities of various Electrical systems of typical Automobile.
CO5: Explain the different Active and Passive Vehicle Safety Systems.

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO 1	2	1	-	-	-	-	3	-	3	-	-	-
CO 2	2	1	1	-	-	-	3	-	-	-	-	-
CO 3	2	1	1	-	-	-	2	-	-	-	-	-
CO 4	2	1	-	1	-	-	-	-	-	-	-	-
CO 5	3	2	3	-	-	-	1	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes:

CO/PSO	PSO 1	PSO 2
CO 1	-	3
CO 2	-	2
CO 3	-	2
CO 4	-	2
CO 5	-	3

UNIT – I
Introduction:
Components of four-wheeler automobile – chassis and body –Chassis Layout - power transmission – rear wheel drive, front wheel drive, 4-wheel drive and Motor Vehicle Act 1988 – Legal Aspects/Compliance of Automotive Vehicles: Introduction to Motor Vehicle Act, Registration of Vehicles, Inspection and Fitness of vehicles and Homologation of Vehicles.

UNIT – II
Transmission System:
Clutches, principle, types, gear boxes, types, Propeller shaft – Hotch – Kiss drive, Torque tube drive, universal joint, differential rear axles– types
Steering System:
Steering geometry – camber, castor, king pin rake, combined angle toe in, center point steering. Types of steering mechanism –Ackerman steering mechanism, Davis steering mechanism, steering linkages.

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UNIT – III

Suspension System:

Objects of suspension systems – rigid axle suspension system, torsion bar, shock absorber, independent suspension system, Air Suspension, Rubber Suspension, Hydrolastic suspension system, Hydra gas suspension system,

Braking System:

Mechanical braking system, hydraulic braking system requirement of brake fluid, pneumatic and vacuum brakes, Parking Braking system

UNIT – IV

Wheels And Tyres

Basic Requirements of Wheels and Tyres, Construction of Wheel Assembly, Tyre Construction, Types, Tyre Sizes and Designation, Aspect Ratio, Tyre Tread Pattern, Selection of Tyre under Different Applications.

UNIT – V

Electrical System:

Charging circuit, generator, starting system, lighting, horn, wiper, fuel gauge, oil pressure gauge, engine temperature indicator.

Safety Systems:

Introduction, safety systems - seat belt, air bags, bumper, anti-lock brake system (ABS), Electronic Brake force Distribution (EBD), mirrors, central locking, speed control, Retractable Steering system, Head restraints, seats with anti-submarine effects and fuel cut off switch.

Textbooks:

1. Automotive Mechanics: Vol.& Vol.2,Kirpal Singh, Standard Publishers, 13th Edition
2. Automobile Engineering, William H Crouse, TMH Distributors, 10thEdition.
3. The Motor Vehicle Act, 1988 by Universal Law Publishing, 2016Edition

Reference Books:

1. Advanced vehicle Technology, by Heinz Heisher, 2e, BH Publications
2. Automotive Chassis by Jonsen Reimpell, BH Pub
3. Automobile Electrical & Electronics by Tom Denton, 3e, Elsevier Publications
4. The Motor Vehicle Act, 1988, 17th e, Asia Law House.
5. Automotive Fuel and Emissions Control Systems, by James D. Halder man, 3e, Professional Technical Series, Pearson publications

Web Links:

1. https://nptel.ac.in/courses/125106002
2. https://www.automotive-online.com
3. https://sciencelinks.jp/j-east/article
4. https:// www.sciencedirect.com/science/book/9780750650540

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THERMAL ENGINEERING LAB

V Semester L T P C

Course Code: 171ME5L03 0 0 3 2

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Sketch the Valve and Port Timing diagrams for IC Engines.
- CO 2: Determine the performance of various types of IC Engines and feed balance.
- CO 3: Calculate the frictional power in various types of IC Engines.
- CO 4: Analyze the performance of reciprocating air compressor.
- CO 5: Explain the construction details of various types of boilers.

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	2	1	1	-	-	-	-	-	-	3	-	-
CO2	3	2	2	-	-	-	-	-	-	1	-	-
CO3	3	2	-	-	-	-	1	-	-	1	-	-
CO4	3	2	2	-	-	-	-	-	-	1	-	-
CO5	3	2	2	-	-	-	1	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes:

CO / PSO	PSO 1	PSO 2
CO1	-	3
CO2	-	3
CO3	-	3
CO4	-	2
CO5	-	2

List of Experiments:

1. Draw the valve and port timing diagrams for four and two stroke engines.
2. Evaluate the performance of 4 -stroke Diesel engines.
3. Evaluate the performance of 4 -stroke Petrol engines.
4. Evaluation of frictional power by conducting morse test on 4-stroke multi cylinder petrol engine.
5. Determination of frictional power by retardation and motoring test on IC engine.
6. Draw the heat balance sheet for 4-stroke Single cylinder Diesel / Petrol engines.
7. Draw the heat balance sheet for 4- stroke multi cylinder petrol engine.
8. Calculate the performance of variable compression ratio engines.
9. Performance test on reciprocating air compressor unit.
10. Disassembly / assembly of engines.

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List of Augmented Experiments:
(Any two of the following experiments can be performed)

1. Determine the flash and fire point of given oil sample.
2. Determination of Viscosity using Red Wood Viscometer.
3. Determination of viscosity using Saybolt Viscometer.
4. Determination of calorific value of fuels by using Bomb Calorimeter.

References:

1. Internal Combustion Engines, V. Ganesan, TMH Publication. 4th Edition.
2. Internal Combustion Engines Fundamentals, John. B. Heywood, MGH.
3. Thermal Engineering lab Manual, Aditya Engineering College.

Web Links:

1. https://www.scribd.com/doc/38559760/Thermal-Lab-Manual
2. http://www.ksrct.ac.in/page/thermal-engineering-lab.html

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METROLOGY AND INSTRUMENTATION

VI Semester L T P C

Course Code: 171ME6T15 3 1 0 3

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1 : Explain the concept of systems of limits and fits and theory of linear and angular measurement.

CO 2 : Describe the surface roughness measurement, screw thread measurement and gear measurement.

CO 3 : Explain the concepts of machine tool alignments.

CO 4 : Select appropriate elements of a measurement system and select instruments for displacement measurement.

CO 5 : Select instruments for temperature, pressure and flow measurement.

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	2	1	-	-	-	-	-	-	-	-	-	-
CO2	2	1	-	-	-	-	-	-	-	-	-	-
CO3	1	2	-	-	-	-	-	-	-	-	-	-
CO4	2	2	-	-	-	-	-	-	-	-	-	-
CO5	2	2	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes:

CO / PSO	PSO 1	PSO 2
CO1	1	-
CO2	1	-
CO3	1	-
CO4	1	-
CO5	1	-

UNIT- I

Linear and Angular Measurements, Limits and Fits:

ISO system: Fits and Types of interchangeability, Taylor's Principle of plain limit gauges, Use of Plug, Ring and Snap gauges. Indicating type limit gauges. Introduction- Linear and Angular measurements - Slip gauges and End bars - Gauge material and manufacturing methods, Different types of Micrometers, Height gauges, Tomlinson gauges. Precision polygon, Sine bar, Autocollimator.

UNIT- II

Optical Measurement and Comparators:

Dial indicator, Sigma and Mechanical comparator, Free flow and Back pressure type Pneumatic comparator. Application of set jet gauge heads Optical projector, Chart, screen gauges and measuring methods, Micro gauge bridge lines. Tool maker's Microscope applications, Measurement of Straightness and- Flatness. Roundness measurement with bench centers and Talyrond, Coordinate Measuring Machine in components geometries.

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UNIT- III

Surface Roughness Measurements and Gear tooth measurement:

Parameters as per ISO indices. Profilometer, Taylor Hobson Talysurf. Application of Thread metrology - 2 wire and 3 Wire methods, Gear measurement - Gear tooth thickness, Parkinson gear tester, General geometric tests for testing machine tools- Lathe, drill, mill.

UNIT- IV

Displacement and Strain Measurement:

Elements of instrumentation system. Static and Dynamic characteristics. Types of errors. Displacement transducers. LVDT. Strain measurement - Wire and foil type resistance strain gauges. Rosette Gauges. Bonding procedure. Lead resistance compensation. Adjacent arm and self-compensating gauges. Proving ring Strain gauge load cells, measurement of axial load and torsion by strain gauges. Piezo electric load cell.

UNIT- V

Temperature, Pressure and Flow Measurement:

Introduction to Seismic Transducers - displacement and acceleration measurement, Pressure measurement - Bourdon pressure gauge, bulk modulus gauge, pirani gauge, Temperature measurement by thermo couples. Laws of thermo electricity. Types of materials used in thermocouples. Rotameter, magnetic, ultrasonic, turbine flow meter, hot – wire anemometer, laser Doppler anemometer (LDA), dynamometers.

Text Books:

1. Dimensional Metrology, Connie Dotson, Cengage Learning,2016.
2. Measurement System: Applications and Design, D.S.Kumar, Metropolitianbook. Co. pvt.lmtd, 1st edition

Reference Books:

1. Engineering Metrology, M.Mahajan, Dhanpat Rai Publishers,2008
2. Engineering Metrology, I.C.Gupta, Dhanpat Rai Publishers,2018
3. Mechanical and Industrial Measurements, R.K. Jain, Khanna Publishers, 2008
4. Instrumentation, measurement & analysis, B.C.Nakra, K.K.Choudhary, TMH, 2008

Web Links:

1. https://nptel.ac.in/courses/112106179/
2. https://www.slideshare.net/engrnouman/metrology-measurement
3. http://www.metrology.pg.gda.pl/
4. https://india.oup.com/product/engineering-metrology

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NON-DESTRUCTIVE EVALUATION
(Professional Elective-II)

VI Semester L T P C

Course Code:171ME6E06 3 1 0 3

Course Outcomes

At the end of the Course, Student will be able to:

- CO 1: Explain the basic principles of different non-destructive evaluation Techniques.
- CO 2: Distinguish between various non-destructive evaluations techniques.
- CO 3: Explain the basic requirement for conducting different NDE test
- CO 4: Apply non-destructive evaluations methods for test Specimens.
- CO 5: Explain the application of non-destructive evaluation techniques.

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	-	1	-	-	2	-	-	-	3	-	2	-
CO2	2	1	1	1	-	-	-	-	-	-	-	-
CO3	-	1	-	-	2	-	-	-	3	1	-	-
CO4	-	1	-	2	-	3	-	-	-	3	-	-
CO5	-	3	2	1	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes:

CO/PSO	PSO 1	PSO 2
CO 1	2	-
CO 2	-	-
CO 3	2	-
CO 4	1	-
CO 5	-	-

UNIT – I

Introduction to non-destructive testing.

Types of testing, Radiographic test: - Sources of X and Gamma Rays and their interaction with Matter, Radiographic equipment, Radiographic Techniques.

Application of Industrial Radiography, Span of NDE Activities Railways, Nuclear, Non-nuclear, Aerospace Industries, Automotive Industries.

UNIT – II

Ultrasonic test: -

Principle of Wave Propagation, Reflection, Refraction, Diffraction, Mode Conversion and Attenuation, Sound Field, Piezo-electric Effect, Ultrasonic Transducers and their Characteristics, Test Equipment, Test Variables, Guidelines for Acceptance and Rejection - Effectiveness and Limitations.

Application of Ultrasonic test in Castings, Railways, Nuclear, Non-nuclear & Steel Industries.

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UNIT – III

Liquid Penetrant Test:

Liquid Penetrant Test, Basic Concepts, Liquid Penetrant System, Test Procedure, Effectiveness and Limitations of Liquid Penetrant Testing. Applications in Aerospace Industries, castings, welded constructions, Pressure vessels.

UNIT – IV

Magnetic Particle Test:

Magnetic Materials, Magnetization of Materials, Demagnetization of Materials, Principle of Magnetic Particle Test and Procedure, Equipment's required, Standardization and Calibration, Interpretation and Evaluation, Advantages and Limitations, Applications of magnetic particle test in Surface detection.

UNIT – V

Eddy Current Test:

Principle of Eddy Current, Eddy Current Test System, Eddy Current Testing Effectiveness. Applications in Offshore Gas and Petroleum Projects, Coal Mining Industry, Castings, Railways.

Text Books:

1. Non-destructive test and evaluation of Materials, J Prasad, GCK Nair, Second Edition, TMH Publishers.
2. Non - Destructive Testing, Ramachandran S,AndersonA, Rajasanthosh Kumar T, First Edition, Airwalk Publications.

Reference Books:

1. Ultrasonic inspection training for NDT: E. A. Gingel, Prometheus Press.
2. ASTM Standards, Vol 3.01, Metals and alloys.
3. Non-destructive, Hand Book – R.Hamchand.
4. Non-destructive testing, Warress, J Mc Gonmade

Web Links:

1. https://eis.hu.edu.jo/acuploads/10526/Radiographic%20Testing.pdf
2. https://www.ndeed.org/EducationResources/CommunityCollege/Radiography/cc_rad_index.htm.
3. https://www.ndeed.org/EducationResources/CommunityCollege/Ultrasonics/Introduction/description.htm
4. https://www.ndeed.org/EducationResources/CommunityCollege/Mag Particle/ Introduction/basicprinciples.htm
5. https://www.ndeed.org/EducationResources/CommunityCollege/PenetrantTest/cc_pt_index.htm.

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MACHINE TOOLS LAB

VI Semester
Course Code: 171ME6L04

L	T	P	C
0	0	3	2

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1: Learn about tool geometry and various conventional machining process.
CO 2: Produce models by turning, facing, threading operations on lathe machine
CO 3: Produce different holes using drilling machine.
CO 4: Produce different types of grooves using shaper and slotter machine.
CO 5: Produce surfaces on flat surface machining, milling and grinding operations

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO 1	2	2	-	-	-	-	-	-	-	2	-	2
CO 2	2	2	-	-	-	-	-	-	-	2	-	2
CO 3	2	1	-	-	-	-	-	-	-	2	-	2
CO 4	1	1	-	-	-	-	-	-	-	2	-	2
CO 5	1	1	-	-	-	-	-	-	-	2	-	2

Mapping of Course Outcomes with Program Specific Outcomes:

CO/PSO	PSO 1	PSO 2
CO 1	1	-
CO 2	3	-
CO 3	1	-
CO 4	2	-
CO 5	2	-

List of Experiments:

1. Introduction of general purpose machine Lathe, Drilling, Milling, Shaper
2. Step turning and taper turning using lathe.
3. Thread cutting and knurling using Lathe machine
4. Drilling and Tapping using Drilling Machine.
5. Shaping of V groove using Shaper.
6. Slotting of a keyway using Slotter.
7. Cutting spur gear using Milling Machine
8. Grinding of Flat surfaces using Surface Grinding Machine
9. Gang Milling on Milling machine
10. Grinding of HSS Tool using Tool and Cutter grinder

List of Augmented Experiments:

(Any two of the following experiments can be performed)

1. Introduction to CNC Machines
2. Eccentric on Lathe
3. Drilling, Boring and internal threading on Lathe

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References:

1. Workshop Technology – B.S.Raghu Vamshi – VolII.
2. Workshop Technology Technology –SkHajrachoudhary-Vol-II

Web Links:

1. http://www.engineeringarticles.org/lathe-lathe-operations-types-and- cutting-tools/
2. https://me-mechanicalengineering.com/operations-related-drilling- machine/
3. http://uotechnology.edu.iq/dep-production/branch3_files/10luma.pdf
4. http://www.americanmachinetools.com/how_to_use_a_surface_grinder.htm

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METROLOGY / INSTRUMENTATION LAB

VI Semester	**L**	**T**	**P**	**C**
Course Code: 171ME6L06	0	0	3	2

Course Outcomes:

At the end of the Course, Student will be able to:

CO1: Measure the bores by internal micrometers and dial bore indicators.
CO2: Measure the angle and taper using bevel protractor and sine bar
CO3: Measure gear tooth thickness using gear tooth caliper.
CO4: Find the errors and calibrate photo and magnetic pickups
CO5: Find the errors and calibrate the pressure gauge, temperature detectors and LVDT

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	3	-
CO2	-	3	-	1	-	-	-	-	-	-	-	-
CO3	1	-	-	1	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	3	-
CO5	-	-	-	-	-	-	-	-	-	-	3	-

Mapping of Course Outcomes with Program Specific Outcomes:

CO/PSO	PSO 1	PSO 2
CO1	1	-
CO2	1	-
CO3	1	-
CO4	1	-
CO5	1	-

List of Experiments:

Section A: Metrology Lab

1. Measurement of lengths, heights, diameters by vernier calipers, micrometers.
2. Angle and taper measurements with bevel protractor, Sine bar, rollers and balls.
3. Measurement of bores by internal micrometers and dial bore indicators.
4. Straightness measuring using autocollimator.
5. Gear tooth thickness measurement using gear tooth vernier calipers.

Section B: Instrumentation Lab

6. Calibration of pressure gauge.
7. Study and calibration of LVDT transducer for displacement measurement.
8. Calibration of thermocouple.
9. Study and calibration of photo and magnetic speed pickups.
10. Calibration of resistance temperature detector.

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List of Augmented Experiments:
Metrology Lab
(Any one of the following experiments can be performed)

11. Flatness measurement using optical flat.
12. Machine tool alignment test on lathe using various metrology instruments.

Instrumentation Lab
(Any one of the following experiments can be performed)

13. Calibration of Force measuring setup
14. Study and calibration of a Rotameter for flow measurement.

References:

1. Engineering Metrology, M.Mahajan, Dhanpat Rai Publishers.
2. Measurement Systems: Applications & design, D.S Kumar, Metropolitian Book Co. pvt lmtd

Web Links:

1. http://www.atri.edu.in/images/pdf/departments/INSTRUMENTATION%20LAB%20manual.
2. http://www.bitswgl.ac.in/ME/Metrology-Lab-Manual%203%20year%201sem.pdf
3. http://slideplayer.com/slide/7020420/
4. http://gps-mech.blogspot.in/2012/01/lab-manual-for-measurement-and.html

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IV Year - I Semester

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CAD/CAM LAB

Course Objectives:

1. To impart the fundamental knowledge on using various analytical tools like ANSYS, FLUENT, etc., for Engineering Simulation
2. To know various fields of engineering where these tools can be effectively used to improve the output of a product.
3. To impart knowledge on how these tools are used in Industries by solving some real time problems using these tools..

1. **DRAFTING:** Development of part drawings for various components in the form of orthographic and isometric representation of dimensioning and tolerances scanning and plotting. study of script, DXE and IGES files.

2. **PART MODELING:** Generation of various 3D models through protrusion, revolve, shell sweep. creation of various features. study of parent child relation. feature based and boolean based modelling surface and assembly modelling. study of various standard translators. design simple components.

3. a). Determination of deflection and stresses in 2D and 3D trusses and beams.
b). Determination of deflections component and principal and Von-mises stresses in plane stress, plane strain and Axisymmetric components.
c). Determination of stresses in 3D and shell structures (at least one example in each case)
d). Estimation of natural frequencies and mode shapes, Harmonic response of 2D beam.
e). Steady state heat transfer Analysis of plane and Axisymmetric components.

4. a). Study of various post processors used in NC Machines.
b). Machining of simple components on NC lathe and Mill by transferring NC Code / from a CAM package. Through RS 232.
c) Practice on CNC Sinutrain Turning
d) Practice on CNC Sinutrain Milling
e) CNC programming for turned components using FANUC Controller
f) CNC programming for milled components using FANUC Controller
g) Automated CNC Tool path & G-Code generation using Pro/E/MasterCAM

Packages to be provided to cater to drafting, modeling & analysis from the following:

CATIA, Pro-E, I-DEAS, ANSYS, NISA, CAEFEM, Gibbs CAM, Master CAM etc.

Course outcomes:

Upon successful completion of this course student should be able to:

1. The student will be able to appreciate the utility of the tools like ANSYS or FLUENT in solving real time problems and day to day problems.
2. Use of these tools for any engineering and real time applications
3. Acquire knowledge on utilizing these tools for a better project in their curriculum as well as they will be prepared to handle industry problems with confidence when it matters to use these tools in their Employment

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Syllabus revision Index (2019-20)

S. No	Name of the course	Percentage of syllabus change
1	Communicative English	90
2	Differential Equations and Linear Algebra	20
3	Engineering Physics	60
4	Engineering Physics Lab	60
5	Environmental Science	50
6	Basic Engineering Workshop	72
7	Partial Differential Equations& Vector Calculus	40
8	Chemistry of Materials	70
9	Engineering Graphics and design	45
10	Engineering Mechanics	20
11	Engineering Chemistry Lab	50
12	Design Of Machine Members-II	20
13	Automobile Engineering	36
14	Thermal Engineering Lab	28
15	Metrology &Instrumentation	48
16	Non-Destructive Evaluation	20
17	Machine Tools Lab	20
18	Metrology &Instrumentation Lab	24
19	CAD/CAM Lab	20

Program Coordinator

Head of the Department

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	English-I	Communicative English
Course Code	171HS1T01	191HS1T01
Syllabus	UNIT-I: 1. IN LONDON: M.K.GANDHI (Detailed) 2. G.D. NAIDU (Non-Detailed)	UNIT-I: 1. An Astrologers' Day - R.K. Narayan (Detailed) 2. Bade Bhai Saab - Munshi Prachanda (Non-Detail)
	UNIT-II: 1. THE KNOWLEDGE SOCIETY- APJ ABDUL KALAM (Detailed) 2. G.R. GOPINATH (Non-Detailed)	UNIT-II: 1. Building A New State - A. P. J. Abdul Kalam (Detailed) 2. Morning Bells- Jayashree Mohan Raj (Non-Detail)
	UNIT-III: 1. THE SCIENTIFIC POINT OF VIEW- J.B.S. HALDANE (Detailed) 2. J.C. BOSE (Non-Detailed)	UNIT-III: 1. Water:The Elixer of Life- C. V. Raman (Detailed) 2. The Power of Plate of Rice- Ifeoma Okoye (Non-Detail)
	UNIT-IV: 1. MAN'S PERIL-BERTRAND RUSSELL (Detailed) 2. HOMI JEHANGIR BHABHA (Non-Detailed)	UNIT-IV: 1. The Woodrose-Abburi Chaya Devi (Detailed) 2. The Cop and The Anthem- O. Henry (Non-Detail)
	UNIT-V: 1. LUCK—MARK TWAIN (Detailed) 2. A SHADOW (Non-Detailed)	UNIT-V: 1. Progress- St. John Ervine (Detailed) 2. Dial 000- Barry Rosenberg (Non-Detail)

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Mathematics-I	Differential Equations and Linear Algebra
Course Code	171BS1T01	191BS1T01
Syllabus	UNIT I: Differential equations of first order and first degree: Linear differential equations - Bernoulli differential equation - Exact differential equationsEquations reducible to exact (Type-1, Type-2, Type-3, Type-4) Applications: Newton's Law of cooling-Law of natural growth and decay-Orthogonal trajectories.	UNIT I: Differential Calculus: Rolle's theorem, Lagrange's theorem, Cauchy Mean Value theorem, Taylor's and Maclaurin's theorems (All theorems Without Proof). Partial Differentiation: Euler's theorem (without proof), Total derivative, Chain rule, Taylor's and Maclaurin's series expansion of functions of two variables, Jacobian, Functional dependence. Applications: Maxima and Minima of functions of several variables without constraints and with constraints (Lagrange's method). ** (SCILAB Exercise: Plot graphs of various single and multivariable functions).
	UNIT II: Linear differential equations of higher order: Linear differential equations of higher order with constant coefficients with RHS term of the type eax, sin ax, cos ax, polynomials in x, e^ax V(x), xV(x)-Method of Variation of parameters, Method of undetermined coefficients. *(MATLAB Exercise: Introduction to MAT LAB commands and Solution of Initial Value Problems using the command 'dsolve') Applications: Electric circuits, simple harmonic motion.	UNIT II: Differential equations of first order: Introduction to differential equations, linear differential equation of first order - Bernoulli differential equation - Exact differential equations- Equations reducible to exact, Applications: Orthogonal trajectories, Newton's Law of cooling, RL circuit
	UNIT III: Linear systems of equations: Rank of a matrix - Echelon form-Normal form – Solution of linear systems – Gauss elimination method - Gauss Seidal method. Applications: Finding the current in electrical circuits.	UNIT III: Linear differential equations of second and higher order: Linear differential equations of higher order with constant coefficients, Complementary function and Particular integral with RHS term of the type polynomials in x, e^ax, sin ax, cos ax,

		eax V(x), xV(x)- Method of Variation of parameters, Equations reducible to constant coefficients –Cauchy-Euler equation, Legendre's equation. Application: LCR Circuit ** (SCILAB Exercise: Introduction to SCILAB commands and Solution of Initial Value Problems)
	UNIT IV: Eigen values - Eigen vectors and Quadratic forms: Eigen values - Eigen vectors– Properties of eigen values (without proof) – Cayley -Hamilton theorem (without proof) - Inverse and powers of a matrix by using Cayley - Hamilton theorem- Diagonalization- Quadratic forms- Reduction of quadratic form to canonical form using orthogonal transformation– Nature of the quadratic form. *(MATLAB Exercise: All Basic Operations on matrices are to be implemented using MATLAB including computation of rank, computation of eigen values and eigen vectors)	UNIT IV: System of linear equations, Eigen values and Eigen vectors: Definition of a Vector space, Linear dependence and independence of vectors, Rank of a matrix, Echelon form and Normal form, solving system of Homogenous and Non homogenous linear equations- Gauss Jordon elimination method, Eigen values, Eigen vectors, Properties of eigen values and eigen vectors (without proof) Applications: Free vibrations of a two mass system
	UNIT V: Partial differentiation and Partial differential equations: Homogeneous function-Euler's theorem-Total derivative-Chain rule-Taylor's and Maclaurin's series expansion of functions of two variables– Functional dependence Jacobian. Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions –solutions of first order linear (Lagrange) equation, nonlinear (standard types) equations. Applications: Maxima and Minima of functions of two variables without constraints and Lagrange's method (with constraints). *(MATLAB Exercise: To Plot graphs of various single and multivariable functions using MATLAB and analyze their maxima and minima graphically).	UNIT V: Quadratic forms: Cayley -Hamilton theorem (without proof), Inverse and powers of a matrix by using Cayley - Hamilton theorem, Diagonalization of a matrix, Quadratic forms, Reduction of quadratic form to canonical form using orthogonal transformation, Nature of the quadratic form. **(SCILAB Exercise: Basic Operations on matrices, computation of rank, computation of eigen values and eigen vectors)

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Physics	Engineering Physics
Course Code	171BS2T07	191BS1T02
Syllabus	UNIT-I: Interference: Principle of Superposition – Coherence – Interference in thinfilms (reflection geometry)— Newton's rings – construction and basic principle of Interferometer.	UNIT-I Crystal Structure: Basis and lattice – Crystal Systems – Bravais Lattice - Symmetry elements- Unit cell-packing fraction – coordination number- Miller indices – Separation between successive (h k l) planes – Bragg's law-Bragg's x-ray spectrometer. Crystal Defects:(qualitative description only) Point defects-Schottky, Frenkel defects, Line defects-Edge, screw dislocations
	UNIT-II: Diffraction: Fraunhofer diffraction at single slit - Cases of double slit, N-slits, & circular aperture, Grating equation – Rayleigh criterion of resolving power- Resolving power of a grating, Telescope and Microscopes.	UNIT-II Acoustics: Introduction – Reverberation - Reverberation time - Sabine's formula (Derivation)–absorption coefficient and its determination-factors affecting acoustics of buildings and their remedies. Ultrasonics:Production of ultrasonics by Magnetostriction and piezoelectric methods– Detection of ultrasonics - acoustic grating - Non-Destructive Testing-pulse echo system through transmission and reflection modes- Applications.
	UNIT-III: Polarization: Types of Polarization-production - Nicol Prism -Quarter wave plateand Half Wave plateworking principle of polarimeter (Sacharimeter) Lasers: Characteristics– Stimulated emission – Einstein's Transition Probabilities- Pumping schemes- Ruby laser – Helium Neon laser- CO2 Laser-Applications	UNIT-III Elasticity: Stress, strain, Hooke's law, stress-strain curve, generalized Hooke's law with and without thermal strains for isotropic materials, different types of moduli and their relations, bending of beams – Bending moment of a beam – Depression of cantilever.
	UNIT-IV: Acoustics: Reverberation time - Sabine's formula – Acoustics of concert-hall. Ultrasonics: Production - Ultrasonic	UNIT-IV Laser: Introduction to wave optics & Interferometer-Characteristics– Spontaneous and Stimulated emission of

	transducers- Non-Destructive Testing-Applications. Crystallography & x-ray diffraction: Basis and lattice – Crystal Systems – Bravais Lattice - Symmetry elements- Unit cellpacking fraction – coordination number- Miller indices – Separation between successive (h k l) planes – Bragg's law-Bragg's x-ray spectrometer.	radiation – population inversion- Einstein's coefficients & Relation between them and their significance - Pumping Mechanisms - Ruby laser – Helium Neon laser – CO2 laserApplications. Sensors:(qualitative description only): Different types of sensors and applications; Strain and Pressure sensors- Piezoelectric, magnetostrictive sensors, Temperature sensor - bimetallic strip, pyroelectric detectors.
	UNIT-V: Magnetism: Classification based on Field, Temperature and order/disorder – atomicorigin – Ferromagnetism-Hysteresis- applications of magnetic materials (Para &Ferro). Dielectrics: Electric Polarization – Dielectric in DC fields – Internal field –Clausius Mossoti Equation – Dielectric loss- Ferroelectric Hysteresis and applications.	UNIT-V Magnetism: Introduction – Magnetic dipole moment – Magnetization-Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr Magneton - Classification of magnetic materials (Dia, Para, and Ferro) – Domain concept of Ferromagnetism - Hysteresis – soft and hard magnetic materials – Applications of Ferromagnetic materials. Dielectrics: introduction - Dielectric polarization– Dielectric polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative)-Lorentz internal field – Claussius_Mossoti equation- Frequency dependence of polarization - Applications of dielectrics.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Physics Lab	Engineering Physics Lab
Course Code	171BS1L02/171BS2L02	191BS1L01
Syllabus	1. Determination of wavelength of a source-Diffraction Grating-Normal incidence..	1. Determination of Rigidity modulus of a material- Torsional Pendulum....
	2. Newton's rings – Radius of Curvature of Plano - Convex Lens	2. Determination of Young's modulus by method of single cantilever oscillations.
	3. Determination of thickness of a spacer using wedge film and parallel interference fringes	3. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum.
	4. Determination of Rigidity modulus of a material- Torsional Pendulum.	4. Verification of laws of vibrations in stretched strings – Sonometer.
	5. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum	5. Determination of spring constant of springs using coupled oscillators.
	6. Melde's experiment – Transverse and Longitudinal modes by capillary rise method.	6.Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus
	7. Verification of laws of vibrations in stretched strings – Sonometer.	7. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
	8. Determination of velocity of sound – Volume Resonator.	8. Measurement of magnetic susceptibility by Gouy's method.
	. 9. L- C- R Series Resonance Circuit.	9. Determination of ultrasonic velocity in liquid (Acoustic Grating)
	10. Study of I/V Characteristics of Semiconductor diode.	10. Determination of dielectric constant by charging and discharging method
	11. I/V characteristics of Zener diode.	11. Determination of wavelength of Laser by diffraction grating
	12. Characteristics of Thermistor – Temperature Coefficients	12. Determination of particle size using Laser
	13. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.	13. Determeination of Pressure variation using strain Gauge sensor.
	14. Energy Band gap of a Semiconductor p -	14.Determination of Moment of Inertia of a

	n junction.	Fly Wheel
	15. Hall Effect in semiconductors.	15.Determination of Velocity of sound – Volume Resoantor
	16. Time constant of CR circuit.	
	17. Determination of wavelength of laser source using diffraction grating.	
	18. Determination of Young's modulus by method of single cantilever oscillations	
	19. Determination of lattice constant – lattice dimensions kit.	
	20. Determination of Planck's constant using photocell.	
	21. Determination of surface tension of liquid	
	22. Polarimeter – Determination of specific rotation of sugar solution..	
	23. Single Slit – Determination of Slit width using laser or Determination of Wavelength of laser	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Environmental Studies	Environmental Science
Course Code	171HS1T02/171HS2T02	191MC1A01
Syllabus	UNIT –I: Ecosystems: Scope of environmental studies, Structure- Producers, consumers and decomposers Function – Food chain, Food web, Tropic structure and Energy flow in the ecosystem Ecological pyramids, nutrient recycling, primary and secondary production, ecosystem regulation. Ecological succession Terrestrial ecosystem and aquatic ecosystem - Introduction, types, characteristic features.	UNIT- I: Multidisciplinary Nature of Environmental Studies: Definition, Scope and Importance, Need for Public Awareness. Natural Resources: Renewable and non-renewable resources – Natural resources and associated problems.
	UNIT – II: Natural Resources: Natural resources and associated problems Forest resources – Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources Food resources: World food problems, changes caused by non-agriculture activities effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources vs oil and natural gas extraction. Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil	UNIT - II: Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers. Food chains, food webs and ecological pyramids. Biodiversity and Its Conservation: Definition: genetic, species and ecosystem diversity – Biogeographical classification of India – Values of biodiversity. Hot-spots of biodiversity – Threats to biodiversity. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

	erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.	
	UNIT – III: Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity classification Value of biodiversity: consumptive use, productive use, social-Biodiversity at national and local levels. India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts - Endangered and endemic species of India – Conservation of biodiversity	UNIT - III: Environmental Pollution: Definition, Cause, effects and control measures of: a) Air Pollution. b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution.
	UNIT – IV: Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Style. Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e – waste management.	UNIT - IV: Social Issues and The Environment: From Unsustainable to Sustainable development – Urban problems related to Energy &Water. Resettlement and rehabilitation of people, Environmental ethics, Climate change, global warming, acid rain, ozonelayer depletion, nuclear accidents and holocaust. Environment Protection Act – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act-Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.
	UNIT – V: Social Issues and the Environment Urban problems related to energy -Water conservation, rain water harvesting Resettlement and rehabilitation of people; its problems and concerns. Global challenges Environmental ethics: Issues and possible solutions. Environmental Protection Act - Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act -Wildlife Protection Act - Forest Conservation Act-Issues involved in enforcement of environmental legislation. - Public awareness and Environmental management.	UNIT - V: Human Population and The Environment: Population growth, variation among nations. Environment and human health, Human Rights, Value Education. Role of Information Technology in Environment and human health.

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1.1.2. Table-Prior/Post revision of syllabus

<table>
<tr><th>Regulation</th><th>Pre-Revision</th><th>Post-Revision</th></tr>
<tr><td>Course Title</td><td>Engineering Workshop& IT Workshop</td><td>Basic Engineering Workshop</td></tr>
<tr><td>Course Code</td><td>171ES2L02</td><td>191ES1L02</td></tr>
<tr><td>Syllabus</td><td>List of Experiments:
Carpentry:
1. T-Lap Joint
2. Cross Lap Joint
3. Dovetail Joint
4. Mortise and Tenon Joint

Fitting:
1. Vee Fit
2. Square Fit
3. Half Round Fit
4. Dovetail Fit
Black Smithy:
1. Round rod to Square
2. S-Hook
3. Round Rod to Flat Ring
4. Round Rod to Square headed bolt
House Wiring:
1. Parallel / Series Connection of three bulbs
2. Stair Case wiring
3. Florescent Lamp Fitting
4. Measurement of Earth Resistance

Tin Smithy:
1. Taper Tray
2. Square Box without lid
3. Open Scoop
4. Funnel</td><td>List of Experiments:
Carpentry:
1. Cross Lap Joint
2. Dovetail Joint
3. T - Joint

Fitting:
1. Vee Fit
2. Square Fit

House Wiring:
1. Parallel Connection of three bulbs
2. Series Connection of three bulbs

Tin Smithy:
1. Taper Tray
2. Funnel
3. Plain Pipe

List of Augmented Experiments:
1. Stair Case wiring
2. 2. Florescent Lamp Fitting</td></tr>
<tr><td></td><td>Exercise 1:
Identification of peripherals of a computer
Block diagram of the CPU along with the configuration of the each peripheral and its functions.</td><td></td></tr>
</table>

	Exercise 2: **System Assembling and Disassembling** Disassembling the components of a PC and assemble them back to working condition. **Exercise 3:** **Installation of softwares** Installation of operating Systems: Windows, Linux along with necessary Device Drivers, Installation of application softwares and Tools. **Exercise 4:** **Troubleshooting (Demonstration)** Hardware Troubleshooting: Identification of a problem and fixing a defective PC Software Troubleshooting: Identification of a problem and fixing the PC for any software issues. **Exercise 5:** **Network Configuration and Internet** Configuring TCP/IP, proxy and firewall settings, Internet and World Wide Web- Search Engines, Types of search engines, netiquette, cyber hygiene. **Exercise 6:** **MS-Office / Open Office** a. Word - Formatting, Page Borders, Reviewing, Equations, symbols. b. Spread Sheet - organize data, usage of formula, graphs and charts. c. Power point - features of power point, guidelines for preparing an effective Presentation. d. Access- creation of database, validate data. **Exercise 7:** **LaTeX** LaTeX - basic formatting, handling equations and images.	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	MATHEMATICS-III	Partial Differential Equations and Vector Calculus
Course Code	171BS2T06	191BS2T05
Syllabus	UNIT - I: Laplace transforms: Laplace transforms of standard functions-First Shifting theorem, Change of scale, Multiplication with t, Division by t - Transforms of derivatives and integrals – Unit step function –Dirac's delta function, Periodic functions.	UNIT - I: Special Functions: Beta and Gamma functions, Properties, Relation between Beta and Gamma functions, Evaluation of improper integrals.
	UNIT- II: Inverse Laplace transforms: Inverse Laplace transforms – Convolution theorem (without proof), Second shifting theorem. *(MATLAB Exercise: Computing Laplace transform off (t) using symbolic toolbox, Solving initial value problems using 'dsolve') Applications: Evaluating improper integrals, solving initial value problems using Laplace transforms.	UNIT II: Partial Differential Equations: Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, Solutions of first order linear partial differential equations, nonlinear partial differential equations (standard types), Homogeneous linear partial differential equations with constant coefficients.
	UNIT - III: Multiple integrals and Beta, Gamma functions: Multiple integrals: Double and triple integrals – Change of variables – Change of order of integration, Beta and Gamma functions- Properties - Relation between Beta and Gamma functions Applications: Finding Areas and Volumes.	UNIT III: Multiple Integrals: Double integrals, Change of order of integration, Change of variables, Double integral in polar coordinates, Triple integrals,Finding Area and Volume as a double integral
	UNIT - IV: Vector Differentiation: Gradient - Directional Derivatives - Divergence- Curl - Laplacian operator - Vector identities. Applications: Equation of continuity, potential surfaces	UNIT IV: Vector Differentiation: Introduction, Gradient of a scalar field, Directional Derivative, Divergence of a vector field, Curl of a vector field, Solenoidal and irrotational fields, Conservative force field, Scalar potential, Laplace operator, Vector identities.
	UNIT - V: Vector Integration: Line integral – Work done - Surface and volume integrals,	UNIT V: Vector Integration: Introduction, Line integral, Work done, Surface and

	Green's Theorem, Stokes Theorem and Gauss Divergence theorem (without proof) and related problems.	volume integrals, Green's theorem, Stokes theorem and Gauss Divergence theorem (All theorems without proof) and related problems.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering Chemistry	Chemistry of Materials
Course Code	171BS1T03	191BS2T06
Syllabus	UNIT- I: High Polymers and Plastics: Polymerization: Introduction- Mechanism of polymerization - Stereo regular polymers - Physical and mechanical properties – Plastics as engineering materials: advantages and limitations – Thermoplastics and Thermosetting plastics – Compounding and fabrication (compression moulding, injection moulding, extrusion moulding and transfer moulding techniques) - Preparation, properties and applications of polyethene, PVC, Bakelite and polycarbonates. Elastomers – Natural rubber- compounding and vulcanization – Synthetic rubbers: Buna S, Buna N, Thiokol – Applications of elastomers. Biodegradable polymers.	UNIT- I: Water Technology: Introduction – Soft Water and hardness of water, types of hardness of water, degree of hardness of water, Units of hardness of water, problems on hardness, Boiler troubles - scale and sludge, Boier corrosion, Industrial water treatment- zeolite and ion-exchange processes. Specifications for drinking water, Bureau of Indian Standards (BIS) and World health organization(WHO) standards, - desalination of brackish water, reverse osmosis (RO) and electrodialysis.
	UNIT - II: Fuel Technology: Fuels:- Introduction – Classification – Calorific value - HCV and LCV – Dulong's formula – Coal — Proximate and ultimate analysis – Significance of the analyses – Liquid fuels – Petroleum- Refining – Cracking – Synthetic petrol –Petrol knocking – Diesel knocking - Octane and Cetane ratings – Anti-knock agents – Power alcohol – Bio-diesel – Gaseous fuels – Natural gas. LPG and CNG – Combustion – Calculation of air for the combustion of a fuel – Flue gas analysis – Orsat apparatus.	UNIT - II: Electrochemical Energy Systems: Introduction-Electrochemical Cell(Galvanic cell), Electrochemical series, Applications, single electrode potential, Hydrogen and Calomel electrode, Nernst Equation for a single electrode ,Concentration Cells(Electrode & Electrolyte),Construction of glass electrode. Batteries – Classical batteries-dry/Leclanche cell,Modern batteries-zinc air, lithium cells-Li MnO2 cell-challenges of battery technology. Fuel cells-Introduction- classification of fuel cells – hydrogen and oxygen fuel cell, propane, and oxygen fuel cell-Merits of fuel cell.
	UNIT - III: Electrochemical Cells and Corrosion: Galvanic cells - Reversible and	UNIT - III: Polymers and Building Materials: Introduction to polymers, functionality of

	irreversible cells – Single electrode potential- Electro chemical series and uses of this series- Standard electrodes (Hydrogen and Calomel electrodes) - Concentration Cells – Batteries: Dry Cell - Li cells - Zinc – air cells. Corrosion:- Definition – Theories of Corrosion (electrochemical) – Formation of galvanic cells by different metals, by concentration cells, by differential aeration and waterline corrosion – Passivity of metals – Pitting corrosion - Galvanic series – Factors which influence the rate of corrosion - Protection from corrosion – Cathodic protection - Protective coatings: – Metallic (cathodic and anodic) coatings - Methods of application on metals (Galvanizing, Tinning, Electroplating, Electroless plating).	monomers, chain growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation (Free radical mechanism for addition ploymerization) Plastics - Thermoplastics and Thermosettings, Preparation, properties, and applications of – PVC, Bakelite. Steel – Types of Steel, chemical composition – applications of alloy steels Cement: Portland cement, constituents, Manufacture of Portland Cement, chemistry of setting and hardening of cement.
	UNIT - IV: Chemistry of Advanced Materials: Nano materials:-Introduction – Sol-gel method - Carbon nano tubes and fullerenes: Types, preparation, properties and applications. Super conductors:-Type – I, Type II – Characteristics and applications Semi conductors: - Preparation of semiconductors, working of diodes and transistors. Green synthesis:-Principles Liquid crystals:-Introduction – Types – Applications Fuel cells: - Introduction - cell representation, H2-O2fuel cell: Design and working, advantages and Limitations. Types of fuel cells: methanol-oxygen fuel cells.	UNIT - IV: Corrosion Engineering: Corrosion: Definition – theories of corrosion, dry corrosion, and electro chemical corrosion – factors affecting corrosion, nature of the metal and nature of the environment. Corrosion controlling methods: Sacrificial and Impressed current cathodic protection, Metallic coatings, anodic coatings, cathodic coating, galvanizing, and tinning, metal cladding, Electroplating –organic coatings, paints (constituents and their functions).
	UNIT - V: Water Technology Hard water:- Reasons for hardness – units of hardness - determination of hardness andalkalinity - Water for steam generation - Boiler troubles – Priming and Foaming, Scale formation, Boiler corrosion, Caustic embrittlement - Internal treatments - Softening of Hard water : Lime – Soda process, Zeolite process and numerical problems based on these processes and Ion Exchange process - Water for drinking purposes- Purification – Sterilization and disinfection : Chlorination, Break point chlorination and other methods – Reverse Osmosis and Electro Dialysis.	UNIT - V: Material Science and Engineering: Nano Materials: Introduction to Nano materials, chemical synthesis of nanomaterials: Solgel method,characterization of nanomateirals by TEM (includes basic principle of TEM), Applications of nanomaterials in wastewater treatment,lubricants, and engines NanoTubes:Carbon nano tubes-Types of CNT's-preparation methods–Arc vapourisation, Laser abiliation and chemical vapour deposition –properties and applications. Band Theory of Solids: Introduction –Explanation of conductors, semiconductors, Insulators by Band Theory- Super Conductors-Types-

		Preparation-Propertiesand Applications. Appendix:Introduction to Smart Materials.

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Department of Mechanical Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**Engineering Drawing**	**Engineering Graphics and Design**
Course Code	**171ES2T03**	**191ES2T02**
Syllabus	**UNIT-I:** **Introduction to Engineering Drawing:** Lettering, Dimensioning, Types of lines. **Geometrical Constructions:** Construction of regular polygons by general method and inscribing circle method. Special methods for pentagon and hexagon. **Conic Sections:** Ellipse, Parabola and Hyperbola by general method (eccentricity method) and special methods. **Scales:** Plain Scale, Diagonal Scale and Vernier Scales.	**Unit-I:** **Introduction to Engineering graphics:** Principles of Engineering Graphics and their significance- conventions in drawing- lettering – BIS Conventions-- Conic sections -Cycloid, epicycloids and hypocycloid-Involutes
	UNIT-II: **Orthographic Projections:** Introduction to orthographic projections, Projections of Points, Projections of Lines.	**UNIT-II:** **Projection of points, lines and planes:** Projection of points in any quadrant, lines inclined to one or both planes, finding true lengths, angle made by line. Projections of regular plane surfaces.
	UNIT-III: **Projections of Planes:** Regular planes perpendicular/parallel to one reference plane and inclined to other reference plane; inclined to both the reference planes.	**UNIT-III:** **Projections of solids:** Projections of regular solids inclined to one or both planes by rotational or auxiliary views method.
	UNIT-IV: **Projections of Solids:** Prisms, Pyramids, Cones and Cylinders with the axis parallel to both the reference planes and axis inclined to one of the reference planes.	**UNIT-IV:** **Computer Aided Drafting** **Introduction to Computer Aided Drafting**: Basic drawing and editing commands- Dimensioning principles and conventional representations, Systems of projections, Conventions and application to orthographic projections

	UNIT-V: **Isometric Projections** Isometric Scale, Isometric Projections, Conversion of Isometric views into Orthographic projections.	**UNIT-V:** **Isometric Projections:** Principles of isometric projection- Isometric scale; Isometric views: lines, planes, figures, simple and compound solids

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**Engineering Mechanics**	**Engineering Mechanics**
Course Code	**171ES1T02**	**191ES2T04**
Syllabus	**UNIT- I:** **Introduction to Engineering Mechanics** Basic Concepts **Systems of Forces:** Coplanar Concurrent Forces & Non-Concurrent Forces – Components in Space – Resultant – Moment of Force and its Application – Couples and Resultant of Force Systems. Friction: Introduction, limiting friction and impending motion, Coulomb's laws of dry friction, coefficient of friction, cone of friction.	**UNIT- I:** **Introduction to Engineering Mechanics:** Composition and resolution of forces, parallelogram law, principle of transmissibility, types of force systems - concurrent and concurrent coplanar forces, resultant of coplanar force systems couple, moment of a force Varignon's theorem, concept of free body diagrams, concept of equilibrium of coplanar force systems.
	UNIT- II: **Equilibrium of Systems of Forces:** Free Body Diagrams, Equations of Equilibrium of Coplanar Systems, and Spatial Systems for concurrent forces. Lami's Theorem, Converse of the law of Triangle of forces, Converse of the law of polygon of forces condition of equilibrium.	**UNIT II** **Analysis of Structures:** Introduction to plane trusses, analysis of plane trusses by method of joints and method of sections. **Virtual Work**: Equilibrium of ideal systems, work done by a force, work done by a couple, principle of virtual work.
	UNIT- III: **Centroid:** Centroid of simple figures (from basic principles) – Centroid of composite figures. **Centre of Gravity:** Centre of gravity of simple body (from basic principles), Centre of gravity of composite bodies, Pappus theorems.	**UNIT III:** **Properties of Surfaces and Volumes:** Centroid and center of gravity, derivation of centroids from first moment of area, centroids of composite sections, center of gravity of common volumes - cylinder, cone, sphere, theorem of Pappus. **Moment of Inertia**: Area moment of inertia of plane and composite shapes, parallel axis theorem, perpendicular axis theorem, polar moment of inertia, mass moment of inertia of common volumes -thin plates, thin rod, cylinder, cone, sphere, rectangular prism, radius of gyration.

	UNIT- IV: **Area Moment of Inertia:** Definition – Polar Moment of Inertia, Transfer Theorem, Moment of Inertia of composite figures. **Mass Moment of Inertia:** Moment of Inertia of masses, Transfer formula for Mass Moment of Inertia, Mass Moment of inertia of composite bodies.	**UNIT IV:** **Kinematics:** Fundamentals of kinematics of motion- Rotation of a rigid body about a fixed axis, introduction to plane motion. **Kinetics:** Principles of dynamics - Newton's Laws of motion, D'Alembert's principle in rectilinear translation, Concepts of Friction
	UNIT – V: **Kinematics:** Basics of linear motion. **Kinetics:** Particle and Rigid body in translation – Central force motion – Equations of plane motion – Fixed axis rotation. **Work – Energy Method:** Equations for translation, Work-Energy Applications to particle motion, Connected system-Fixed axis rotation and plane motion. Impulse momentum method.	**UNIT V:** **Applications:** Principle of work and energy-Principle of conservation of energy, Concept of power, Conservation of linear and angular momentum, Principle of momentum and impulse, Types of impact.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering /Applied Chemistry Lab	Engineering Chemistry Lab
Course Code	171BS1L01	191BS1L02/191BS2L04
Syllabus	Exercise 1: Introduction to Chemistry laboratory – Molarity, Normality, Primary, secondary standard solutions, Volumetric titrations, Quantitative analysis, Qualitative analysis, etc.	Exercise 1: Determination of Total Hardness of a water sample.
	Exercise 2: Trial experiment - Determination of HCl using standard Na2CO3 solution.	Exercise 2: Determination of Dissolved Oxygen in Water Sample.
	Exercise 3: Preparation of Phenol - Formaldehyde resin (Bakelite).	Exercise 3: Determination of Zinc by Complexometric method
	Exercise 4: Determination of KMnO4 using standard Oxalic acid solution.	Exercise 4: P H metric titration of (i) strong acid vs. strong base.
	Exercise 5: Determination of ferrous iron using standard K2Cr2O7 solution.	Exercise 5: Determination of Fe (II) in Mohr's salt by potentiometric method
	Exercise 6: Preparation of Bio-Diesel.	Exercise 6: Potentiometry – Titration between strong acid – strong base
	Exercise 7: Determination of temporary and permanent hardness of water using standard EDTA solution.	7: Conductometric titrations(Strong acid vs Strong base).
	Exercise 8: Determination of Copper using standard EDTA solution.	Exercise 8: Preparation of Phenol-Formaldehyde resin.
	Exercise 9: Determination of Iron by a Colorimetric method using thiocynate as reagent.	Exercise 9: Preparation of Urea-Formaldehyde resin
	Exercise 10: Determination of pH of the given sample solution using pH meter.	Exercise 10: Preparation of bio diesel
	Exercise 11: Conduct metric titration between strong acid and strong base.	Exercise.. Exercise 11: Determination of Vitamin – C.
	Exercise 12: Conduct metric titration between strong acid and weak base.	
	Exercise 13: Potentiometric titration between strong acid and strong base.	
	Exercise 14: Potentiometric titration	

	between strong acid and weak base.	
	Exercise 15: Determination of Zinc using standard EDTA solution.	
	Exercise 16: Determination of Vitamin – C.	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Design of Machine Members -II	Design of Machine Members -II
Course Code	R1631031	171ME5T11
Syllabus	**UNIT-I:** **Bearings:** Classification of bearings-applications, types of journal bearings – lubrication – bearing modulus – full and partial bearings – clearance ratio – heat dissipation of bearings, bearing materials – journal bearing design – ball and roller bearings – static loading of ball & roller bearings, bearing life.	**UNIT-I:** **Bearings:** Classification of bearings-applications, types of journal bearings, lubrication, bearing modulus, full and partial bearings, clearance ratio, heat dissipation of bearings, bearing materials, journal bearing design, ball and roller bearings, static loading of ball & roller bearings.
	UNIT-II: **Engine Parts:** Connecting Rod: Thrust in connecting rod – stress due to whipping action on connecting rod ends – cranks and crank shafts, strength and proportions of over hung and center cranks – crank pins, crank shafts. Pistons, forces acting on piston – construction design and proportions of piston, cylinder, cylinder liners	**UNIT-II:** **Engine Parts:** Connecting Rod, thrust in connecting rod, stress due to whipping action on connecting rod ends, cranks and crank shafts, strength and proportions of over hung and center cranks, crank pins, crank shafts. Pistons, forces acting on piston, construction design and proportions of piston, cylinder, cylinder liners
	UNIT-III: **Design of curved beams:** introduction, stresses in curved beams, expression for radius of neutral axis for rectangular, circular, trapezoidal and t-section, design of crane hooks, c –clamps.	**UNIT-III:** **Design of Curved Beams:** Introduction, stresses in curved beams, expression for radius of neutral axis for rectangular, circular, trapezoidal and T-section, design of crane hooks, C clamps.
	UNIT-IV: **Power Transmissions Systems, Pulleys:** Transmission of power by belt and rope drives, transmission efficiencies, belts – flat and v types – ropes - pulleys for belt and rope drives, materials, chain drives DESIGN OF POWER SCREWS: Design of screw, square ACME, buttress screws, design of nut,	**UNIT-IV:** **Power Transmissions Systems, Pulleys:** Introduction, Belt and rope drives, Selection of belt drives, types of belt drives, Transmission of power by belt and rope drives, Velocity ratio of belt drives, slip of belt, creep of belt, Tension for flat belt drive, angle of contact, centrifugal tension, maximum tension of belt, transmission efficiencies, belts flat and V types

	compound screw, differential screw, ball screw- possible failures.	ropes - pulleys for belt and rope drives, materials, chain drives –length, angular speed ratio, classification of chains. Design of Power Screws: Design of screw, square ACME, buttress screws, design of nut, compound screw, differential screw, ball screw possible failures.
	UNIT-V: **Spur & Helical Gear Drives**: Spur gears- helical gears – load concentration factor – dynamic load factor, surface compressive strength – bending strength – design analysis of spur gears – estimation of centre distance, module and face width, check for plastic deformation, check for dynamic and wear considerations.	**UNIT-V:** **Spur & Helical Gear Drives:** Spur gears- helical gears load concentration factor dynamic load factor, surface compressive strength bending strength (lewis equation) design analysis of spur gears estimation of centre distance, module and face width, check for plastic deformation.
	UNIT-VI: **Machine Tool Elements**: Levers and brackets: design of levers – hand levers-foot lever – cranked lever – lever of a lever loaded safety valve- rocker arm straight – angular-design of a crank pin – brackets-hangers- wall boxes. **Wire Ropes:** Construction, Designation, Stresses in wire ropes, rope sheaves and drums.	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Automobile Engineering	Automobile Engineering
Course Code	R1642033	171ME5E01
Syllabus	**UNIT-I:** **Introduction:** Components of four wheeler automobile – chassis and body – power unit – power transmission – rear wheel drive, front wheel drive, 4 wheel drive – types of automobile engines, engine construction, turbo charging and super charging – engine lubrication, splash and pressure lubrication systems, oil filters, oil pumps – crank case ventilation – engine service, reboring, decarbonisation, Nitriding of crank shaft.	**UNIT-I:** **Introduction:** Components of four wheeler automobile – chassis and body – Chassis Layout - power transmission – rear wheel drive, front wheel drive, 4 wheel drive and Motor Vehicle Act 1988 – Legal Aspects/Compliance of Automotive Vehicles: Introduction to Motor Vehicle Act, Registration of Vehicles, Inspection and Fitness of vehicles and Homologation of Vehicles.
	UNIT-II: **Transmission System**: Clutches, principle, types, cone clutch, single plate clutch, multi plate clutch, magnetic and centrifugal clutches, fluid fly wheel – gear boxes, types, sliding mesh, construct mesh, synchro mesh gear boxes, epicyclic gear box, over drive torque converter. propeller shaft – Hotch – Kiss drive, Torque tube drive, universal joint, differential rear axles – types – wheels and tyres.	**UNIT-II:** **Transmission System:** Clutches, principle, types, gear boxes, types, Propeller shaft – Hotch – Kiss drive, Torque tube drive, universal joint, differential rear axles– types **Steering System:** Steering geometry – camber, castor, king pin rake, combined angle toe in, center point steering. Types of steering mechanism –Ackerman steering mechanism, Davis steering mechanism, steering linkages.

	UNIT-III: **Steering System:** Steering geometry – camber, castor, king pin rake, combined angle toein, center point steering. types of steering mechanism – Ackerman steering mechanism, Davis steering mechanism, steering gears – types, steering linkages.	**UNIT-III:** **Suspension System:** Objects of suspension systems – rigid axle suspension system, torsion bar, shock absorber, independent suspension system, Air Suspension, Rubber Suspension, Hydro elastic suspension system, Hydra gas suspension system **Braking System**: Mechanical braking system, hydraulic braking system requirement of brake fluid, pneumatic and vacuum brakes, Parking Braking system
	UNIT-IV: **Suspension System:** Objects of suspension systems – rigid axle suspension system, torsion bar, shock absorber, independent suspension system. **Braking System:** Mechanical brake system, hydraulic brake system, master cylinder, wheel cylinder tandem master cylinder requirement of brake fluid, pneumatic and vacuum brakes. **Electrical System:** Charging circuit, generator, current – voltage regulator – starting system, Bendix drive mechanism solenoid switch, lighting systems, horn, wiper, fuel gauge – oil pressure gauge, engine temperature indicator etc.	**UNIT-IV:** **Wheels And Tyres**: Basic Requirements of Wheels and Tyres, Construction of Wheel Assembly, Tyre Construction, Types, Tyre Sizes and Designation, Aspect Ratio, Tyre Tread Pattern, Selection of Tyre under Different Applications.
	UNIT-V: **Engine Specification And Safety Systems:** Introduction- engine specifications with regard to power, speed, torque, no. of cylinders and arrangement, lubrication and cooling etc. **Safety:** Introduction, safety systems - seat belt, air bags, bumper, anti-lock brake system (ABS), wind shield, suspension sensors, traction control, mirrors, central locking and electric windows, speed control.	**UNIT-V:** **Electrical System:** Charging circuit, generator, starting system, lighting, horn, wiper, fuel gauge, oil pressure gauge, engine temperature indicator. **Safety Systems:** Introduction, safety systems - seat belt, air bags, bumper, anti-lock brake system (ABS), Electronic Brake force Distribution (EBD), mirrors, central locking, speed control, Retractable Steering system, Head restraints, seats with anti-submarine effects and fuel cut off switch.

	UNIT-VI: **Engine Emission Control:** Introduction – types of pollutants, mechanism of formation, concentration measurement, methods of controlling-engine modification, exhaust gas treatment-thermal and catalytic converters-use of alternative fuels for emission control – National and International pollution standards **Engine Service:** Introduction, service details of engine cylinder head, valves and valve mechanism, piston connecting rod assembly, cylinder block, crank shaft and main bearings, engine reassembly-precautions.	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Thermal Engineering Lab	Thermal Engineering Lab
Course Code	R1631038	171ME5L03
	List of Experiments: 1. I.C. Engines valve / port timing diagrams. 2. Testing of Fuels – Viscosity, flash point/fire point, carbon residue, calorific value. 3. I.C. Engines performance test and Exhaust emission measurements (4 -stroke diesel engine) 4. I.C. Engines performance test and Exhaust emission measurements (2-stroke petrol engine) 5. Evaluation of engine friction by conducting Morse test on 4-stroke multi cylinder petrol engine. 6. Determination of FP by retardation and motoring test on IC engine. 7. I.C. Engines heat balance at different loads and show the heat distribution curve. 8. Economical speed test of an IC engine. 9. Performance test on variable compression ratio engines. 10. Performance test on reciprocating air compressor unit. 11. Dis-assembly / assembly of different parts of two wheelers. 3 wheelers & 4 wheelers. Tractor & Heavyduty engines covering 2-stroke and 4 stroke, SI and CI engines. 12. Study of boilers, mountings and accessories.	**List of Experiments:** 1. Draw the valve and port timing diagrams for four and two stroke engines 2. Evaluate the performance of 4 - stroke Diesel engines. 3. Evaluate the performance of 4 - stroke Petrol engines. 4. Evaluation of frictional power by conducting morse test on 4-stroke multi cylinder petrol engine. 5. Determination of frictional power by retardation and motoring test on IC Engine 6. Draw the heat balance sheet for 4-stroke Single cylinder Diesel / Petrol engines. 7. Draw the heat balance sheet for 4-stroke multi cylinder petrol engine. 8. Calculate the performance of variable compression ratio engines. 9. Performance test on reciprocating air compressor unit. 10. Disassembly / assembly of engines. 11. Determine the flash and fire point of given oil sample. 12. Determination of Viscosity using Red Wood Viscometer. 13. Determination of viscosity using Saybolt Viscometer. 14. Determination of calorific value of fuels by using Bomb Calorimeter.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Metrology	Metrology& Instrumentation
Course Code	R1632031	171ME6T15
Syllabus	**UNIT-I:** **Systems Of Limits And Fits:** Introduction, nominal size, tolerance, limits, deviations, fits -Unilateral and bilateral tolerance system, hole and shaft basis systems- interchangeability, deter mistic & statistical tolerances, selective assembly. International standard system of tolerances, selection of limits and tolerances for correct functioning.	**UNIT-I:** **Linear and Angular Measurements, Limits and Fits:** ISO system: Fits and Types of interchangeability, Taylor's Principle or plain limit gauges, Use of Plug, Ring and Snap gauges. Indicating type limit gauges. Introduction- Linear and Angular measurements - Slip gauges and End bars - Gauge material and manufacturing methods, Different types of Micrometers, Height gauges, Tomlinson gauges. Precision polygon, Sine bar, Auto collimator.
	UNIT-II:. **Linear Measurement:** Length standards, end standards, slip gauges- calibration of the slip gauges, dial indicators, micrometers. **Measurement of Angles and Tapers:** Different methods – bevel protractor, angle slip gauges- angle dekkor- spirit levels- sine bar- sine table, rollers and spheres used to measure angles and tapers. LIMIT GAUGES: Taylor's principle – design of go and no go gauges; plug, ring, snap, gap, taper, profile and position gauges.	**UNIT-II:** **Optical Measurement and Comparators:** Dial indicator, Sigma and Mechanical comparator, Free flow and Back pressure type Pneumatic comparator. Application of set jet gauge heads Optical projector, Chart, screen gauges and measuring methods, Micro gauge bridge lines. Tool maker's Microscope applications, Measurement of Straightness and- Flatness. Roundness measurement with bench centers and talyround, Coordinate Measuring Machine in components geometries.
	UNIT-III: **Optical Measuring Instruments:** Tools maker's microscope and uses - autocollimators, optical projector, optical flats and their uses.	**UNIT-III:** **Surface Roughness Measurements And Gear Tooth Measurement:** Parameters as per ISO indices. Profilometer, Taylor Hobson Talysurf. Application of Thread metrology - 2 wire and 3 Wire methods,

	Interferometry: Interference of light, Michelson's interferometer, NPL flatness interferometer, and NPL gauge interferometer.	**Gear measurement** – Gear tooth thickness, Parkinson gear tester, General geometric tests for testing machine tools- Lathe, drill, mill.
	UNIT-IV: **Surface Roughness Measurement:** Differences between surface roughness and surface waviness – Numerical assessment of surface finish-CLA, Rt., R.M.S. Rz, R10 values, Method of measurement of surface finish – Profilograph, Talysurf, ISI symbols for indication of surface finish. COMPARATORS: Types - mechanical, optical, electrical and electronic, pneumatic comparators and their uses	**UNIT-IV:** **Displacement and Strain Measurement:** Elements of instrumentation system. Static and Dynamic characteristics. Types of errors. Displacement transducers. LVDT. Strain measurement - Wire and foil type resistance strain gauges. Rosette Gauges. Bonding procedure. Lead resistance compensation. Adjacent arm and self-compensating gauges. Proving ring Strain gauge load cells, measurement of axial load and torsion by strain gauges. Piezo electric load cell.
	UNIT-V: **Gear Measurement**: Nomenclature of gear tooth, tooth thickness measurement with gear tooth vernier & flange micro meter, pitch measurement, total composite error and tooth to tooth composite errors, rolling gear tester, involute profile checking. **Screw Thread Measurement:** Elements of measurement – errors in screw threads- concept of virtual effective diameter, measurement of effective diameter, angle of thread and thread pitch, and profile thread gauges.	**UNIT-V:** **Temperature, Pressure and Flow Measurement:** Introduction to Seismic Transducers - displacement and acceleration measurement, Pressure measurement - Bourdon pressure gauge, bulk modulus gauge, pirani gauge, Temperature measurement by thermo couples. Laws of thermo electricity. Types of materials used in thermocouples. Rotameter, magnetic, ultrasonic, turbine flow meter, hot – wire anemometer, laser Doppler anemometer (LDA), dynamometers.
	UNIT-VI: **Flatness Measurement:** Measurement of flatness of surfaces- instruments used- straight edges- surface plates – auto collimator. **Machine Tool Alignment Tests:** Principles of machine tool alignment testing on lathe, drilling and milling machines.	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Non-Destructive Evaluation	Non-Destructive Evaluation
Course Code	R164203B	171ME6E06
Syllabus	**UNIT – I** **Introduction to non-destructive testing**: Radiographic test, Sources of X and Gamma Rays and their Interaction with Matter, Radiographic equipment, Radiographic Techniques, Safety Aspects of Industrial Radiography	**UNIT – I** **Introduction to non-destructive testing:** Types of testing, Radiographic test: - Sources of X and Gamma Rays and their interaction with Matter, Radiographic equipment, Radiographic Techniques. Application of Industrial Radiography, Span of NDE Activities Railways, Nuclear, Non-nuclear, Aerospace Industries, Automotive Industries.
	UNIT – II **Ultrasonic test:** Principle of Wave Propagation, Reflection, Refraction, Diffraction, Mode Conversion and Attenuation, Sound Field, Piezo-electric Effect, Ultrasonic Transducers and their Characteristics, Ultrasonic Equipment and Variables Affecting Ultrasonic Test, Ultrasonic Testing, Interpretations and Guidelines for Acceptance, Rejection - Effectiveness and Limitations of Ultrasonic Testing.	**UNIT – II** **Ultrasonic test:** Principle of Wave Propagation, Reflection, Refraction, Diffraction, Mode Conversion and Attenuation, Sound Field, Piezo-electric Effect, Ultrasonic Transducers and their Characteristics, Test Equipment, Test Variables, Guidelines for Acceptance and Rejection - Effectiveness and Limitations. Application of Ultrasonic test in Castings, Railways, Nuclear, Non-nuclear & Steel Industries.
	UNIT – III **Liquid Penetrant Test:** Liquid Penetrant Test, Basic Concepts, Liquid Penetrant System, Test Procedure, Effectiveness and Limitations of Liquid Penetrant Testing **Eddy Current Test:** Principle of Eddy Current, Eddy Current Test System, Applications of Eddy Current Testing Effectiveness of Eddy Current Testing	**UNIT – III** **Liquid Penetrant Test:** Liquid Penetrant Test, Basic Concepts, Liquid Penetrant System, Test Procedure, Effectiveness and Limitations of Liquid Penetrant Testing. Applications in Aerospace Industries, castings, welded constructions, Pressure vessels.

	UNIT – IV **Magnetic Particle Test:** Magnetic Materials, Magnetization of Materials, Demagnetization of Materials, Principle of Magnetic Particle Test, Magnetic Particle Test Equipment, Magnetic Particle Test Procedure, Standardization and Calibration, Interpretation and Evaluation, Effective Applications and Limitations of the Magnetic Particle Test	**UNIT – IV** **Magnetic Particle Test:** Magnetic Materials, Magnetization of Materials, Demagnetization of Materials, Principle of Magnetic Particle Test and Procedure, Equipment's required, Standardization and Calibration, Interpretation and Evaluation, Advantages and Limitations, Applications of magnetic particle test in Surface detection.
	UNIT – V **Infrared And Thermal Testing:** Introduction and fundamentals to infrared and thermal testing–Heat transfer –Active and passive techniques –Lock in and pulse thermography–Contact and non-contact thermal inspection methods–Heat sensitive paints –Heat sensitive papers ––thermally quenched phosphors liquid crystals –techniques for applying liquid crystals –other temperature sensitive coatings –Inspection methods –Infrared radiation and infrared detectors–thermos mechanical behaviour of materials–IR imaging in aerospace applications, electronic components, Honey comb and sandwich structures–Case studies.	**UNIT – V** **Eddy Current Test:** Principle of Eddy Current, Eddy Current Test System, Eddy Current Testing Effectiveness. Applications in Offshore Gas and Petroleum Projects, Coal Mining Industry, Castings, Railways.
	UNIT – VI **Industrial Applications of NDE:** Span of NDE Activities Railways, Nuclear, Non-nuclear and Chemical Industries, Aircraft and Aerospace Industries, Automotive Industries, Offshore Gas and Petroleum Projects, Coal Mining Industry, NDE of pressure vessels, castings, welded constructions	

KL.M

Course Coordinator

Head of the Department

Head of the Department
Mechanical Engineering
Aditya Engineering College
Surampalem

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Department of Mechanical Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Machine Tools Lab	Machine Tools Lab
Course Code	R163107	171ME6L04
Syllabus	**List of Experiments:** 1. Introduction of general purpose machines -lathe, drilling machine, milling machine, shaper, planing 2. machine, slotting machine, cylindrical grinder, surface grinder and tool and cutter grinder. 3. Step turning and taper turning on lathe machine 4. Thread cutting and knurling on lathe machine. 5. Drilling and tapping 6. Shaping and planning 7. Slotting 8. Milling 9. Cylindrical surface grinding 10. Grinding of tool angles.	**List of Experiments:** 1. Introduction of general purpose machine Lathe, Drilling, Milling, Shaper 2. Step turning and taper turning using lathe. 3. Thread cutting and knurling using Lathe machine 4. Drilling and Tapping using Drilling Machine. 5. Shaping of V groove using Shaper. 6. Slotting of a keyway using Slotter. 7. Cutting spur gear using Milling Machine 8. Grinding of Flat surfaces using Surface Grinding Machine 9. Gang Milling on Milling machine 10. Grinding of HSS Tool using Tool and Cutter grinder
		List of Augmented Experiments: 1. Introduction to CNC Machines 2. Eccentric on Lathe 3. Drilling, Boring and internal threading on Lathe

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Surampalem

Department of Mechanical Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Metrology& Instrumentation Lab	Metrology/Instrumentation Lab
Course Code	R1632037	171ME6L06
Syllabus	**List of Experiments** **Metrology Lab** 1. Measurement of lengths, heights, diameters by vernier calipers, micrometers etc. 2. Measurement of bores by internal micrometers and dial bore indicators. 3. Use of gear tooth vernier caliper for tooth thickness inspection and flange micro meter for checking the 4. chordal thickness of spur gear. 5. Machine tool alignment test on the lathe. 6. Machine tool alignment test on drilling machine. 7. Machine tool alignment test on milling machine. 8. Angle and taper measurements with bevel protractor, Sine bar, rollers and balls. 9. Use of spirit level in finding the straightness of a bed and flatness of a surface. 10. Thread inspection with two wire/ three wire method & tool makers microscope. 11. Surface roughness measurement with roughness measuring instrument.	**List of Experiments** **Metrology Lab** 1. Measurement of lengths, heights, diameters by vernier calipers, micrometers. 2. Angle and taper measurements with bevel protractor, Sine bar, rollers and balls. 3. Measurement of bores by internal micrometers and dial bore indicators. 4. Straightness measuring using autocollimator. 5. Gear tooth thickness measurement using gear tooth vernier calipers.
	Instrumentation Lab 1. Calibration of pressure gauge. 2. Calibration of transducer for temperature measurement. 3. Study and calibration of LVDT transducer for displacement measurement. 4. Calibration of strain gauge. 5. Calibration of thermocouple. 6. Calibration of capacitive transducer.	**Instrumentation Lab** 1. Calibration of pressure gauge. 2. Study and calibration of LVDT transducer for displacement measurement. 3. Calibration of thermocouple. 4. Study and calibration of photo and magnetic speed pickups. 5. Calibration of resistance temperature detector.

	7. Study and calibration of photo and magnetic speed pickups. 8. Calibration of resistance temperature detector. 9. Study and calibration of a rotameter. 10. Study and use of a seismic pickup for the measurement of vibration amplitude of an engine bed at various loads. 11. Study and calibration of Mcleod gauge for low pressure.	
	.	**List of Augmented Experiments:** 1. Flatness measurement using optical flat: 2. Machine tool alignment test on lathe using various metrology instruments.
		List of Augmented Experiments: 1. Calibration of Force measuring setup 2. Study and calibration of a Rotameter for flow measurement.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Simulation Lab	CAD/CAM Lab
Course Code	RT4103L	R16421037
Syllabus	**List of Experiments:** 1. **Drafting:** Development of part drawings for various components in the form of orthographic and isometric representation of dimensioning and tolerances scanning and plotting. study of script, DXE and IGES files.	**List of Experiments:** 1. **Drafting:** Development of part drawings for various components in the form of orthographic and isometric representation of dimensioning and tolerances scanning and plotting. study of script, DXE and IGES files.
	2. **Part Modeling:** Generation of various 3D models through protrusion, revolve, shell sweep. creation of various features. study of parent child relation. feature based and boolean based modelling surface and assembly modelling. study of various standard translators. design simple components.	2. **Part Modeling:** Generation of various 3D models through protrusion, revolve, shell sweep. creation of various features. study of parent child relation. feature based and boolean based modelling surface and assembly modelling. study of various standard translators. design simple components.
	3. a. Determination of deflection and stresses in 2D and 3D trusses and beams. b. Determination of deflections component and principal and Von-mises stresses in plane stress, plane strain and Axisymmetric components. c. Determination of stresses in 3D and shell structures (at least one example in each case) d. Estimation of natural frequencies and mode shapes, Harmonic response of 2D beam. e. Steady state heat transfer Analysis of plane and Axisymmetric components.	3. a. Determination of deflection and stresses in 2D and 3D trusses and beams. b. Determination of deflections component and principal and Von-mises stresses in plane stress, plane strain and Axisymmetric components. c. Determination of stresses in 3D and shell structures (at least one example in each case) d. Estimation of natural frequencies and mode shapes, Harmonic response of 2D beam. e. Steady state heat transfer Analysis of plane and Axisymmetric components.

	4. a. Development of process sheets for various components based on b. tooling Machines. c. Development of manufacturing and tool management systems. d. Study of various post processors used in NC Machines. e. Development of NC code for free form and sculptured surfaces using CAM packages. f. Machining of simple components on NC lathe and Mill by transferring g. NC Code / from a CAM package. Through RS 232. h. Quality Control and inspection.	4. a. Study of various post processors used in NC Machines. b. Machining of simple components on NC lathe and Mill by transferring NC Code / from a CAM package. Through RS 232. c. Practice on CNC Sinutrain Turning d. Practice on CNC Sinutrain Milling e. CNC programming for turned components using FANUC Controller f. CNC programming for milled components using FANUC Controller g. Automated CNC Tool path & G-Code generation using Pro/E/MasterCAM

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Program Name : B.Tech. in Electronics and Communication Engineering

Syllabus Revision for the Academic Year 2019-20

S.No	Semester	Course Code	Course Name	% of content revised for the existing year
1	I	191HS1T01	Communicative English	90
2	I	191BS1T01	Differential Equations and Linear Algebra	20
3	I	191BS1T03	Applied Physics	40
4	I	191ES1T01	Programming for Problem Solving Using C	20
5	I	191HS1L01	Communicative English Lab-I	0
6	I	191BS1L03	Applied Physics Lab	60
7	I	191ES1L01	Programming for Problem Solving Using C Lab	35
8	I	191ES1L02	Basic Engineering Workshop	50
9	I	191MC1A01	Environmental Science	33
10	I	191MC1A02	Constitution of India	100
11	II	191BS2T08	Transform Techniques	60
12	II	191BS2T09	Engineering Chemistry	80
13	II	191ES2T02	Engineering Graphics and Design	55
14	II	191ES2T07	Basic Electrical Engineering	60
15	II	191ES2T08	Network Analysis	10
16	II	191HS2L02	Communicative English Lab-II	0
17	II	191BS2L04	Engineering Chemistry Lab	50
18	II	191ES2L08	Basic Electrical Engineering Lab	6
19	II	191ES2L09	Electronics Engineering Workshop	100
20	II	191PR2P01	Engineering Exploration Project	100
21	III	171EC3T01	Electronic Devices and Circuits	0
22	III	171EC3T02	Switching Theory and Logic Design	0
23	III	171EC3T03	Signals and Systems	0
24	III	171ES3T15	Network Analysis	0
25	III	171EC3T04	Random Variables and Stochastic Processes	0
26	III	171HS3T04	Managerial Economics and Financial Analysis	0

S.No	Semester	Course Code	Course Name	% of content revised for the existing year
27	III	171EC3L01	Electronic Devices and Circuits Lab	0
28	III	171ES3L08	Networks and Electrical Technology Lab	0
29	III	171HS3A09	Professional Ethics and Human Values	0
30	III	171HS3A10	Employability Skills – I	0
31	IV	171EC4T05	Electronic Circuit Analysis	0
32	IV	171EC4T06	Electromagnetic Waves and Transmission Lines	0
33	IV	171EC4T07	Analog Communications	0
34	IV	171EC4T08	Pulse and Digital Circuits	0
35	IV	171HS4T05	Management Science	0
36	IV	171ES4T28	Linear Control Systems	0
37	IV	171HS4T08	IPR and Patents	0
38	IV	171EC4L02	Electronic Circuit Analysis Lab	0
39	IV	171EC4L03	Analog Communications Lab	0
40	IV	171HS4A11	Employability Skills – II	0
41	V	171EC5T09	Linear IC Applications	4
42	V	171EC5T10	Digital IC Applications	0
43	V	171EC5T11	Digital Communications	0
44	V	171EC5T12	Antennas and Wave Propagation	0
45	V	171EC5E01	Computer Architecture and Organization	35
46	V	171EC5E02	OOPS through JAVA	0
47	V	171EC5E03	Electronic Switching Systems	0
48	V	171HS5T06	Employability Skills - III	100
49	V	171EC5L04	Linear IC Applications Lab	6.6
50	V	171EC5L05	Digital IC Applications Lab	0
51	V	171EC5L06	Pulse and Digital Circuits Lab	13.33
52	VI	171EC6T13	Micro Processors and MicroControllers	0
53	VI	171EC6T14	VLSI Design	32
54	VI	171EC6T15	Digital Signal Processing	16.6
55	VI	171EC6E04	CPLD and FPGA Architectures	100
56	VI	171EC6E05	Operating Systems	16.6
57	VI	171EC6E06	Computer Networks	16.6
58	VI	171EC6E07	Digital Design Through Verilog	0
59	VI	171EC6E08	Biomedical Engineering	100

S.No	Semester	Course Code	Course Name	% of content revised for the existing year
60	VI	171EC6E09	Information Theory and Coding	100
61	VI	171HS6T07	Employability Skills - IV	100
62	VI	171EC6L07	Micro Processor and Micro Controllers Lab	0
63	VI	171EC6L08	VLSI lab	66.6
64	VI	171EC6L09	Digital Communications Lab	20
65	VII	R1641041	Radar Systems	0
66	VII	R1641042	Digital Image Processing	50
67	VII	R1641043	Computer Networks	18
68	VII	R1641044	Optical Communications	0
69	VII	R164104A	TV Engineering	100
70	VII	R164104B	Electronic Switching Systems	12
71	VII	R164104C	System Design through Verilog	100
72	VII	R164104D	Embedded Systems	5
73	VII	R164104E	Analog IC Design	0
74	VII	R164104F	Network Security & Cryptography	18
75	VII	R1641047	Micro Wave Engineering & Optical Lab	18
76	VII	R1641048	Digital Signal Processing Lab	60
77	VIII	R1642041	Cellular Mobile Communications	10
78	VIII	R1642042	Electronic Measurements and Instrumentation	0
79	VIII	R1642043	Satellite Communications	0
80	VIII	R164204A	Wireless sensors & Networks	0
81	VIII	R164204B	Digital IC Design	0
82	VIII	R164204C	Operating Systems	15
83	VIII		Seminar	0
84	VIII		Project	0

Total number of courses in the academic year 2019-20	= 84
Number of courses having revision in syllabus content >/= 20% in the academic year 2019-20	29
Percentage of syllabus revision carried out in the academic year 2019-20 = (29/84)*100	34.5

A Karthik

Program Coordinator

G. Sridevi

Head of the Department

Head of the Department
Department of E.C.E.
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19-20

PROGRAM STRUCTURE

I SEMESTER

Course Code	Course Title	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practical (P)	Total Hours	
191HS1T01	Communicative English	HSMC	3	0	0	3	3
191BS1T01	Differential Equations and Linear Algebra	BSC	3	0	0	3	3
191BS1T03	Applied Physics	BSC	3	0	0	3	3
191ES1T01	Programming for Problem Solving Using C	ESC	3	0	0	3	3
191HS1L01	Communicative English Lab-I	HSMC	0	0	3	3	1.5
191BS1L03	Applied Physics Lab	BSC	0	0	3	3	1.5
191ES1L01	Programming for Problem Solving Using C Lab	ESC	0	0	3	3	1.5
191ES1L02	Basic Engineering Workshop	ESC	0	0	3	3	1.5
191MC1A01	Environmental Science	MC	2	0	0	2	0
191MC1A02	Constitution of India	MC	2	0	0	2	0
		TOTAL	**16**	**0**	**12**	**28**	**18**

II SEMESTER

Course Code	Course Title	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practical (P)	Total Hours	
191BS2T08	Transform Techniques	BSC	3	0	0	3	3
191BS2T09	Engineering Chemistry	BSC	3	0	0	3	3
191ES2T02	Engineering Graphics and Design	ESC	1	0	3	4	2.5
191ES2T07	Basic Electrical Engineering	ESC	3	0	0	3	3
191ES2T08	Network Analysis	ESC	3	0	0	3	3
191HS2L02	Communicative English Lab-II	HSMC	0	0	2	2	1
191BS2L04	Engineering Chemistry Lab	BSC	0	0	3	3	1.5
191ES2L08	Basic Electrical Engineering Lab	ESC	0	0	3	3	1.5
191ES2L09	Electronics Engineering Workshop	ESC	0	0	3	3	1.5
191PR2P01	Engineering Exploration Project	PROJ	0	0	2	2	1
		TOTAL	**13**	**0**	**16**	**29**	**21**

G. Sridhar

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III SEMESTER

Course Code	Course Title	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practical (P)	Total Hours	
171EC3T01	Electronic Devices and Circuits	PC	3	1	0	4	3
171EC3T02	Switching Theory and Logic Design	PC	3	1	0	4	3
171EC3T03	Signals and Systems	PC	3	1	0	4	3
171ES3T15	Network Analysis	ES	3	1	0	4	3
171EC3T04	Random Variables and Stochastic Processes	PC	3	1	0	4	3
171HS3T04	Managerial Economics and Financial Analysis	HSS	3	1	0	4	3
171EC3L01	Electronic Devices and Circuits Lab	PC	0	0	3	3	2
171ES3L08	Networks and Electrical Technology Lab	ES	0	0	3	3	2
171HS3A09	Professional Ethics and Human Values	HSS	2	0	0	2	0
171HS3A10	Employability Skills – I	HSS	0	0	2	2	0
		Total	20	6	8	34	22

IV SEMESTER

Course Code	Course Title	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practical (P)	Total Hours	
171EC4T05	Electronic Circuit Analysis	PC	3	1	0	4	3
171EC4T06	Electromagnetic Waves and Transmission Lines	PC	3	1	0	4	3
171EC4T07	Analog Communications	PC	3	1	0	4	3
171EC4T08	Pulse and Digital Circuits	PC	3	1	0	4	3
171HS4T05	Management Science	HSS	3	1	0	4	3
171ES4T28	Linear Control Systems	ES	3	1	0	4	3
171HS4T08	IPR and Patents	HSS	2	0	0	2	1
171EC4L02	Electronic Circuit Analysis Lab	PC	0	0	3	3	2
171EC4L03	Analog Communications Lab	PC	0	0	3	3	2
171HS4A11	Employability Skills – II	HSS	0	0	2	2	0
		Total	20	6	8	34	23

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V SEMESTER

Course Code	Course Title	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practical (P)	Total Hours	
171EC5T09	Linear IC Applications	PC	3	1	0	4	3
171EC5T10	Digital IC Applications	PC	3	1	0	4	3
171EC5T11	Digital Communications	PC	3	1	0	4	3
171EC5T12	Antennas and Wave Propagation	PC	3	1	0	4	3
---	**Professional Elective - I**	PE	3	1	0	4	3
171HS5T06	Employability Skills - III	HSS	0	0	2	2	1
171EC5L04	Linear IC Applications Lab	PC	0	0	3	3	2
171EC5L05	Digital IC Applications Lab	PC	0	0	3	3	2
171EC5L06	Pulse and Digital Circuits Lab	PC	0	0	3	3	2
171EC5S01	MOOCs – I	SS	0	0	0	0	0
		Total	**13**	**5**	**13**	**31**	**22**

VI SEMESTER

Course Code	Course Title	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practical (P)	Total Hours	
171EC6T13	Micro Processors and Micro Controllers	PC	3	1	0	4	3
171EC6T14	VLSI Design	PC	3	1	0	4	3
171EC6T15	Digital Signal Processing	PC	3	1	0	4	3
---	**Professional Elective – II**	PE	3	1	0	4	3
---	**Professional Elective - III**	PE	3	1	0	4	3
171HS6T07	Employability Skills - IV	HSS	0	0	2	2	1
171EC6L07	Micro Processor and Micro Controllers Lab	PC	0	0	3	3	2
171EC6L08	VLSI Lab	PC	0	0	3	3	2
171EC6L09	Digital Communications Lab	PC	0	0	3	3	2
171EC6S02	MOOCs – II	SS	0	0	0	0	0
		Total	**13**	**5**	**13**	**31**	**22**

MOOCs – Massive Open Online Courses

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Professional Elective – I (V Semester)

S.No	Course Code	Name of the Course
1	171EC5E01	Computer Architecture and Organization
2	171EC5E02	OOPS through JAVA
3	171EC5E03	Electronic Switching Systems

Professional Elective – II (VI Semester)

S.No	Course Code	Name of the Course
1	171EC6E04	CPLD and FPGA Architectures
2	171EC6E05	Operating Systems
3	171EC6E06	Computer Networks

Professional Elective – III (VI Semester)

S.No	Course Code	Name of the Course
1	171EC6E07	Digital Design Through Verilog
2	171EC6E08	Biomedical Engineering
3	171EC6E09	Information Theory and Coding

Professional Elective – IV (VII Semester)

S.No	Course Code	Name of the Course
1	171EC7E10	Digital Signal Processors
2	171EC7E11	Embedded Systems
3	171EC7E12	Cellular and Mobile Communications

Professional Elective – V (VII Semester)

S.No	Course Code	Name of the Course
1	171EC7E13	Analog IC Design
2	171EC7E14	Cryptography and Network Security
3	171EC7E15	Radar Systems

Professional Elective – VI (VIII Semester)

S.No	Course Code	Name of the Course
1	171EC8E16	Mixed Signal IC Design
2	171EC8E17	Wireless Sensors and Networks
3	171EC8E18	Satellite Communications

Open Elective (VIII Semester)

S.No	CourseCode	Name of the Course
1	171EC8O01	Basic Concrete Technology
2	171CE8O04	Waste Water Management
3	171EE8O05	Robotics
4	171EC8O02	Disaster Management
5	171EE8O07	Internet of Things
6	171EC8O03	Neural Networks
7	171CE8O03	Alternative Energy Sources
8	171CE8O02	Database Management Systems
9	171EC8O04	Web Technologies
10	171CE8O06	Green Fuel Technologies

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IV Year - I Semester

S.No.	Subjects	L	T	P	Credits
1	Radar Systems	4	--	--	3
2	Digital Image Processing	4	--	--	3
3	Computer Networks	4	--	--	3
4	Optical Communications	4	--	--	3
5	**Elective I** 1. TV Engineering 2. Electronic Switching Systems 3. System Design through Verilog	4	--	--	3
6	**Elective II** 1.Embedded Systems 2. Analog IC Design 3.Network Security & Cryptography	4	--	--	3
7	Micro Wave Engineering & Optical Lab	--	--	2	2
8	Digital Signal Processing Lab	--	--	2	2
	Total Credits				**22**

IV Year - II Semester

S.No.	Subjects	L	T	P	Credits
1	Cellular Mobile Communications	4	--	--	3
2	Electronic Measurements and Instrumentation	4	--	--	3
3	Satellite Communications	4	--	--	3
4	**Elective III** 1.Wireless sensors & Networks 2. Digital IC Design 3. Operating Systems	4	--	--	3
5	Seminar	--	3	--	2
6	Project	--	--	--	10
	Total Credits				**24**

Total Course Credits = 48+44 + 42 + 46 = 180

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19-20

COMMUNICATIVE ENGLISH

(Common to all branches)

I Semester	**L**	**T**	**P**	**C**
Course Code:191HS1T01	**3**	**0**	**0**	**3**

Introduction:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training the students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competence of the students of Engineering. As far as the detailed textbooks are concerned, the focus should be on the skills of Listening, Speaking, Reading and Writing. The non-detailed textbooks are meant for extensive reading both to instruct and delight. Hence the focus in the syllabus is primarily on the development of communicative skills and fostering of ideas about the essence of English Communication.

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Identify the ways to overcome fear and use of words paradoxically, interpret the developing conditions and the core competences of the state to prioritize education system.
- CO 2: Explain about world's most precious natural resources.
- CO 3: Explain about importance of unity to aboilish war.
- CO 4: Respond well to the changing situations in life with independent knowledge for better decision making.
- CO 5: Demonstrate writing and concepts of effective writing skills.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12
CO1	-	-	-	-	-	-	1	-	-	3	-	-
CO2	-	-	-	-	-	-	1	-	-	3	-	-
CO3	-	-	-	-	-	-	-	-	-	3	-	-
CO4	-	-	-	-	-	-	-	-	2	3	-	2
CO5	-	-	-	-	-	-	-	-	1	3	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

Methodology:

1. The class is to be learner-centered where the learners are to read the texts to get a comprehensive idea of those texts on their own with the help of the peer group and theteacher.

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2. Integrated skill development methodology has to be adopted with focus on individual language skills as per thetasks/exercise.
3. The tasks/exercises at the end of each unit should be completed by the learners only and the teacher intervention is permitted as per the complexity of the task/exercise.
4. The teacher is expected to use supplementary material wherever necessary and generate activities/tasks as per the requirement.
5. The teacher is permitted to use lecture method when a completely new concept is introduced in the class.

Recommended Topics:

UNIT-I:

1. An Astrologers' Day - R.K. Narayan (Detailed)
2. Bade Bhai Saab - Munshi Prachanda (Non-Detail)

UNIT-II:

1. Building A New State - A. P. J. Abdul Kalam (Detailed)
2. Morning Bells- Jayashree Mohan Raj (Non-Detail)

UNIT-III:

1. Water:The Elixer of Life- C. V. Raman (Detailed)
2. The Power of Plate of Rice- Ifeoma Okoye (Non-Detail)

UNIT-IV:

1. The Woodrose-Abburi Chaya Devi (Detailed)
2. The Cop and The Anthem- O. Henry (Non-Detail)

UNIT-V:

1. Progress- St. John Ervine (Detailed)
2. Dial 000- Barry Rosenberg (Non-Detail)

Textbooks:

Detailed Textbook: 'Using English' by Orient Black Swan.

Non-Detailed Textbook: 'Life, Language and Culture - Explorations' by Cengage.

Reference Books:

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1. Objective English, Pearson Publications.
2. Effective English Communication, Tata Mc Graw-Hill Publishing.
3. Effective Technical English, Scitech.

Weblinks:

1. http://sittingbee.com/an-astrologers-day-r-k-narayan/
2. http://bbrenglishforall.blogspot.com/2014/01/building-new-state-study-material.html
3. https://www.literatureworms.com/2012/10/water-elixir-of-life-by-sircvraman.html
4. http://macon.hol.es/woodrose-abburi-chaya-devi.pdf
5. https://ardhendude.blogspot.com/2013/07/analysis-of-progress-by-st-john-ervine.html

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DIFFERENTIAL EQUATIONS AND LINEAR ALGEBRA

(Common to all branches)

I Semester **L T P C**
Course Code: 191BS1T01 **3 0 0 3**

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1: Apply the concepts of Mean Value theorem, Partial Differentiation and identify the maxima and minima of a given function.
CO 2: Solve the linear differential equations and model various situations involving differential equations of first order.
CO 3: Solve linear differential equations of higher order and model various situations involving second order differential equations.
CO 4: Calculate Rank of a matrix and solve the system of Linear equations and find the Eigen values and Eigen vectors.
CO 5: Compute various powers of a matrix and identify the nature of the quadratic form.

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes:

CO / PSO	PSO1 1	PSO2 2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

UNIT I

Differential Calculus: Rolle's theorem, Lagrange's theorem, Cauchy Mean Value theorem, Taylor's and Maclaurin's theorems (All theorems Without Proof)

Partial Differentiation: Euler's theorem (without proof), Total derivative, Chain rule, Taylor's and Mclaurin's series expansion of functions of two variables,Jacobian, Functional dependence.

Applications:

Maxima and Minima of functions of several variables without constraints and with constraints (Lagrange's method).

**(SCILAB Exercise: Plot graphs of various single and multivariable functions)

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UNIT II

Differential equations of first order: Introduction to differential equations, linear differential equation of first order - Bernoulli differential equation - Exact differential equations- Equations reducible to exact,

Applications: Orthogonal trajectories, Newton's Law of cooling, RL circuit.

UNIT III

Linear Differential Equations of Second and Higher Order: Linear differential equations of higher order with constant coefficients, Complementary function and Particular integral with RHS term of the type polynomials in x, e^{ax}, sin ax,

cos ax, e^{ax} V(x), xV(x)- Method of Variation of parameters, Equations reducible to constant coefficients –Cauchy-Euler equation, Legendre's equation.

Application: LCR Circuit

** (SCILAB Exercise: Introduction to SCILAB commands and Solution of Initial Value Problems)

UNIT IV

System of Linear Equations, Eigen Values and Eigen Vectors:

Definition of a Vector space, Linear dependence and independence of vectors, Rank of a matrix, Echelon form and Normal form, solving system of Homogenous and Non homogenous linear equations- Gauss Jordon elimination method, Eigen values, Eigen vectors, Properties of eigen values and eigen vectors (without proof)

Applications: Free vibrations of a two mass system

UNIT V

Quadratic forms:

Cayley -Hamilton theorem (without proof), Inverse and powers of a matrix by using Cayley - Hamilton theorem, Diagonalization of a matrix, Quadratic forms, Reduction of quadratic form to canonical form using orthogonal transformation, Nature of the quadratic form.

**(SCILAB Exercise: Basic Operations on matrices, computation of rank, computation of eigen values and eigen vectors)

**Not to be examined

Text Books:

1. Advanced Engineering Mathematics, R.K.Jain, S.R.K.Iyenkar, Alpha Science Publications.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10[th]Edition, Wiley- India.
3. B.S.Grewal, Higher Engineering Mathematics, 43[rd] Edition, Khanna Publishers.
4. P.Sivaramakrishna Das, C.Vijayakumari, Engineering Mathematics, Pearson
5. Publications.

Reference Books:

1. D.G.Zill, MICHAIL R CULTER, Advanced Engineering Mathematics Third Edition Norosa Publications 2009.
2. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press.

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3. Peter O'neil, Advanced Engineering Mathematics, Cengage Learning.
4. Glyn James, Advanced modern engineering mathematics, Pearson education.

Web Links:

1. https://nptel.ac.in/courses/111106100/
2. https://nptel.ac.in/courses/122107037/14
3. https://nptel.ac.in/courses/111106051/
4. http://mathworld.wolfram.com
5. https://www.khanacademy.org
6. https://spoken-tutorial.org/tutorial-search/?search_foss=Scilab&search_language=English

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APPLIED PHYSICS
(Common to ECE& CSE)

I Semester
Course Code: 191BS1T03

L	T	P	C
3	0	0	3

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Apply the principles of interference and diffraction to design and enhance the resolving power of various optical instruments.
CO 2: Explain the fundamental concepts of Quantum behaviour of matter.
CO 3: Classify the solids based on energy band structure.
CO 4: Explain the basic concepts of Semi-Conductors and Identify the type of semiconductors using Hall Effect.
CO 5: Explain about magnetic and dielectric properties of different materials.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	2	1	-	-	-	-	-	-	-	-	-	-
CO3	2	1	-	-	-	-	-	-	-	-	-	-
CO4	2	1	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1	PSO 2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

UNIT-I

Wave Optics: Principle of Superposition - Interference of light - Conditions for sustained Interference - Interference in thin films (reflected geometry) - Newton's Rings (reflected geometry).
Diffraction - Fraunhofer Diffraction - Diffraction due to Single slit (quantitative), Double slit, N -slits and circular aperture (qualitative) – Intensity distribution curves - Diffraction Grating – Grating spectrum – missing order– resolving power – Rayleigh's criterion – Resolving powers of Microscope, Telescope and grating (qualitative).

UNIT-II

Quantum Mechanics: Introduction – Matter waves – de Broglie's hypothesis – Davisson-Germer experiment – G.P.Thomson experiment – Heisenberg's Uncertainity Principle – interpretation of wave function – Schröedinger Time Independent and Time Dependent wave equations – Particle in a potential box.

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UNIT-III

Free Electron Theory: Introduction – Classical free electron theory (merits and demerits only) - Quantum Free electron theory – electrical conductivity based on quantum free electron theory – Fermi Dirac distribution function – Temperature dependence of Fermi-Dirac distribution function - expression for Fermi energy -Density of states .

BAND THEORY OF SOLIDS Bloch's theorem (qualitative) – Kronig-Penney model(qualitative) – energy bands in crystalline solids – E Vs K diagram – classification of crystalline solids – effective mass of electron – m^* Vs K diagram - concept of hole.

UNIT-IV

Semiconductor Physics: Introduction– Intrinsic semi-conductors - density of charge carriers - Electrical conductivity – Fermi level – extrinsic semiconductors - p-type & n-type - Density of charge carriers - Dependence of Fermi energy on carrier concentration and temperature – Hall effect- Hall coefficient - Applications of Hall effect - Drift and Diffusion currents – Einstein's equation.

UNIT-V

Magnetism: Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr magneton – Classification of magnetic materials: Dia, para & Ferro – Domain concept of Ferromagnetism - Hysteresis – soft and hard magnetic materials – applications of Ferromagnetic material.

Dielectrics: Introduction - Dielectic polarization – Dielectric Polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative) – Lorentz Internal field – Claussius-Mossoti equation - Frequency dependence of polarization – Applications of dielectrics.

Text Books:

1. "A Text book of Engineering Physics" by M.N. Avadhanulu, P.G.Kshirsagar –S.Chand Publications, 2017.
2. "Engineering Physics" by D.K.Bhattacharya and Poonam Tandon, Oxford press (2015).
3. "Engineering Physics" by R.K Gaur. and S.L Gupta., - Dhanpat Rai publishers, 2012.

Reference Books:

1. "Engineering Physics" by M.R.Srinivasan, New Age international publishers (2009)
2. "Optics" by AjoyGhatak, 6th Edition McGraw Hill Education, 2017.
3. Engineering Physics by Mani naidu – Peasrson Publications, 2017.

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WebLinks:

1. http://nptel.ac.in/courses/122107035/11
2. http://nptel.ac.in/courses/115102023/
3. https://phet.colorado.edu/en/simulations/category/physics
4. http://physicsgecg.blogspot.in/p/reading-materials.html
5. https://sites.google.com/site/physicsbysureshsaganti/home

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PROGRAMMING FOR PROBLEM SOLVING USING C

(Common to all branches)

	L	T	P	C
I Semester	**L**	**T**	**P**	**C**
Course Code: 191ES1T01	**3**	**0**	**0**	**3**

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Illustrate the fundamental concepts of computers and basics of computer programming
- CO 2: Make use of control structures and arrays in solving complex problems.
- CO 3: Develop modular program aspects and strings fundamentals.
- CO 4: Demonstrate the ideas of pointers usage.
- CO 5: Solve real world problems using the concept of structures, unions and File operations.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12
CO1	2	3	-	-	1	-	-	-	-	-	-	2
CO2	3	2	-	-	2	-	-	-	-	-	-	2
CO3	2	2	3	-	-	-	-	-	-	-	-	1
CO4	2	3	-	-	2	-	-	-	-	-	-	2
CO5	3	2	2	-	-	-	-	-	-	-	-	2

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1	PSO 2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

UNIT-I

Computer History, Hardware, Software, Programming Languages and Algorithms: Components and functions of a Computer System, Concept of Hardware and Software Programming Languages: Low-level and High-level Languages, Program Design Tools: Algorithm, Flowchart, Pseudo code.

Introduction to C Programming: Introduction, Structure of a C Program, Comments, Keywords, Identifiers, Data Types, Variables, Constants, Input/Output Statements, Operators, Type Conversion.

UNIT -II

Control Flow, Relational Expressions & Arrays: Conditional Branching Statements: if, if-else, if-else–if, switch. Basic Loop Structures: while, do-while loops, for loop, nested loops, The Break and Continue Statements, go to statement.

Arrays: Introduction, Operations on Arrays, One dimensional Array, Two dimensional Array, Multi dimensional arrays.

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UNIT-III

Strings: String Fundamentals, String Processing with and without Library Functions.

Functions: Introduction, Function Declaration, Function Definition, Function call, Categories of Functions, passing parameters to Functions, Arrays as Function Arguments, Scope of Variables, Variable Storage Classes,Recursion.

UNIT-IV

Pointers: Concept of a Pointer, Declaring and Initializing Pointer Variables, Pointer Expressions and Address Arithmetic, Null Pointers, Generic Pointers, Pointers as Function arguments, Pointers and Arrays, Pointers and Strings, Pointer to Pointer, Dynamic Memory Allocation, Dangling Pointer, Command line Arguments.

UNIT-V

Structures, Unions, Bit Fields: Introduction, Nested Structures, Arrays of Structures, Structures and Functions, Self-Referential Structures, Unions, Enumerated Data Type –enum variables, Using Typedef keyword, Bit Fields.

Data Files: Introduction to Files, Using Files in C, Reading from Text Files, Writing to Text Files, Random File Access.

Text Books:

1. Computer Programming, Reema Thareja, Oxford University Press.
2. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.
3. Programming In C A-Practial Approach, Ajay Mittal, Pearson.

Reference Books:

1. C Programming – A Problem Solving Approach, Forouzan, Gilberg, Cengage.
2. The C Programming Language, Dennis Richie And Brian Kernighan, Pearson Education.
3. Programming In C, Ashok Kamthane, Second Edition, Pearson Publication.

Web Links:

1. http://www.c4learn.com/
2. http://www.geeksforgeeks.org/c/
3. http://nptel.ac.in/courses/122104019/
4. http://www.learn-c.org/
5. https://www.tutorialspoint.com/cprogramming/

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COMMUNICATIVE ENGLISH LAB–I

(Common to all branches)

I Semester **L T P C**
Course Code: 191HS1L01 **0 0 3 1.5**

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Make use of the concepts to communicate confidently and competently in English Language in all spheres.
CO 2: Express Creative skills to construct Dialogues / Conversations in Spoken and Written forms.
CO 3: Identify Accent for intelligibility.
CO 4: Demonstrate communicative ability in everyday Conversation, JAM Sessions and Public Speaking.
CO 5: Demonstrate nuances of Language through Audio – Visual Experience and group activities.

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	-	-	-	-	1	-	-	-	-	3	-	1
CO2	-	-	-	-	1	-	-	-	-	3	-	2
CO3	-	-	-	-	1	-	-	-	-	3	-	2
CO4	-	-	-	-	1	-	-	-	-	3	-	1
CO5	-	-	-	-	1	-	-	-	-	3	-	1

Mapping of Course Outcomes with Program Specific Outcomes:

CO / PSO	PSO 1	PSO 2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

PRACTICE 1:
A. Greeting, Introducing, and Taking leave
B. Pure Vowels

PRACTICE 2:
A. Giving Information and Asking for Information
B. Diphthongs

PRACTICE 3:
A. Inviting, Accepting and Declining Invitations
B. Consonants

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Applied Physics Lab
(Common to ECE& CSE)

I Semester **L T P C**
Course Code: 191BS1L03 **0 0 3 1.5**
Course Outcomes:
At the end of Course, Student will be able to:

CO 1 : Use spectrometer, travelling microscope for making measurements.
CO 2 : Determine energy gap of a semiconductor, draw characteristic curves to estimate thermal coefficient of a thermistor, Zener diode.
CO 3 : Determine the dielectric constant and resistivity.
CO 4 : Determine wavelength of source and width of the narrow slits.
CO 5 : Find the strength of magnetic field.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	1	-	-	1
CO2	2	2	-	-	-	-	-	-	1	-	-	1
CO3	3	1	-	-	-	-	-	-	1	-	-	1
CO4	3	2	-	-	-	-	-	-	1	-	-	1
CO5	3	2	-	-	-	-	-	-	1	-	-	1

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1	PSO 2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

LIST OF EXPERIMENTS
(Any 10 of the following listed experiments)

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence.
2. Newton's rings – Radius of Curvature of Plano - Convex Lens.
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.
5. Energy Band gap of a Semiconductor p - n junction.
6. Characteristics of Thermistor – Temperature Coefficients
7. Determination of dielectric constant by charging and discharging method
8. Determination of resistivity of semiconductor by Four probe method.
9. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
10. Measurement of magnetic susceptibility by Quincke's method.
11. Dispersive power of diffraction grating.
12. Resolving Power of telescope

10. Pointers
10.1) Perform Addition, Subtraction, Multiplication and Division of two numbers using Command line arguments.
10.2) Find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc () function.
10.3) Find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc () function.

11. Structures
11.1) Store Information of a book Using Structure
11.2) Add Two Complex Numbers by Passing Structure to a Function

12. Files
12.1) Open a file and to print the contents of the file on screen.
12.2) Copy content of one file to another file.
12.3) Merge two files and store content in another file.

LIST OF AUGMENTED EXPERIMENTS:
13 to 16 (Any 2 of the following experiments can be performed)

13. Atm Pin Generation: Aditya purchased a credit card. He has to generate a PIN number to access the ATM and Net banking for which OTP was sent to his registered mobile number. Using this OTP number he has to generate ATM PIN number. After generating PIN number, he can use it for further transactions. Maximum login he can make is 3 times.

Sample Input:
OTP: 6732
If valid
Enter PIN: 8858
Confirm your PIN: 8858

Sample output:
valid/Invalid
PIN generated successfully.
Note: OTP is hard coded.

14. Reset Password: Aditya was using Syndicate Bank's Online Account. She wanted to pay her bills through Online. But she forgets her password. Now she has to reset the password. For resetting the password, she has to select reset option from the Menu.
NOTE: using switch case.

Sample input:
Fast withdrawal
Mini Statement
Balance Enquiry
Reset Password Enter your choice: 4
Sample Output:
Reset password: New password: ***** Confirm password: *****

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15. Student Attendance Report Generation:

Some of the school staff had failed to maintain the attendance of the students, causing lack of essential records related to students attendance that should be submitted in a parents meet. The school management has decided to automate the process in order to maintain the attendance of every student effectively. You are asked to write a program to the above scenario and display whether the student is allowed to write the Exam or not.

Percentage<65	Detained
>=65 and <75	should pay condonation to appear for Exams
>=75	Allowed for exams

Sample Input:

Enter no of students: 5

Enter Students Details:

Rno:1	**Name:Kalyan**	**Attendance(%): 67**	**Should pay condonation to appear for exams**
Rno:2	Name: Laxman	Attendance(%): 56	
Rno:3	Name:Yamini	Attendance(%): 79	
Rno:4	Name: Aryan	Attendance(%): 60	
Rno:5	Name: Raghav	Attendance(%): 88	

Sample output:

Rno	**Name**	**Attendance (%)**	**Remarks**
1	Kalyan	67	67 should pay condonation to appear for Exams
2	Laxman	56	detained
3	Yamini	79	allowed for Exams
4	Aryan	60	detained
5	Raghav	88	allowed for Exams

16. Library Management

Shilpa is a student of PGEC got the Library Card. She wants to lend the books from the Library. The college gave two cards to each and every student. The students can lend only two books at a time and it has to be returned back after 15 days. If the books are not returned late fee will be collected for no. of days the books were returned after the due date. Late fee per day is Rs.50/-

Sample output:

Enter the name of student: nalini

Enter the Roll No.:555

Enter the branch: cse

Enter the section: A

Enter the year: 3

Enter the Date of Lend (dd mm yyyy) : 08 08 2017

Enter the Date of return (dd mm yyyy): 09 10 2017

The no. of days book used by the student = 62

Extra days used by the student = 47
Late return fine fee = 2350

Reference Books:

1. Let Us C YashwanthKanetkar, Eighth edition, BPB Publications.
2. Programming in C A-Practial Approach Ajay Mittal. Pearson Education.
3. The C programming Language, Dennis Richie and Brian Kernighan, Pearson Education.

Web Links:

1. https://www.hackerrank.com/
2. https://www.codechef.com/
3. https://www.topcoder.com/
4. https://code-cracker.github.io/
5. https://raptor.martincarlisle.com/
6. https://nptel.ac.in/courses/106105085/2

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BASIC ENGINEERING WORKSHOP

(Common to all branches)

I Semester		**L**	**T**	**P**	**C**
Course Code:	**191ES1L02**	**0**	**0**	**3**	**1.5**

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1 : Prepare carpentry joints using carpentry tools
CO 2 : Develop various fitting joints using fitting tools.
CO 3 : Develop component drawings for making the sheet metal models.
CO 4 : Prepare sheet metal models using drawings and tin smithy tools
CO 5 : Experiment with the various house wiring connections.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	1	-	-	-	-	-	-	-	1	-	-	1
CO2	1	-	-	-	-	-	-	-	1	-	-	1
CO3	1	-	-	-	-	-	-	-	1	-	-	1
CO4	1	-	-	-	-	-	-	-	1	-	-	1
CO5	1	-	-	-	-	-	-	-	1	-	-	1

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1	PSO 2
CO1	1	-
CO2	1	-
CO3	1	-
CO4	1	-
CO5	1	-

List of Experiments:

Carpentry:
1. Cross Lap Joint
2. Dovetail Joint
3. T - Joint

Fitting:
4. Vee Fit
5. Square Fit

House Wiring:
6. Parallel Connection of three bulbs
7. Series Connection of three bulbs

Tin Smithy:
8. Taper Tray
9. Funnel
10. Plain Pipe

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List of Augmented Experiments:

(Student can perform any one of the following experiments)

1. Stair Case wiring
2. Florescent Lamp Fitting

Reference Books:

1. Engineering Workshop by Dr. A. B. Srinivasa Rao, AMIGO Books.
2. Manual on Workshop practice by Dr. P.Kannaiah& Dr. K.L.Narayana, Scitech publications.

Web Links:

1. http://tite.ac.in/index.php/departments/mechanical-engineering/workshop
2. https://www.gopracticals.com/basic-engineering/workshop/

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ENVIRONMENTAL SCIENCE

(Common to all branches)

I Semester
Course Code: 191MC1A01

L	T	P	C
2	0	0	0

Course Outcomes:

At the end of the Course, Student will be able to:

CO1: Outline the natural resources and their importance for the sustenance of the life
CO2: Explain about the biodiversity of India, threats and its conservation methods
CO3: Illustrate various attributes of the pollution, impacts and measures to control the pollution along with waste management practices
CO4: Describe social issues of both rural and urban environment to combat the challenges and the legislations of India in environmental protection
CO5: Explain the population growth and its implications

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	-	-	-	-	-	1	2	-	-	-	-	-
CO2	-	-	-	-	-	1	2	-	-	-	-	-
CO3	-	-	-	-	-	1	2	-	-	-	-	-
CO4	-	-	-	-	-	1	2	-	-	-	-	-
CO5	-	-	-	-	-	1	2	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes:

CO / PSO	PSO 1	PSO 2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

UNIT- I

Multidisciplinary Nature Of Environmental Studies:
Definition, Scope and Importance, Need for Public Awareness.

Natural Resources: Renewable and non-renewable resources – Natural resources and associated problems

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UNIT - II

Ecosystem, Biodiversity and Its Conservation:

Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers. Food chains, food webs and ecological pyramids.

Biodiversity and its Conservation: Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Values of biodiversity. Hot-spots of biodiversity – Threats to biodiversity. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT - III

Environmental Pollution and Solid Waste Management:

Environmental Pollution: Definition, Cause, effects and control measures of:

a. Air Pollution.
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution.

UNIT - IV

Social Issues And The Environment:

Social Issues and the Environment: From Unsustainable to Sustainable development – Urban problems related to Energy &Water. Resettlement and rehabilitation of people, Environmental ethics, Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Environment Protection Act – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution)Act-Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

UNIT - V

Human Population And The Environment:

Human population and the environment: Population growth, variation among nations. Environment and human health, Human Rights, Value Education. Role of Information Technology in Environment and human health.

Text Books:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, Universities Press.
2. Environmental Studies by Palan is wamy – Pearson education.
3. Environmental Studies by Dr.S.Azeem Unnisa, Academic Publishing Company.

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Reference Books:

1. Textbook of Environmental Science by Deeksha Dave and E.SaiBaba Reddy, Cengage Publications.
2. Textbook of Environmental Sciences and Technology by M.AnjiReddy, BS Publication.
3. Comprehensive Environmental studies by J.P.Sharma, Laxmi publications.
4. Environmental sciences and engineering – J. Glynn Henry and Gary W. Heinke – Prentice hall of India Private limited.
5. A Text Book of Environmental Studies by G.R.Chatwal, Himalaya PublishingHouse
6. Introduction to Environmental engineering and science by Gilbert M.Masters and Wendell P. Ela - Prentice hall of India Private limited.

Web Links:

1. https://www.youtube.com/watch?v=mOwyPENHhbc
2. https://www.youtube.com/watch?v=_mgvsPnCYj4
3. https://www.youtube.com/watch?v=L5B-JMnBIyQ
4. https://www.youtube.com/watch?v=3RDGV5i82_Q

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TRANSFORM TECHNIQUES

II Semester **L T P C**
Course Code:191BS2T08 **3 0 0 3**

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Compute Laplace transform of standard functions and analyze the properties of Laplace transform.
CO 2: Apply Laplace transform to solve Initial value problems.
CO 3: Compute the Fourier series of a given function and study the convergence of the series.
CO 4: Compute the Fourier transforms for certain functions and apply the properties of Fourier transforms.
CO 5: Compute the Z- transforms for certain functions and apply the properties of Z-transforms to solve difference equations.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO/PSO	PSO 1	PSO 2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

UNIT I

Laplace Transforms: Laplace transforms of standard functions, First Shifting theorem, Change of scale, Multiplication with t, Division by t, Transforms of derivatives and integrals, Unit step function, Dirac delta function, Periodic function, Evaluating improper integrals by using Laplace Transform.

UNITII

Inverse Laplace Transforms: Inverse Laplace transforms, Convolution theorem (without proof), Second shifting theorem, Solving differential equations and integro-differential equations using Laplace transforms, **(SCILAB Exercise: Computing Laplace transform of f(t) using symbolic toolbox, Solving initial value problems)

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UNIT III

Fourier Series: Fourier series of periodic function, Dirichlet's conditions for Fourier expansion, Functions having points of discontinuities, Change of interval, Even and odd functions, Half-range series.

UNIT IV

Fourier Transforms: Fourier integral theorem (without proof), Fourier sine and cosine integrals, Fourier Transforms, Fourier sine and cosine transforms, properties, inverse transforms, Finite Fourier transforms.

UNIT-V

Z-Transforms: Introduction to power series, Definition of Z-transform, Properties, Damping rule, Shifting rule, Initial and final value theorem, Inverse z-transform, Convolution theorem (without proof), Solution of Difference equation by using z-transforms.

Text Books:

1. Advanced Engineering Mathematics, R.K.Jain, S.R.K.Iyenkar, Alpha Science Publications.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley- India.
3. B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
4. P.Sivaramakrishna Das, C.Vijayakumari, Engineering Mathematics, Pearson Publications.

Reference Books:

1. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press.
2. Dass H.K., Rajnish Verma. Er.,Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd,Delhi.
3. Higher engineering mathematics by John Bird, 5th edition Elsevier Limited, 2006.

Web Links:

1. https://nptel.ac.in/courses/108106075/23
2. https://nptel.ac.in/courses/117105134/13
3. https://nptel.ac.in/courses/111103021/15
4. http://mathworld.wolfram.com
5. https://www.khanacademy.org

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ENGINEERING CHEMISTRY
(Common to ECE&CSE)

II Semester **L T P C**
Course Code: 191BS2T09 **3 0 0 3**

Course Outcomes
At the end of the Course, Student will be able to:

CO 1: Compare the quality of drinking water and problems associated with hard water.

CO 2: Explain the fundamentals and applications of Electrochemical Energy Systems.

CO 3: Explain the fundamentals and applications of Advance materials.

CO 4: Explain about renewable energy sources and their manufacturing methods

CO 5: Summarize the importance of Nano materials and Green chemistry.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-
CO4	2	-	-	-	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO/PSO	PSO 1	PSO 2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

UNIT- I
Water Technology: Introduction –Soft Water and hardness of water, types of hardness of water, degree of hardness of water, Units of hardness of water, problems on hardness, Boiler troubles - scale and sludge, Boiler corrosion, Industrial water treatment- zeolite and ion-exchange processes.Specifications for drinking water, Bureau of Indian Standards (BIS) and World health organization(WHO) standards, - desalination of brackish water, reverse osmosis (RO) and electrodialysis.

UNIT - II
Electrochemical Energy Systems: Introduction-Electrochemical Cell(Galvanic cell), Electrochemical series, Applications,single electrode potential,Hydrogen and Calomel electrode,Nernst Equation for a single electrode,Concentration Cells(Electrode & Electrolyte),Construction of glass electrode.
Batteries – Classical batteries-dry/Leclanche cell,Modern batteries-zinc air, lithium cells-Li MnO_2 cell- challenges of battery technology.Fuel cells- Introduction- classification of fuel cells – hydrogen and oxygen fuel cell, propane and oxygen fuel cell-Merits of fuel cell.

UNIT - III

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Polymer Chemistry: Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation (Free radical mechanism for addition ploymerization)

Plastics - Thermoplastics and Thermosettings, Preparation, properties and applications of – PE,PVC, Bakelite, Teflon and Nylon-6, 6.

Elastomers–Buna-S, Buna-N–preparation, properties and applications.

Conducting polymers – polyacetylene,polyaniline – mechanism of conduction and applications.

UNIT - IV

Energy Sources And Applications:Introduction- sources of renewable energy –Hydro power, Biomass and Bio-fuelsSolar energy – Introduction - Physical and Chemical properties of Silicon- Preparation of Semi-conductors - Doping of Silicon- p and n type semi-conductors-PV cell / solar cell- Working & Manufacturing of Photovoltaic Cells using Chemical Vapor Deposition Technique-applications of solar energy.

Fuels: Introduction- classification- liquid fuels- Refining of petroleum-cracking-Reforming-Gaseous fuels-LPG & CNG Applications.

UNIT - V

Material Science And Engineering:

Nanomaterials: Introduction to nanomaterial: nanoparticles, nanocluster, carbon nanotube (CNT) and nanowires. Chemical synthesis of nanomaterials: sol-gel method. Characterization: Principle and applications of scanning electron microscope (SEM) and transmission electron microscope (TEM).

NanoTubes: Carbon nano tubes- Types of CNT's-preparation methods –Arc discharge, Laser abiliation and chemical vapour deposition –properties and applications.

Green Chemistry: Introduction, priniciples of green chemistry

(Ex: Solvent,Catalyst,Reactant)

Band Theory of Solids: Introduction –Explanation of conductors, semi conductors, Insulators by Band Theory- Super conductors-Types-Preparation-Properties and Applications.

Appendix: Introduction to Molecular Machines and Molecular Switches

Text Books:

1. P.C. Jain and M. Jain, Engineering Chemistry, 16/e, Dhanapat Rai & Sons, (2014).
2. B.K. Sharma, Engineering Chemistry, Krishna Prakasham, (2014).
3. Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.

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Reference Books:

1. Sashi Chawla, A Textbook of Engineering Chemistry, Dhanapath Rai and sons, (2003).
2. B.S Murthy and P. Shankar, A Text Book of NanoScience and NanoTechnology, University Press (2013).
3. S.S. Dara, A Textbook of Engineering Chemistry, S.Chand& Co, (2010).

Web Links:

1. http://www.nptelvideos.in/2012/11/chemistry-of-materials
2. http://www.nptelvideos.com/lecture.php?id=2946
3. http://www.nptelvideos.com/lecture.php?id=2922
4. http://www.nptelvideos.com/lecture.php?id=2954

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ENGINEERING GRAPHICS AND DESIGN

(Common to CE, ME, ECE, CSE, IT, Min.E, PT &Ag.E)

	L	T	P	C
II Semester				
Course Code: 191ES2T02	1	0	3	2.5

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Make use of fundamentals of Engineering Drawing to sketch basic curves, conic sections, cycloid, epicycloid, hypocycloid and involute.
- CO 2: Apply the principles of orthographic projections for points, lines and planes.
- CO 3: Apply the principles of orthographic projections for solids.
- CO 4: Apply the AutoCAD software for the orthographic projection of the machine parts.
- CO 5: Apply the AutoCAD software for the isometric projection of the machine parts.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12
CO1	1	-	-	-	-	-	-	-	-	1	-	1
CO2	1	-	-	-	-	-	-	-	-	1	-	1
CO3	1	-	-	-	-	-	-	-	-	1	-	1
CO4	1	-	-	-	3	-	-	-	-	1	-	1
CO5	1	-	-	-	3	-	-	-	-	1	-	1

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1	PSO 2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

CONVENTIONAL DRAFTING

UNIT-I

Introduction To Engineering Graphics: Principles of Engineering Graphics and their significance- conventions in drawing- lettering – BIS Conventions- - Conic sections -Cycloid, epicycloids and hypocycloid-Involutes

UNIT-II

Projection of Points, Lines And Planes: Projection of points in any quadrant, lines inclined to one or both planes, finding true lengths, angle made by line. Projections of regular plane surfaces.

UNIT-III

Projections of Solids: Projections of regular solids inclined to one or both planes by rotational or auxiliary views method.

COMPUTER AIDED DRAFTING

UNIT-IV

Introduction To Computer Aided Drafting: Basic drawing and editing commands- Dimensioning principles and conventional representations, Systems of projections, Conventions and application to orthographic projections

UNIT-V

Isometric Projections: Principles of isometric projection- Isometric scale; Isometric views: lines, planes, figures, simple and compound solids

Text Books:

1. N.D.Bhatt, Engineering Drawing, 53rd Edition, Charotar Publishers, 2016.
2. K.L.Narayana & P.Kannaiah, Engineering Drawing, 3rd Edition, Scitech Publishers, Chennai, 2012.

Reference Books:

1. Dhanajay A Jolhe, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2009
2. Shah and Rana, Engineering Drawing, 2/e, Pearson Education, 2009
3. Venugopal, Engineering Drawing and Graphics, 3/e, New Age Publishers, 2000
4. K.C.John, Engineering Graphics, 2/e, PHI, 2013
5. Basant Agarwal &C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2008.

Note:

1. Manual and Computer Aided Drafting classes can be held in alternative weeks for optimal utilization of computer facilities.
2. External examinations to be conducted both manual and computer mode with equal weightage of marks.

Additional Sources

1. Youtube: http-sewor,Carleton.cag,kardos/88403/drawings.html conic sections-online, red woods.edu

Web Links:

1. https://www.wiziq.com/tutorials/engineering-drawing
2. www.me.umn.edu/courses

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BASIC ELECTRICAL ENGINEERING

II Semester **L T P C**
Course Code: 191ES2T07 **3 0 0 3**

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1 : Explain about the working principle of DC Motor.
- CO 2 : Summarize the working principle of DC generator.
- CO 3 : Explain the working and construction of single phase transformer, efficiency and regulation using OS and SC test.
- CO 4: Explain the working of three phase induction motor, efficiency and starting methods.
- CO 5 : Analyze the basic principle of single phase induction motor using double field revolving theory and cross field theory.
- CO 6 : Analyze the concept of special electrical machines.

Mapping of course outcomes with program outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12
CO1	2	1	-	2	-	-	-	-	-	-	1	-
CO2	2	1	-	-	-	-	2	-	-	-	-	-
CO3	2	1	-	-	-	-	3	-	-	-	2	-
CO4	2	1	-	-	-	-	3	-	-	-	2	-
CO5	3	2	2	-	-	-	-	-	-	-	-	-
CO6	2	1	-	-	-	-	3	-	-	-	-	-

Mapping of course outcomes with program specific outcomes

CO / PSO	PSO 1	PSO 2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-
CO6	-	-

UNIT- I

Dc Generators: Principle of operation and construction of DC generators – EMF equation – types of generators – magnetization and load characteristics of DC generators.

UNIT- II

Dc Motors: Principle of operation and construction of DC Motors – types of DC Motors – Characteristics of DC motors – basic starting methods for DC shunt motor – losses and efficiency – Swinburne's test – speed control of DC shunt motor – flux and Armature voltage control methods.

UNIT- III

Transformers: Principle of operation of single phase transformer – types – constructional features – phasor diagram on no-load and load – equivalent circuit, losses and efficiency of

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transformer – regulation of transformer – OC and SC tests – predetermination of efficiency and regulation.

UNIT- IV

Three Phase Induction Machine: Principle of operation and construction of three- phase induction motors –slip ring and squirrel cage motors – slip-torque characteristics, Losses,efficiency calculation – starting methods.

UNIT- V

Single Phase Machine & Special Machines: Principle Of Operation And Construction – Single Phase Induction Motor – Shaded Pole Motors, Capacitor Motors, Universal Motor, Reluctance Motor.

Text Books:

1. Electrical Technology by Surinder Pal Bali, Pearson Publications. Vol. I and Vol. II
2. Electronic Devices and Circuits, R. L. Boylestad and Louis Nashelsky, 9th edition, PEI/PHI.

Reference Books:

1. Basic Electrical Engineering by M. S. Naidu and S. Kamakshiah, TMH Publications
2. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI Publications, 2nd edition
3. Basic Electrical Engineering by Sukhija and Nagsarkar, Oxford Publications, 2nd edition
4. Electrical Circuit Theory and Technology by John Bird, Routledge Taylor & Francis Group

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COMMUNICATIVE ENGLISH LAB–II

(Common to all branches)

II Semester	**L T P C**
Course Code:191HS2L02	**0 0 2 1**

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Make effective use of Body language in all situations and contexts to enhance effective communication in all aspects.
- CO 2: Identify communicative competency to respond to others in different situations.
- CO 3: Make use of effective delivery strategies to select, compile and synthesize information for oral presentation.
- CO 4: Demonstrate in mock interviews, group discussion and public speaking.
- CO 5: Illustrate interpersonal skills using English language confidently and effectively for personal and professional growth.

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	-	-	-	-	-	-	-	-	-	3	-	2
CO2	-	-	-	-	-	-	-	-	-	3	-	2
CO3	-	-	-	-	-	-	-	-	-	3	-	2
CO4	-	-	-	-	-	-	-	-	-	3	-	2
CO5	-	-	-	-	-	-	-	-	-	3	-	2

Mapping of Course Outcomes with Program Specific Outcomes:

CO / PSO	PSO 1	PSO 2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

PRACTICE1:
BodyLanguage

PRACTICE2:
Dialogues

PRACTICE 3:
Presentation Skills

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PRACTICE 4:
Group Discussion

PRACTICE 5:
Interviews and Telephonic Interviews.

PRACTICE 6:
Debates

Reference Books:

1. Strengthen your Communication Skills by Dr.M. Hari Prasad, Dr. Salivendra J.Raju and Dr.G.Suvarna Lakshmi, Maruthi Publications.

2. English for Professionals by Prof Eliah, B.S Publications, Hyderabad.
3. A Handbook of English for Professionals by Prof Eliah, B.SPublications.
4. Effective Technical Communication by M. Ashraf Rizvi, Tata McGraw – Hill Publishing Company.
5. Cornerstone. Developing Soft Skills, Pearson Education.

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ENGINEERING CHEMISTRY LAB
(Common to CE, ME, ECE, CSE, Min.E, PT &Ag.E)

II Semester
Course Code:191BS2L04

L	T	P	C
0	0	3	1.5

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1 : Demonstrate Acid –Complexometric titrations by volumetric analysis.

CO 2 : Demonstrate Acid – Base titrations by instrumental analysis.

CO 3 : Estimate Vitamin C using volumetric analysis

CO 4 : Prepare polymer like Bakelite.

CO 5 : Prepare alternative fuel like Bio-Diesel.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12
CO1	2	-	-	-	-	-	-	-	1	1	-	1
CO2	2	-	-	-	-	-	-	-	1	1	-	1
CO3	2	-	-	-	-	-	-	-	1	1	-	1
CO4	2	-	-	-	-	-	-	-	1	1	-	1
CO5	2	-	-	-	-	-	1	-	1	1	-	1

Mapping of Course Outcomes with Program Specific Outcomes

CO/PSO	PSO 1	PSO 2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

Introduction to Chemistrylaboratory – Molarity, Normality, Primary, secondary standard solutions, Volumetric titrations, Quantitative analysis, Qualitative analysis, etc.

Exercise 1:
Determination of Total Hardness of a water sample.

Exercise 2:
Determination of Dissolved Oxygen in Water Sample.

Exercise 3:
Determination of Zinc by Complexometric method

Exercise 4:
P^H metric titration of (i) strong acid vs. strong base.

Exercise 5:
Determination of Fe (II) in Mohr's salt by potentiometric method.

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Exercise 6:
Potentiometry – Titration between strong acid – strong base

Exercise 7:
Conductometric titrations(Strong acid vs Strong base).

Exercise 8:
Preparation of Phenol- Formaldehyde resin.

Exercise 9:
Preparation of Urea-Formaldehyde resin.

Exercise 10:
Preparation of bio diesel.

Exercise 11:
Determination of Vitamin – C.

LIST OF AUGMENTED EXPERIMENTS
12 to 15 (Any two of the following experiments can be performed)

Exercise 12:
Determination of percentage Moisture content in a coal sample.

Exercise 13:
Determination of acid value and saponification value of a given lubricant.

Exercise 14:
Determination of viscosity of a liquid.

Exercise 15:
Estimation of Calcium in port land Cement.

Reference Books:

1. A Textbook of Quantitative Analysis, Arthur J. Vogel.
2. Dr.Jyotsna Cherukuris (2012) Laboratory Manual of engineering chemistry - II, VGS Techno Series.
3. Chemistry Practical Manual, Lorven Publications K. Mukkanti (2009). Practical Engineering Chemistry,B.S.Publication.

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COMPUTER ARCHITECTURE AND ORGANIZATION
(Professional Elective-I)

V Semester	**L**	**T**	**P**	**C**
Course Code: 171EC5E01	**3**	**1**	**0**	**3**

Course Outcomes:
At the end of this course, the student will be able to

CO1	Explain the internal architecture and functionality of a computer
CO2	Make use of Computer Arithmetic to solve various computational problems.
CO3	Summarize various types of Micro-operations and Instructions.
CO4	Analyse various Addressing modes, Control Unit Organizations and I/O organization.
CO5	Illustrate different memory systems, pipelining and vector processing techniques.

Mapping of course outcomes with program outcomes:

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO 1	2	2	-	-	-	-	-	-	-	-	-	-
CO 2	2	2	1	2	-	-	-	-	-	-	-	-
CO 3	2	2	2	2	-	-	-	-	-	-	-	-
CO 4	2	2	2	2	-	-	-	-	-	-	-	-
CO 5	1	2	1	3	-	-	-	-	-	-	-	-

Mapping of course outcomes with program specific outcomes:

CO / PSO	PSO 1	PSO 2
CO 1	-	-
CO 2	-	-
CO 3	-	-
CO 4	-	-
CO 5	-	-

UNIT I:
Basic Structure of Computers:
Computer Types, Functional units, Basic operational concepts, Bus structures, Software, Performance.

Computer Arithmetic:
Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating point Arithmetic operations, Decimal Arithmetic unit, Decimal Arithmetic operations.

UNIT II:
Register Transfer Language and Micro-Operations:
Register Transfer language. Register Transfer, Bus and memory Transfer, Types of Micro-operations, Arithmetic logic shift unit, Instruction codes, Computer Registers, Computer instructions, Instruction cycle, Memory Reference Instructions, Input Output and Interrupt.

UNIT III:

Central Processing Unit:
Stack organization, Instruction formats, Addressing modes, Data Transfer and manipulation, Program control, Reduced Instruction Set Computer (RISC).

Micro Programmed Control:
Control memory, Address sequencing, Micro program example, Design of control unit-Hard wired control, Micro programmed control

UNIT IV:

The Memory System:
Memory Hierarchy, Main memory, Auxiliary memory, Associative memory, Cache memory, Virtual memory.

Input-Output Organization:
Peripheral Devices, Input-Output Interface, Asynchronous data Transfer Modes, Priority Interrupt, Direct Memory Access (DMA), Input –Output Processor (IOP)

UNIT V:

Pipeline and Vector Processing:
Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

Multi Processors:
Characteristics of Multiprocessors, Interconnection Structures, Inter-processor Arbitration, Inter-processor Communication and Synchronization, Cache Coherence.

Text Books:

1. Computer System Architecture, M.Moris Mano, IIIrd Edition, PHI /Pearson.
2. Computer Organization, Carl Hamacher, ZvonksVranesic, SafwatZaky, McGraw Hill, 5th Edition.

Reference Books:

1. Computer Organization and Architecture, William Stallings, PHI/Pearson, 7th Edition.
2. Computer Architecture and Organization, John P. Hayes, McGraw Hill.

Web Links:

1. http://nptel.ac.in/courses/106106092/
2. http://nptel.ac.in/courses/106103068/2
3. https://onlinecourses.nptel.ac.in/noc17_cs35/preview
4. https://www.coursera.org/learn/comparch
5. http://www.studytonight.com/computer-architecture/

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VLSI DESIGN

VI Semester **L T P C**

Course Code: 171EC6T14 **3 1 0 3**

Course Outcomes:

At the end of the Course, Student will be able to:

- CO 1: Summarize the fundamental concepts of VLSI Design including bothfabrication process and basic design elements.
- CO 2: Analyze the electrical properties of MOS and BiCMOS Circuits.
- CO 3: Developthe stick and layout models of MOS circuits using design rules.
- CO 4: Demonstrate the scaling factors in determining the characteristics and performance of MOS circuits in silicon.
- CO 5: Explain FPGA architecture withuseofVLSI Design issues, trends and design processes

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO 1	3	2	-	-	-	-	-	-	-	-	-	2
CO 2	3	2	1	-	-	-	-	-	-	-	-	1
CO 3	2	2	3	-	-	-	-	-	-	-	-	1
CO 4	2	2	3	-	-	-	-	-	-	-	-	1
CO 5	1	1	3	-	-	-	-	-	-	-	-	2

Mapping of Course Outcomes with Program Specific Outcomes:

CO/PSO	PSO 1	PSO 2
CO 1	1	-
CO 2	2	-
CO 3	1	-
CO 4	2	-
CO 5	2	-

UNIT I:

Introduction:

Introduction to IC Technology, MOS and related VLSI Technology, Basic MOS Transistors, Enhancement and Depletion modes of transistor action, IC production process, MOS and CMOS Fabrication processes, BiCMOS Technology, Comparison between CMOS and Bipolar technologies.

UNIT II:

Basic Electrical Properties of MOS and Bi-CMOS Circuits:

Ids versus V_{ds}Relationships, Aspects of MOS transistor Threshold Voltage, MOS transistorTrans, Output Conductance and Figure of Merit. The Pass transistor, NMOSInverter, Pull-up to Pull-down Ratio for NMOS inverter driven by anotherNMOS inverter. Alternative forms of pull-up, The CMOS Inverter, MOStransistor circuit model, Bi-CMOS Inverter, Latch-up in CMOS circuits andBiCMOS Latch-up Susceptibility.

UNIT III:

MOS and Bi-CMOS Circuit Design Processes:

MOS Layers, StickDiagrams, Design Rules and Layout, General observations of design rules, 2μm Double Metal, Double Poly, CMOS/BiCMOS rules, 1.2μmDouble Metal, Double Poly CMOS rules, Layout Diagrams of NAND andNOR gates and CMOS inverter, Symbolic Diagrams-Translation to MaskForm.

Basic Circuit Concepts:

Sheet Resistance, Sheet Resistance concept appliedto MOStransistors and Inverters, Area Capacitance of Layers, Standard unitof capacitance, The Delay Unit, Inverter Delays, Propagation Delays, WiringCapacitances, Fan-in and fan-out characteristics, Choice of layers, Transistorswitches, Realization of gates using NMOS, PMOS and CMOS technologies.

UNIT IV:

Scaling of MOS Circuits:

Scaling models, Scaling factors for deviceparameters, Limits due to sub threshold currents, current density limits onlogic levels and supply voltage due to noise.

Subsystem Design:

Architectural issues, switch logic, Gate logic, examples of structured design, clocked sequential circuits, system considerations, general considerations of subsystem design processes, an illustration of design processes.

UNIT V:

VLSI Design Issues:

VLSI Design issues and design trends, design process, design for testability, technology options, power calculations, package selection, clock mechanisms, mixed signal design, ASIC design flow, and introduction to SoC design.

FPGA Design:

Basic FPGA architecture, FPGA configuration, configuration modes, FPGA designs process-FPGA design flow, FPGA families.

Text Books:

1. Essentials of VLSI Circuits and Systems By Kamran Eshraghian, Douglas and A. Pucknell, SholehEshraghian, Prentice-Hall of India Private Limited,2005.
2. VLSI Design, Black Book by Dr. K.V.K.K. Prasad, KattulaShyamala, Kogent Learning Solutions Inc, 2012.

Reference Books:

1. VLSI Design, A.Albert Raj, T.Latha,PHI Learning Private Limited,2010.
2. VLSI Design, A.Shanthi, A.Kavita, New Age International Private Limited,1st Edition, 2006.
3. CMOS Digital Integrated Circuits Analysis & Design, Sung-Mo (Steve) Kang, Yusuf Leblebici,Tata McGraw-Hill,3rd Edition, 2002.
4. Modern VLSI Design-Wolf Wayne,Pearson Edition,3rd Edition, 1997.
5. VLSI Design, K. LalKishore, V.S.V.Prabhakar, I.K. International Publishing House Private Limited, 1st Edition, 2009.

Web Links:

1. http://nptel.ac.in/courses/117106093/
2. http://www.nptelvideos.in/2012/12/vlsi-design.html
3. https://www.smartzworld.com/notes/vlsi-design/

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VLSI LAB

VI Semester **L T P C**

Course Code: 171EC6L08 **0 0 3 2**

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1	Outline different schematics for the same given logic.
CO 2	Design logic schematics as per the list of specifications from user.
CO 3	Infer different types of layouts with respect to stated IC Aspect Ratio.
CO 4	Interpret the concepts of DRC, LVS and PEX in designing the ICs.
CO 5	Distinguish the simulation results of Pre and Post layout simulation for a logic circuit.

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO 1	3	2	-	1	2	-	-	-	-	-	-	-
CO 2	3	2	-	1	2	-	-	-	-	-	-	-
CO 3	3	2	-	1	2	-	-	-	-	-	-	-
CO 4	1	1	-	3	2	-	-	-	-	-	-	-
CO 5	1	1	-	3	2	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes:

CO/PSO	PSO 1	PSO 2
CO 1	3	
CO 2	2	
CO 3	1	
CO 4	2	
CO 5	1	

List of Experiments:

(The students are required to design schematics and verify their functional response (under specified delay and power constraints) and extract the layout for the same using CMOS 130nm Technology with Mentor Graphics Tool in order to predict the parasitic values that come across).

1. Digital circuit simulation
2. Digital circuits Schematics and its functional response verification of logic gates
3. Digital circuits Schematics and its functional response verification of complex logic gates and combinational circuits
4. Layout Extraction of Logic gates.
5. Layout Extraction of complex gates and combinational circuits
6. Performing DRC for logic gates
7. Performing DRC for complex gates and combinational circuits
8. Performing LVS / Net list extraction for logic gates
9. Performing LVS / Net list extraction for complex gates and combinational circuits
10. PEX estimation for the given logic circuits
11. PEX estimation for the given complex gates and combinational circuits

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Augmented Experiments:
(Minimum of two experiments has to be performed)

1. Layout design for specific constraints (delay, power dissipation)
2. DRC / LVS / PEX verification of Multiplexer.
3. DRC / LVS / PEX verification of a given SOP($Z= \overline{(AB+C)D}$)

Software/Hardware Required:

1. Mentor Graphics EDA Tool (HEP 1 and HEP 2)
2. Vivado EDA Tool
3. FPGA Kits

References:

1. CMOS Digital Integrated Circuits, Sung Mo Kang, MHeducation,3rd Edition.
2. Low Voltage, Low Power VLSI Subsystems, Kaushik Roy,Kiat-Seng Yeo,MHeducation, 2009
3. Essentials of VLSI Circuits and Systems By Kamran Eshraghian, Douglas and A. Pucknell and Sholeh Eshraghian, Prentice-Hall of India Private Limited,2005 Edition.
4. VLSI Design, Black Book By Dr. K.V.K.K. Prasad, KattulaShyamala, Kogent Learning Solutions Inc,2012 Edition.

Web Links:

1. https://www.mentor.com/products/ic_nanometer_design/pyxis
2. www.academia.edu/16132434/Mentor_Graphics_procedure

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DIGITAL COMMUNICATIONS LAB

VI Semester	**L**	**T**	**P**	**C**
Course Code: 171EC6L09	**0**	**0**	**3**	**2**

Course Outcomes:
At the end of the Course, Student will be able to:

CO1: Examine Time Division Multiplexing and Demultiplexing.
CO 2: Analyze digital baseband modulation techniques.
CO 3: Experiment with various digital carrier modulation schemes.
CO 4: Measure the efficiency of the source coding techniques.
CO 5: Examine different error control coding schemes.

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO 1	3	2	-	-	2	-	-	-	2	-	-	-
CO 2	3	1	-	-	2	-	-	-	2	-	-	-
CO 3	3	1	-	-	2	-	-	-	2	-	-	-
CO 4	2	2	-	-	2	-	-	-	2	-	-	-
CO 5	2	2	-	-	2	-	-	-	2	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes:

CO/PSO	PSO 1	PSO 2
CO 1	3	-
CO 2	3	-
CO 3	3	-
CO 4	3	-
CO 5	3	-

List of Experiments:

1. Verify Time division multiplexing and demultiplexing.
2. Obtain digital equivalent of analog voltage using Pulse code modulation.
3. Convert analog voltages into their digital equivalents using Delta modulation.
4. Observe the process of Frequency shift keying modulation and demodulation.
5. Verify the process of Phase shift keying modulation and demodulation.
6. Verify the operation of Differential phase shift keying.
7. Minimize coding redundancy using Source Encoder and Decoder.
8. Perform error detection and correction using Linear Block Code-Encoder and Decoder.
9. Perform error detection and correction using Binary Cyclic Code – Encoder and Decoder
10. Perform error detection and correction using Convolution Code – Encoder and Decoder.

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Augmented experiments:
(Minimum of two experiments has to be performed)

1. Verify Differential pulse code modulation and demodulation.
2. Perform Non-Uniform quantization using Companding.
3. Verify Time Division Multiplexing and demultiplexing using MATLAB Simulink.
4. Observe the process of frequency shift keying modulation and demodulation using MATLAB Simulink.
5. Verify the operation of Differential Phase Shift Keying using MATLAB Simulink.

Equipment required:

1. Regulated Power Supply : 0 – 30 V
2. Cathode Ray Oscilloscope:0 – 20 M Hz.
3. Function Generator : 0 – 1 M Hz
4. Multimeters.
5. Lab Experimental kits for Digital Communication.
6. Computer Systems with latest specifications.
7. Connected in LAN (Optional).
8. Operating system (Windows XP).
9. MATLAB with Simulink.

References:

1. Principles of Communication Systems, H. Taub and D. Schilling, TMH, 2003.

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IV Year - I Semester

L	T	P	C
4	0	0	3

DIGITAL IMAGE PROCESSING

UNIT-1

Introduction: Introduction to Image Processing, Fundamental steps in digital image processing, components of an image processing system, image sensing and acquisition, image sampling and quantization, some basic relationships between pixels, an introduction to the mathematical tools used in digital image processing.

Image Transforms: Need for image transforms, Discrete Fourier transform (DFT) of one variable, Extension to functions of two variables, some properties of the 2-D Discrete Fourier transform, Importance of Phase, Walsh Transform. Hadamard transform, Haar Transform, Slant transform, Discrete Cosine transform, KL Transform, SVD and Radon Transform, Comparison of different image transforms

UNIT-2

Intensity Transformations and Spatial Filtering: Background, Some basic intensity transformation functions, histogram processing, fundamentals of spatial filtering, smoothing spatial filters , sharpening spatial filters, Combining spatial enhancement methods

Filtering in the Frequency Domain: Preliminary concepts, The Basics of filtering in the frequency domain, image smoothing using frequency domain filters, Image Sharpening using frequency domain filters, Selective filtering.

UNIT-3

Image Restoration and Reconstruction: A model of the image degradation / Restoration process, Noise models, restoration in the presence of noise only-Spatial Filtering, Periodic Noise Reduction by frequency domain filtering, Linear, Position –Invariant Degradations, Estimating the degradation function, Inverse filtering, Minimum mean square error (Wiener) filtering, constrained least squares filtering ,geometric mean filter ,image reconstruction from projections.

UNIT-4

Image compression: Fundamentals, Basic compression methods: Huffman coding, Golomb coding, Arithmetic coding, LZW coding, Run-Length coding, Symbol-Based coding, Bit-Plane coding, Block Transform coding, Predictive coding

Wavelets and Multiresolution Processing: Image pyramids, subband coding, Multiresolution expansions, wavelet transforms in one dimensions & two dimensions, Wavelet coding.

UNIT-5

Image segmentation: Fundamentals, point, line, edge detection, thresholding, region –based segmentation.

Morphological Image Processing: Preliminaries, Erosion and dilation, opening and closing, basic morphological algorithms for boundary extraction, thinning, gray-scale morphology, Segmentation using morphological watersheds.

UNIT-6

Color image processing: color fundamentals, color models, pseudo color image processing, basics of full color image processing, color transformations, smoothing and sharpening. Image segmentation based on color, noise in color images, color image compression.

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Text Books

1. R. C. Gonzalez and R. E. Woods, Digital Image Processing, 3rd edition, Prentice Hall, 2008.
2. Jayaraman, S. Esakkirajan, and T. Veerakumar," Digital Image Processing", Tata McGraw-Hill Education, 2011.

Reference Books

1. Anil K.Jain, "Fundamentals of Digital Image Processing", Prentice Hall of India, 9th Edition, Indian Reprint, 2002.
2. B.Chanda, D.Dutta Majumder, "Digital Image Processing and Analysis", PHI, 2009.

Course Objectives:

Students undergoing this course are expected to:

1. Familiarize with basic concepts of digital image processing and different image transforms
2. Learn various image processing techniques like image enhancement, restoration, segmentation and compression
3. Understand color fundamentals and different color models
4. Understand wavelets and morphological image processing

Course Outcomes:

After undergoing the course students will be able to

1. Perform image manipulations and different digital image processing techniques
2. Perform basic operations like – Enhancement, segmentation, compression,Image transforms and restoration techniques on image.
3. Analyze pseudo and fullcolor image processing techniques.
4. Apply various morphological operators on images

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IV Year - I Semester

L	T	P	C
0	0	3	2

DIGITAL SIGNAL PROCESSING LABORATORY

List of the Experiments / programs

To Student has to perform at least FOUR Experiments in each part

PART-1(SIGNALS)

1) Generation of discrete time signals for discrete signals
2) To verify the Linear Convolution
   a) Using MATLAB
   b) Using Code Composer Studio(CCS)
3) To verify the Circular Convolution for discrete signals
   a) Using MATLAB
   b) Using Code Composer Studio(CCS)
4) To Find the addition of Sinusoidal Signals
5) To verify Discrete Fourier Transform(DFT) and Inverse Discrete Fourier Transform(IDFT)
   a) Using MATLAB
   b) Using Code Composer Studio(CCS)
6) Transfer Function Stability Analysis: using pole-zero plot, bode plot, Nyquist plot, z-plane plot.

PART-2 (FILTERS)

7) Frequency Response of IIR low pass Butterworth Filter
8) Frequency Response of IIR high pass Butterworth Filter
9) Frequency Response of IIR low pass Chebyshev Filter
10) Frequency Response of IIR high pass Chebyshev Filter
11) Frequency Response of FIR low pass Filter using Rectangle Window
12) Frequency Response of FIR low pass Filter using Triangle Window

PART – 3(IMAGE PROCESSING)

13) An image processing in a false contouring system
14) To generate the histogram equalization to the image
15) To verify the Normalized Cross Correlation to the addition of noise and removal of noise using filters to an image.
16) Compute the edge of an image using spatial filters.
17) Perform the image motion blur and calculate PSNR to the noise image and also noise free image.
18) To verify the PSNR to the Second order Decomposition of Discrete Wavelet transforms and to the reconstructed image using inverse Discrete Wavelet transform

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Department of Electronics and communication Engineering

Syllabus revision Index

2019-20

S.No	Name of the course	Percentage of syllabus change
1	Communicative English	90
2	Differential Equations and Linear Algebra	20
3	Applied Physics	40
4	Programming for Problem Solving Using C	20
5	Applied Physics Lab	60
6	Programming for Problem Solving Using C Lab	35
7	Basic Engineering Workshop	50
8	Environmental Science	33
9	Transform Techniques	60
10	Engineering Chemistry	80
11	Engineering Graphics and Design	55
12	Basic Electrical Engineering	60
13	Engineering Chemistry Lab	50
14	Computer Architecture and Organization	35
15	VLSI Design	32
16	VLSI lab	66.6
17	Digital Communications Lab	20
18	Digital Image Processing	50
19	Digital Signal Processing Lab	60

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Department of Humanities & Basic Sciences

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	English-I	Communicative English
Course Code	171HS1T01	191HS1T01
Syllabus	UNIT-I: 1. IN LONDON: M.K.GANDHI (Detailed) 2. G.D. NAIDU (Non-Detailed)	UNIT-I: 1. An Astrologers' Day - R.K. Narayan (Detailed) 2. Bade Bhai Saab - Munshi Prachanda (Non-Detail)
	UNIT-II: 1. THE KNOWLEDGE SOCIETY- APJ ABDUL KALAM (Detailed) 2. G.R. GOPINATH (Non-Detailed)	UNIT-II: 1. Building A New State - A. P. J. Abdul Kalam (Detailed) 2. Morning Bells- Jayashree Mohan Raj (Non-Detail)
	UNIT-III: 1. THE SCIENTIFIC POINT OF VIEW-J.B.S. HALDANE (Detailed) 2. J.C. BOSE (Non-Detailed)	UNIT-III: 1. Water:The Elixer of Life- C. V. Raman (Detailed) 2. The Power of Plate of Rice- Ifeoma Okoye (Non-Detail)
	UNIT-IV: 1. MAN'S PERIL-BERTRAND RUSSELL (Detailed) 2. HOMI JEHANGIR BHABHA (Non-Detailed)	UNIT-IV: 1. The Woodrose-Abburi Chaya Devi (Detailed) 2. The Cop and The Anthem- O. Henry (Non-Detail)
	UNIT-V: 1. LUCK—MARK TWAIN (Detailed) 2. A SHADOW (Non-Detailed)	UNIT-V: 1. Progress- St. John Ervine (Detailed) 2. Dial 000- Barry Rosenberg (Non-Detail)

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Department of Humanities & Basic Sciences

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Mathematics-I	Differential Equations and Linear Algebra
Course Code	171BS1T01	191BS1T01
Syllabus	UNIT I: Differential equations of first order and first degree: Linear differential equations - Bernoulli differential equation - Exact differential equationsEquations reducible to exact (Type-1, Type-2, Type-3, Type-4) Applications: Newton's Law of cooling-Law of natural growth and decay-Orthogonal trajectories.	UNIT I: Differential Calculus: Rolle's theorem, Lagrange's theorem, Cauchy Mean Value theorem, Taylor's and Maclaurin's theorems (All theorems Without Proof). Partial Differentiation: Euler's theorem (without proof), Total derivative, Chain rule, Taylor's and Maclaurin's series expansion of functions of two variables, Jacobian, Functional dependence. Applications: Maxima and Minima of functions of several variables without constraints and with constraints (Lagrange's method). ** (SCILAB Exercise: Plot graphs of various single and multivariable functions).
	UNIT II: Linear differential equations of higher order: Linear differential equations of higher order with constant coefficients with RHS term of the type eax, sin ax, cos ax, polynomials in x, e^ax V(x), xV(x)- Method of Variation of parameters, Method of undetermined coefficients. *(MATLAB Exercise: Introduction to MAT LAB commands and Solution of Initial Value Problems using the command 'dsolve') Applications: Electric circuits, simple harmonic motion.	UNIT II: Differential equations of first order: Introduction to differential equations, linear differential equation of first order - Bernoulli differential equation - Exact differential equations- Equations reducible to exact, Applications: Orthogonal trajectories, Newton's Law of cooling, RL circuit
	UNIT III: Linear systems of equations: Rank of a matrix - Echelon form-Normal form – Solution of linear systems – Gauss elimination method - Gauss Seidal method. Applications: Finding the current in electrical circuits.	UNIT III: Linear differential equations of second and higher order: Linear differential equations of higher order with constant coefficients, Complementary function and Particular integral with RHS term of the type polynomials in x, e^ax, sin ax, cos ax,

		eax V(x), xV(x)- Method of Variation of parameters, Equations reducible to constant coefficients –Cauchy-Euler equation, Legendre's equation. Application: LCR Circuit ** (SCILAB Exercise: Introduction to SCILAB commands and Solution of Initial Value Problems)
	UNIT IV: Eigen values - Eigen vectors and Quadratic forms: Eigen values - Eigen vectors– Properties of eigen values (without proof) – Cayley -Hamilton theorem (without proof) - Inverse and powers of a matrix by using Cayley - Hamilton theorem- Diagonalization- Quadratic forms- Reduction of quadratic form to canonical form using orthogonal transformation– Nature of the quadratic form. *(MATLAB Exercise: All Basic Operations on matrices are to be implemented using MATLAB including computation of rank, computation of eigen values and eigen vectors)	UNIT IV: System of linear equations, Eigen values and Eigen vectors: Definition of a Vector space, Linear dependence and independence of vectors, Rank of a matrix, Echelon form and Normal form, solving system of Homogenous and Non homogenous linear equations- Gauss Jordon elimination method, Eigen values, Eigen vectors, Properties of eigen values and eigen vectors (without proof) Applications: Free vibrations of a two mass system
	UNIT V: Partial differentiation and Partial differential equations: Homogeneous function-Euler's theorem-Total derivative-Chain rule-Taylor's and Maclaurin's series expansion of functions of two variables– Functional dependence Jacobian. Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions –solutions of first order linear (Lagrange) equation, nonlinear (standard types) equations. Applications: Maxima and Minima of functions of two variables without constraints and Lagrange's method (with constraints). *(MATLAB Exercise: To Plot graphs of various single and multivariable functions using MATLAB and analyze their maxima and minima graphically).	UNIT V: Quadratic forms: Cayley -Hamilton theorem (without proof), Inverse and powers of a matrix by using Cayley - Hamilton theorem, Diagonalization of a matrix, Quadratic forms, Reduction of quadratic form to canonical form using orthogonal transformation, Nature of the quadratic form. **(SCILAB Exercise: Basic Operations on matrices, computation of rank, computation of eigen values and eigen vectors)

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Department of Humanities & Basic Sciences

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Applied Physics	Applied Physics
Course Code	171BS1T04/171BS2T04	191BS1T03/191BS2T07
Syllabus	UNIT-I: Interference: Principle of Superposition – Coherence– Interference in thin films (reflection geometry) – Newton's rings – construction and working principle of Interferometer.	UNIT-I Wave Optics: Principle of Superposition - Interference of light - Conditions for sustained Interference - Interference in thin films (reflected geometry) - Newton's Rings (reflected geometry). Diffraction - Fraunhofer Diffraction - Diffraction due to Single slit (quantitative), Double slit, N -slits and circular aperture (qualitative) – Intensity distribution curves - Diffraction Grating – Grating spectrum – missing order– resolving power – Rayleigh's criterion – Resolving powers of Microscope, Telescope and grating (qualitative).
	UNIT-II: Diffraction: Fraunhofer diffraction at single slit – Cases of double slit, N-slits, & circular aperture, grating equation – Rayleigh criterion of resolving power- Resolving power of a grating, Telescope and Microscopes	UNIT-II Quantum Mechanics: Introduction – Matter waves – de Broglie's hypothesis – Davisson-Germer experiment – G.P. Thomson experiment – Heisenberg's Uncertainity Principle –interpretation of wave function – Schröedinger Time Independent and Time Dependent wave equations – Particle in a potential box.
	UNIT-III: Polarization: Types of Polarization – Methods of production – Nicol Prism – Quarter wave plate and Half Wave plate- working principle of polarimeter (Sacharimeter). LASERS: Characteristics– Stimulated emission – Einstein's Transition Probabilities Pumping schemes- Ruby laser – Helium Neon laser-CO2 Laser-Applications	. UNIT-III Free Electron Theory: Introduction – Classical free electron theory (merits and demerits only) - Quantum Free electron theory – electrical conductivity based on quantum free electron theory – Fermi Dirac distribution function – Temperature dependence of Fermi Dirac distribution function - expression for Fermi energy -Density of states. BAND THEORY OF SOLIDS Bloch's theorem (qualitative) – Kronig-Penney model(qualitative) – energy

		bands in crystalline solids – E Vs K diagram – classification of crystalline solids – effective mass of electron – m* Vs K diagram - concept of hole.
	UNIT-IV: Quantum Mechanics: Introduction –Matter waves – Schrödinger Time Independent and Time Dependent wave equations – Particle in a box. FREE ELECTRON THEORY: Defects of classical free electron theory –Quantum Free electron theory – concept of Fermi Energy..	**UNIT-IV Semiconductor Physics:** Introduction– Intrinsic semi conductors - density of charge carriers - Electrical conductivity – Fermi level – extrinsic semiconductors - p-type & ntype - Density of charge carriers - Dependence of Fermi energy on carrier concentration and temperature – Hall effect- Hall coefficient - Applications of Hall effect - Drift and Diffusion currents – Einstein's equation.
	UNIT-V: Band Theory of Solids: Bloch's theorem (qualitative) – Kronig – Penney model (Qualitative) – energy bands in crystalline solids – classification of crystalline solids– effective mass of electron & concept of hole. Semiconductor Physics: Conduction – Density of carriers in Intrinsic and Extrinsic semiconductors – Drift & Diffusion – relevance of Einstein's equation- Hall effect in semiconductors.–	UNIT-V Magnetism: Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr magneton – Classification of magnetic materials: Dia, para & Ferro – Domain concept of Ferromagnetism - Hysteresis – soft and hard magnetic materials – applications of Ferromagnetic material. Dielectrics: Introduction - Dielectic polarization – Dielectric Polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative) – Lorentz Internal field – Claussius- Mossoti equation - Frequency dependence of polarization – Applications of dielectrics.

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Department of Electronics and communication Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	**Pre-Revision**	**Post-Revision**
Course Title	COMPUTER PROGRAMMING	PROGRAMMING FOR PROBLEM SOLVING USING C
Course Code	171ES1T01	191ES1T01
Syllabus	**UNIT-I:** **Computer History, Hardware, Software, Programming Languages and Algorithms:** Fundamental concepts of Computer, Programming Languages - Machine Language, Assembly Language, Low-level and High-level Languages, Basics of Hardware and Software, Algorithms, Flowchart, pseudo code, The Software Development Process. **Introduction to C Programming**: Introduction, Structure of a C Program, Identifiers, main() function, printf() function, Indentation, Comments, Keywords, Data Types, Variables, Constants and Declarations, Input/ Output Statements, Operators, Type Conversion.	**UNIT-I** **Computer History, Hardware, Software, Programming Languages and Algorithms:** Components and functions of a Computer System, Concept of Hardware and Software Programming Languages: Low-level and High-level Languages, Program Design Tools: Algorithm, Flowchart, Pseudo code. **Introduction to C Programming:** Introduction, Structure of a C Program, Comments, Keywords, Identifiers, Data Types, Variables, Constants, Input/Output Statements, Operators, Type Conversion.
	UNIT -II: **Control Flow, Relational Expressions &Arrays:** Selection: if, if-else, nested if with examples, Multi-way selection: switch, else-if with examples. Repetition: Basic Loop Structures: for, while and do-while loops, counter controlled and condition controlled loops, nested loops, goto, continue and break. **Arrays:** Introduction, Operations on Arrays, 2D Arrays, Arrays as Function	**UNIT -II** **Control Flow, Relational Expressions & Arrays:** Conditional Branching Statements: if, if-else, if-else–if, switch. Basic Loop Structures: while, do-while loops, for loop, nested loops, The Break and Continue Statements, go to statement. **Arrays:** Introduction, Operations on Arrays, One dimensional Array, Two dimensional Array, Multi dimensional arrays.

	Arguments, Multi Dimensional Arrays.	
	UNIT-III: **Functions:** Basics of Functions: Declaration, Definition and call, Categories of Functions, passing parameters to Functions, Variable Scope, Storage Classes, Recursive Functions, Recursion and its Types. **Strings:** String Fundamentals, String Processing with and without Library Functions.	**UNIT-III** **Strings:** String Fundamentals, String Processing with and without Library Functions. **Functions:** Introduction, Function Declaration, Function Definition, Function call, Categories of Functions, passing parameters to Functions, Arrays as Function Arguments, Scope of Variables, Variable Storage Classes,Recursion.
	UNIT-IV: **Pointers:** Concept of a Pointer, Declaring and Initializing Pointer Variables, Pointer Expressions and Address Arithmetic, Null Pointers, Generic Pointers, Pointers as Function arguments, Pointer to Pointer, Pointers and Arrays, Pointers and Strings, Dynamic Memory Allocation Functions, Dangling Pointer, Command line Arguments.	**UNIT-IV** **Pointers:** Concept of a Pointer, Declaring and Initializing Pointer Variables, Pointer Expressions and Address Arithmetic, Null Pointers, Generic Pointers, Pointers as Function arguments, Pointers and Arrays, Pointers and Strings, Pointer to Pointer, Dynamic Memory Allocation, Dangling Pointer, Command line Arguments.
	UNIT-V: **Structures:** Introduction to Structures, Nested Structures, Arrays of Structures, Structures and Functions, Self-Referential Structures, Unions, derived data type, bit-fields. **Data Files:** Introduction to Files, Using Files in C, Reading and Writing with Text Files, Error Handling during File Operations, Random File Access.	**UNIT-V** **Structures, Unions, Bit Fields:** Introduction, Nested Structures, Arrays of Structures, Structures and Functions, Self-Referential Structures, Unions, Enumerated Data Type –enum variables, Using Typedef keyword, Bit Fields. **Data Files:** Introduction to Files, Using Files in C, Reading from Text Files, Writing to Text Files, Random File Access.

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Department of CSE
ADITYA ENGINEERING COLLEGE (A

Department of Humanities & Basic Sciences

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	• Engineering Physics Lab	Applied Physics Lab
Course Code	171BS1L02/171BS2L02	191BS1L03/191BS2L05
Syllabus	1. Determination of wavelength of a source-Diffraction Grating-Normal incidence..	1. Determination of wavelength of a source-Diffraction Grating-Normal incidence..
	2. Newton's rings – Radius of Curvature of Plano - Convex Lens	2. Newton's rings – Radius of Curvature of Plano - Convex Lens
	3. Determination of thickness of a spacer using wedge film and parallel interference fringes	3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
	4. Determination of Rigidity modulus of a material- Torsional Pendulum.	4. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus
	5. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum	5. Energy Band gap of a Semiconductor p - n junction
	6. Melde's experiment – Transverse and Longitudinal modes by capillary rise method.	6. Characteristics of Thermistor – Temperature Coefficients
	7. Verification of laws of vibrations in stretched strings – Sonometer.	7. Determination of dielectric constant by charging and discharging method
	8. Determination of velocity of sound – Volume Resonator.	8. Determination of resistivity of semiconductor by Four probe method
	. 9. L- C- R Series Resonance Circuit.	. 9. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
	10. Study of I/V Characteristics of Semiconductor diode.	10. Measurement of magnetic susceptibility by Quincke's method
	11. I/V characteristics of Zener diode.	11. Dispersive power of diffraction grating.
	12. Characteristics of Thermistor – Temperature Coefficients	12. Resolving Power of telescope
	13. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.	13. Resolving power of grating
	14. Energy Band gap of a Semiconductor p -	14. Determination of Hall voltage and Hall

	n junction.	coefficients of a given semiconductor using Hall-effect.
	15. Hall Effect in semiconductors.	15. Variation of dielectric constant with temperature
	16. Time constant of CR circuit.	
	17. Determination of wavelength of laser source using diffraction grating.	
	18. Determination of Young's modulus by method of single cantilever oscillations	
	19. Determination of lattice constant – lattice dimensions kit.	
	20. Determination of Planck's constant using photocell.	
	21. Determination of surface tension of liquid	
	22. Polarimeter – Determination of specific rotation of sugar solution..	
	23. Single Slit – Determination of Slit width using laser or Determination of Wavelength of laser	

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Department of Electronics and communication Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**COMPUTER PROGRAMMING LAB**	Programming for Problem Solving Using C Lab
Course Code	171ES1L01	191ES1L01
	Exercise – 1: **Introduction to C Programming** 1.1) Introduction about Editors – Turbo, vi, Emacs 1.2) C Program to Perform Addition, Subtraction, Multiplication and Division of two numbers from Command line 1.3) Write a C Program to Calculate area of a Triangle using Heron's formula. **Exercise – 2:** **Basic Math** 2.1) Write a C Program to Find Whether the Given Year is a Leap Year or not. 2.2) Write a C Program to convert Celsius to Fahrenheit and vice versa. 2.3) Write a C Program to find largest of three numbers using ternary operator. **Exercise – 3:** **Control Flow - I** 3.1) Write a C program to find the roots of a Quadratic Equation. 3.2) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Using switch…case. 3.3) Scenario - 1 ATM PIN GENERATION: Aditya purchased a credit card. He has to generate a PIN number to access the ATM and Net banking for which OTP	**1. Introduction to C Programming** 1.1) Basic Linux Commands 1.2) Exposure to Turbo C, Vi, Emacs, Code Blocks IDE, Dev C++ 1.3) Writing simple programs using printf(), scanf() **2. Raptor** 2.1) Installation and Introduction to Raptor. 2.2) Draw a flow chart to find the Sum of 2 numbers. 2.3) Draw a flow chart to find Simple interest. **For the following experiments, develop flow charts using Raptor and implement C programs to:** **3. Basic Math** 3.1) Convert Celsius to Fahrenheit and vice versa. 3.2) Find largest of three numbers using ternary operator. 3.3) Calculate area of a Triangle using Heron's formula. **4. Control Flow- I** 4.1) Find Whether the Given Year is a Leap Year or not. 4.2) Find the roots of a Quadratic Equation. 4.3) Make a simple Calculator to Add, Subtract, Multiply or Divide Using switch…case. **5. Control Flow- II** 5.1) Find Whether the Given Number is

	was sent to his registered mobile number. Using this OTP number he has to generate ATM PIN number. After generating PIN number, he can use it for further transactions. Maximum login he can make is 3 times. Sample Input: OTP: 6732 If valid Enter PIN: 8858 Confirm your PIN: 8858 Sample output: valid/Invalid PIN generated successfully. Note: OTP is hard coded. 3.4) Scenario - 2 RESET PASSWORD: Sindhuja was using Syndicate Bank's Online Account. She wanted to pay her bills through Online. But she forget her password. Now she has to reset the password. For resetting the password, she has to select reset option from the Menu. NOTE: using switch case. Sample input: 1. Fast withdrawal 2. Mini Statement. 3. Balance Enquiry 4. Reset Password Enter your choice: 4 Sample Output: Reset password: New password: ***** Confirm password: ***** **Exercise –4:** **Control Flow - II** 4.1) Write a C Program to Find Whether the Given Number is i) Prime Number ii) Armstrong Number 4.2) Write a C program to print Floyd Triangle 4.3) Write a C Program to print Pascal Triangle **Exercise – 5:**	Prime number or not 5.2) Find Whether the Given Number is Armstrong Number or not. 5.3) Print Floyd Triangle. **6. Control Flow- III** 6.1) Find the sum of individual digits of a positive integer. 6.2) Check whether given number is palindrome or not. 6.3) Read two numbers, x and n, and then compute the sum of the geometric progression 1+x+x2 +x3 +............+xn. **7. Arrays** 7.1) Search an element in the given array (Linear Search) 7.2) Perform matrix addition. 7.3) Perform matrix multiplication. **8. Strings** 8.1) Implementation of string manipulation operations with library function. a) copy b) concatenate c) length d) compare 8.2) Implementation of string manipulation operations without library function. a) copy b) concatenate c) length d) compare 8.3) Verify whether the given string is a palindrome or not **9. Functions, Array & Pointers** 9.1) Demonstrate parameter passing in Functions. 9.2) Find Fibonacci, Factorial of a number with Recursion and without Recursion. 9.3) Find the sum of given numbers with arrays and pointers. **10. Pointers** 10.1) Perform Addition, Subtraction,

Control Flow – III

5.1) Write a C program to find the sum of individual digits of a positive integer.

5.2) Write a C program to check whether given number is palindrome or not.

5.3) Write a C program to read two numbers, x and n, and then compute the sum of the geometric progression 1+x+x2 +x3 +………….+xn.

5.4) Scenario - 3 Student Attendance report Generation:

Some of the school staff had failed to maintain the attendance of the students, causing lack of essential records related to students attendance that should be submitted in a parents meet. The school management has decided to automate the process in order to maintain

the attendance of every student effectively. You are asked to write a program to the above scenario and display whether the student is allowed to write the Exam or not. percentage<65	detained
>=65 and <75	should pay condonation to appear for Exams
>=75	allowed for Exams

Exercise 6:

Arrays

Demonstration of arrays

6.1) Linear Search.

6.2) Bubble Sort.

6.3) Operations on Matrix.

6.4) Scenario – 4 Celebrity of the Week:

Red FM has launched a program

Multiplication and Division of two numbers using Command line arguments.

10.2) Find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc () function.

10.3) Find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc () function.

11. Structures

11.1) Store Information of a book Using Structure

11.2) Add Two Complex Numbers by Passing Structure to a Function

12. Files

12.1) Open a file and to print the contents of the file on screen.

12.2) Copy content of one file to another file.

12.3) Merge two files and store content in another file.

LIST OF AUGMENTED EXPERIMENTS:

13 to 16 (Any 2 of the following experiments can be performed)

13. Atm Pin Generation:

Aditya purchased a credit card. He has to generate a PIN number to access the ATM and Net banking for which OTP was sent to his registered mobile number. Using this OTP number he has to generate ATM PIN number. After generating PIN number, he can use it for further transactions. Maximum login he can make is 3 times.

Sample Input:

OTP: 6732

If valid

Enter PIN: 8858

Confirm your PIN: 8858

output:

valid/Invalid

PIN generated successfully.

Note: OTP is hard coded.

called Celebrity of the week in their channel. Listeners are given a toll free number where they can listen to list of celebrities. Listeners can choose their favourite celebrity from the list and vote for him/her. The votes are validated from Monday to Saturday. The one with highest votes is called as "Celebrity of the Week" and his/her songs are played in the program, which is aired on Sundays. Now write a program to find the celebrity of the week.

Exercise – 7:

Functions

7.1) Write a C Program to demonstrate parameter passing in Functions and returning values.

7.2) Write a C Program to find Fibonacci, Factorial of a number with Recursion and without Recursion.

7.3) Scenario – 5 SELF DRIVE RENTAL

Sadiq and his friends are going to Banglore. But they don't have a vehicle in Banglore. For that they go to rental cars to take car for rent. You have find out what is total amount of car's rent. The car's rentals and rules are as follows.

i) Minimum booking is 4.

ii) There are 3 types of cars

A) SWIFT

B) SCORPIO

C) INNOVA

iii) There are 3 categories in cars rental

A) LTTE

B) CLASS

C) XL

FOR SWIFT,

- • In LTTE 5 kms are free for one hour and Rs.70 per one hour, if they exceed 5kmph, then Rs.12 per km.
- • In CLASS, 10 kms are free

14. Reset Password:

Aditya was using Syndicate Bank's Online Account. She wanted to pay her bills through Online. But she forgets her password. Now she has to reset the password. For resetting the password, she has to select reset option from the Menu.

NOTE: using switch case.

Sample input:

Fast withdrawal

Mini Statement

Balance Enquiry

Reset Password Enter your choice: 4

Sample Output:

Reset password: New password: *****

Confirm password: *****

15. Student Attendance Report Generation:

Some of the school staff had failed to maintain the attendance of the students, causing lack of

essential records related to students attendance that should be submitted in a parents meet. The school management has decided to automate the process in order to maintain the attendance of every student effectively. You are asked to write a program to the above scenario and display whether the student is allowed to write the Exam or not. Percentage<65	Detained
>=65 and <75	should pay condonation to appear for Exams
>=75	Allowed for

for one hour and Rs.90 per one hour, if they exceed 10kmph, then Rs.12 per km.

- • In XL, 15 kms are free for one hour and Rs.110 per one hour, if they exceed 15kmph, then Rs.12 per km.

FOR SCORPIO,

- • In LTTE, 5 kms are free for one hour and Rs.90 per one hour, if they exceed 5kmph, then Rs.15 per km.
- • In CLASS, 10 kms are free for one hour and Rs.110 per one hour, if they exceed 10kmph, then Rs.15 per km.
- • In XL, 15 kms are free for one hour and Rs.130 per one hour, if they exceed 15kmph, then Rs.15 per km.

FOR INNOVA

- • In LTTE, 5 kms are free for one hour and Rs.110 per one hour, if they exceed 5kmph, then Rs.18 per km.
- • In CLASS, 10 kms are free for one hour and Rs.130 per one hour, if they exceed 10kmph, then Rs.18 per km.
- • In XL, 15 kms are free for one hour and Rs.150 per one hour, if they exceed 15kmph, then Rs.18 per km.

Exercise – 8:
Strings

8.1) Implementation of string manipulation operations with library function.
i) copy
ii) concatenate
iii) length
iv) compare

8.2) Implementation of string manipulation operations without library function.

exams

16. Library Management

Shilpa is a student of PGEC got the Library Card. She wants to lend the books from the
Library. The college gave two cards to each and every student. The students can lend
only two books at a time and it has to be returned back after 15 days. If the books are
not returned late fee will be collected for no. of days the books were returned after the
due date. Late fee per day is Rs.50/-

Sample output:
Enter the name of student: nalini
Enter the Roll No.:555
Enter the branch: cse
Enter the section: A
Enter the year: 3
Enter the Date of Lend (dd mm yyyy) : 08 08 2017
Enter the Date of return (dd mm yyyy): 09 10 2017
The no. of days book used by the student = 62
Extra days used by the student = 47
Late return fine fee = 2350

	i) copy ii) concatenate iii) length iv) compare 8.3) Verify whether the given string is a palindrome or not 8.4) Scenario – 6 Word with Obesity: Jeeth is a fun loving and active boy. He likes to play with words and numbers. One day Jeeth and his friends attended a seminar, which was conducted in his school. The Seminar was about "Causes of obesity in children and its effects". Jeeth and his friend Ram are not interested in listening to the seminar, so he thought of giving a puzzle to Ram. Jeeth gave some words to Ram and wanted him to find the word with Obesity. Ram was confused and asking your help. Write a program to find the weights of the words and display the word with highest weight (word with obesity). Sample Input: Enter no of words: 3 Enter 3 words: apple banana carrot Sample Output: Word with Obesity is carrot **Exercise – 9:** **Arrays and Pointers** 9.1) Write a C Program to Access Elements of an Array Using Pointer 9.2) Write a C Program to find the sum of numbers with arrays and pointers. **Exercise – 10:** **Dynamic Memory Allocations** 10.1) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc () function. 10.2)Write a C program to find sum of n elements entered by user. To perform this program, allocate	

	memory dynamically using calloc () function. Understand the difference between the above two programs **Exercises – 11:** **Structures** 11.1) Write a C Program to Store Information of a book Using Structure 11.2) Write a C Program to Store Information Using Structures with Dynamically Memory Allocation 11.3) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function 11.4) Scenario – 7 Library Management Shilpa student of PGEC got the Library Card. She wants to lend the books from the Library. The college gave two cards to each and every student. The students can lend only two books at a time and it has to be returned back after 15 days. If the books are not returned late fee will be collected for no. of days the books were returned after the due date. Late fee per day is Rs.50/- Sample Input. Enter the name of student, Roll No. Branch, Section, Year, DOL, DOR, Sample output No. of days returned after the due date = 5 Late fee per day = Rs. 50 Fine paid by the student is 5 * 50 =250. **Exercise -12:** **Files** 12.1) Write a C program to open a file and to print the contents of the file on screen. 12.2) Write a C program to copy content of one file to another file. 12.3) Write a C program to merge two files and store content in another file. 12.4) Scenario – 8 Student Information System Using Files:	

	Lakshya International school was recently established and having large no of admissions. The school management wanted the Student information to be computerized and wanted to maintain in a simple and in effective manner. You are asked to develop Student Information System using Files to perform the following tasks 1. Add New Student 2. Update Existing Student 3. Delete Existing Student 4. Retrieve A Particular/All Students Sample Input: Choose the task you want to perform: 1. Add 2. Update 3. Delete 4. Retrieve Your choice: 1 Enter student details: Name: Akhil Age: 5 Class: 1 Sample Output: Student details added	

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Signature of the HOD

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Department of Electronics and communication Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	engineering workshop &it workshop	basic engineering workshop
Course Code	171ES2L02	191ES1L02
Syllabus	**Trade:** **Carpentry:** 1. T-Lap Joint 2. Cross Lap Joint 3. Dovetail Joint 4. Mortise and Tenon Joint **Fitting:** 1. Vee Fit 2. Square Fit 3. Half Round Fit 4. Dovetail Fit **Black Smithy:** 1. Round rod to Square 2. S-Hook 3. Round Rod to Flat Ring 4. Round Rod to Square headed bolt **House Wiring:** 1. Parallel / Series Connection of three bulbs 2. Stair Case wiring 3. Florescent Lamp Fitting 4. Measurement of Earth Resistance **Tin Smithy:** 1. Taper Tray 2. Square Box without lid 3. Open Scoop 4. Funnel	**List of Experiments:** **Carpentry:** 1. Cross Lap Joint 2. Dovetail Joint 3. T - Joint **Fitting:** 4. Vee Fit 5. Square Fit **House Wiring:** 6. Parallel Connection of three bulbs 7. Series Connection of three bulbs **Tin Smithy:** 8. Taper Tray 9. Funnel 10. Plain Pipe **List of Augmented Experiments:** (Student can perform any one of the following experiments) 1. Stair Case wiring 2. Florescent Lamp Fitting
	IT WORKSHOP: **Exercise 1: Identification of peripherals of a computer** Block diagram of the CPU along with the configuration of the each peripheral and its functions.	

	Exercise 2: System Assembling and Disassembling Disassembling the components of a PC and assemble them back to working condition. **Exercise 3: Installation of softwares** Installation of operating Systems: Windows, Linux along with necessary Device Drivers, Installation of application softwares and Tools. **Exercise 4:Troubleshooting (Demonstration)** Hardware Troubleshooting: Identification of a problem and fixing a defective PC Software Troubleshooting: Identification of a problem and fixing the PC for any software issues. **Exercise 5:Network Configuration and Internet** Configuring TCP/IP, proxy and firewall settings, Internet and World Wide Web-Search Engines, Types of search engines, netiquette, cyber hygiene. **Exercise 6: MS-Office / Open Office** a. Word - Formatting, Page Borders, Reviewing, Equations, symbols. b. Spread Sheet - organize data, usage of formula, graphs and charts. c. Power point - features of power point, guidelines for preparing an effective Presentation. d. Access- creation of database, validate data. **Exercise 7:LaTeX** LaTeX - basic formatting, handling equations and images.	

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Department of Humanities & Basic Sciences

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Environmental Studies	Environmental Science
Course Code	171HS1T02/171HS2T02	191MC1A01
Syllabus	UNIT –I: Ecosystems: Scope of environmental studies, Structure-Producers, consumers and decomposers Function – Food chain, Food web, Tropic structure and Energy flow in the ecosystem Ecological pyramids, nutrient recycling, primary and secondary production, ecosystem regulation. Ecological succession Terrestrial ecosystem and aquatic ecosystem - Introduction, types, characteristic features.	UNIT- I: Multidisciplinary Nature of Environmental Studies: Definition, Scope and Importance, Need for Public Awareness. Natural Resources: Renewable and non-renewable resources – Natural resources and associated problems.
	UNIT – II: Natural Resources: Natural resources and associated problems Forest resources – Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources Food resources: World food problems, changes caused by non-agriculture activities effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources vs oil and natural gas extraction. Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil	UNIT - II: Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers. Food chains, food webs and ecological pyramids. Biodiversity and its Conservation: Definition: genetic, species and ecosystem diversity – Biogeographical classification of India – Values of biodiversity. Hot-spots of biodiversity – Threats to biodiversity. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

	erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.	
	UNIT – III: Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity classification Value of biodiversity: consumptive use, productive use, social-Biodiversity at national and local levels. India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts - Endangered and endemic species of India – Conservation of biodiversity	UNIT - III: Environmental Pollution: Definition, Cause, effects and control measures of: a) Air Pollution. b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution.
	UNIT – IV: Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Style. Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e – waste management.	UNIT - IV: Social Issues and The Environment: From Unsustainable to Sustainable development – Urban problems related to Energy &Water. Resettlement and rehabilitation of people, Environmental ethics, Climate change, global warming, acid rain, ozonelayer depletion, nuclear accidents and holocaust. Environment Protection Act – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act-Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.
	UNIT – V: Social Issues and the Environment Urban problems related to energy -Water conservation, rain water harvesting Resettlement and rehabilitation of people; its problems and concerns. Global challenges Environmental ethics: Issues and possible solutions. Environmental Protection Act - Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act -Wildlife Protection Act - Forest Conservation Act-Issues involved in enforcement of environmental legislation. - Public awareness and Environmental management.	UNIT - V: Human Population and The Environment: Population growth, variation among nations. Environment and human health, Human Rights, Value Education. Role of Information Technology in Environment and human health.

N. Mallesh

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Head of the Department

Department of H & BS

Aditya Engineering College (A9)

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Department of Humanities & Basic Sciences

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Mathematics-II	Transform Techniques
Course Code	171BS2T02	191BS2T08
Syllabus	UNIT I: Solution of Algebraic and Transcendental Equations and Interpolation: Introduction- Bisection method – Method of false position – Iteration method – Newton - Raphson method.Errors in polynomial interpolation – Finite differences- Forward differences- Backward differences –Central differences – Relation between operators - Differences of a polynomial-Newton's formulae for interpolation – Interpolation with unequal intervals - Lagrange's interpolation formula.	UNIT I Laplace Transforms:Laplace transforms of standard functions, First Shifting theorem, Change of scale, Multiplication with t, Division by t, Transforms of derivatives and integrals, Unit step function, Dirac delta function, Periodic function, Evaluating improper integrals by using Laplace Transform.
	UNIT II: Numerical Integration and solution of Ordinary Differential equations: Trapezoidal rule- Simpson's 1/3rd and 3/8th rule-Solution of ordinary differential equations by Taylor's series-Picard's method of successive approximations- Euler's method, Modified Euler's method – Runge - Kutta method (fourth order).	UNITII Inverse Laplace Transforms:Inverse Laplace transforms, Convolution theorem (without proof), Second shifting theorem, Solving differential equations and integro-differential equations using Laplace transforms, **(SCILAB Exercise: Computing Laplace transform of f(t) using symbolic toolbox, Solving initial value problems)
	UNIT III: Fourier Series: Fourier series of periodic function - Dirichlet's conditions for Fourier expansion - Functions having points of discontinuities–Change of interval – Even and odd functions – Half-range series.	UNIT III Fourier Series:Fourier series of periodic function, Dirichlet's conditions for Fourier expansion, Functions having points of discontinuities, Change of interval, Even and odd functions, Half-range series.
	UNIT IV: Fourier Transforms: Fourier integral theorem (without proof) – Fourier sine and cosine integrals - sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.	UNIT IV Fourier Transforms:Fourier integral theorem (without proof), Fourier sine and cosine integrals, Fourier Transforms, Fourier sine and cosine transforms, properties, inverse transforms, Finite Fourier transforms
	UNIT V: Applications of Partial Differential	UNIT-V Z-Transforms:Introduction to power

	Equations: Classification of Higher order P.D.E - Method of separation of Variables-Solution of One dimensional Wave equation, Heat equation and two-dimensional Laplace equation.	series, Definition of Z-transform, Properties, Damping rule, Shifting rule, Initial and final value theorem, Inverse z-transform, Convolution theorem (without proof), Solution of Difference equation by using z-transforms.

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Department of Humanities & Basic Sciences

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Applied Chemistry	Engineering Chemistry
Course Code	171BS1T05/171BS2T05	191BS1T04/191BS2T09
Syllabus	UNIT - I: High Polymers and Plastics: Polymerization: Introduction- Mechanism of polymerization - Stereo regular polymers - Physical and mechanical properties – Plastics as engineering materials: advantages and limitations – Thermoplastics and Thermosetting plastics – Compounding and fabrication (compression moulding, injection moulding, extrusion moulding and transfer moulding techniques)- Preparation, properties and applications of polyethene, PVC, Bakelite and polycarbonates. Elastomers – Natural rubber- compounding and vulcanization – Synthetic rubbers: Buna S, Buna N, Thiokol – Applications of elastomers. Biodegradable polymers.	UNIT- I Water Technology: Introduction – Soft Water and hardness of water, types of hardness of water, degree of hardness of water, Units of hardness of water, problems on hardness, Boiler troubles - scale and sludge, Boiler corrosion, Industrial water treatment- zeolite and ion exchange processes. Specifications for drinking water, Bureau of Indian Standards (BIS) and World health organization(WHO) standards, - desalination of brackish water, reverse osmosis (RO) and electrodialysis.
	UNIT - II: Fuel Technology: Fuels:- Introduction – Classification – Calorific value - HCV and LCV – Dulong's formula – Coal — Proximate and ultimate analysis – Significance of the analyses – Liquid fuels – Petroleum- Refining – Cracking – Synthetic petrol –Petrol knocking – Diesel knocking - Octane and Cetane ratings – Anti-knock agents – Power alcohol – Bio-diesel – Gaseous fuels— Natural gas. LPG and CNG – Combustion – Calculation of air for the combustion of a fuel – Flue gas analysis – Orsat apparatus.	UNIT - II Electrochemical Energy Systems: Introduction-Electrochemical Cell(Galvanic cell), Electrochemical series, Applications, single electrode potential, Hydrogen and Calomel electrode, Nernst Equation for a single electrode, Concentration Cells(Electrode & Electrolyte),Construction of glass electrode. Batteries – Classical batteries-dry/Leclanche cell,Modern batteries-zinc air, lithium cells-Li MnO_2 cell-challenges of battery technology. Fuel cells-Introduction- classification of fuel cells – hydrogen and oxygen fuel cell, propane and oxygen fuel cell-Merits of fuel cell.
	UNIT - III: Electrochemical Cells and Corrosion: Galvanic cells - Reversible and	Unit-III Polymer Chemistry: Introduction to polymers, functionality of monomers, chain

	irreversible cells – Single electrode potential- Electro chemical series and uses of this series- Standard electrodes (Hydrogen and Calomel electrodes) - Concentration Cells – Batteries: Dry Cell - Li cells - Zinc – air cells. Corrosion:- Definition – Theories of Corrosion (electrochemical) – Formation of galvanic cells by different metals, by concentration cells, by differential aeration and waterline corrosion – Passivity of metals – Pitting corrosion - Galvanic series – Factors which influence the rate of corrosion - Protection from corrosion – Cathodic protection - Protective coatings: – Metallic (cathodic and anodic) coatings - Methods of application on metals (Galvanizing, Tinning, Electroplating, Electroless plating).	growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation (Free radical mechanism for addition ploymerization) Plastics - Thermoplastics and Thermosettings, Preparation, properties and applications of – PE,PVC, Bakelite, Teflon and Nylon-6, 6. Elastomers–Buna-S, Buna-N–preparation, properties and applications. Conducting polymers – polyacetylene, polyaniline – mechanism of conduction and applications.
	UNIT - IV: Chemistry of Advanced Materials: Nano materials:-Introduction – Sol-gel method - Carbon nano tubes and fullerenes: Types, preparation, properties and applications. Super conductors: -Type –I, Type II – Characteristics and applications Semiconductors: - Preparation of semiconductors, working of diodes and transistors. Green synthesis: -Principles Liquid crystals:-Introduction – Types – Applications Fuel cells: - Introduction - cell representation, H2-O2fuel cell: Design and working, advantages and Limitations. Types of fuel cells: methanol-oxygen fuel cells.	UNIT - IV Energy Sources And Applications: Introduction- sources of renewable energy –Hydro power, Biomass and Bio-fuels Solar energy – Introduction - Physical and Chemical properties of Silicon- Preparation of Semi-conductors - Doping of Silicon- p and n type semi-conductors PV cell / solar cell- Working & Manufacturing of Photovoltaic Cells using Chemical Vapor Deposition Technique-applications of solar energy. Fuels: Introduction- classification- liquid fuels- Refining of petroleum- cracking-Reforming Gaseous fuels-LPG & CNG Applications.
	UNIT - V: Non-Conventional Energy Sources: Solar Energy: - Introduction, application of solar energy, conversion of solar energy (Thermal conversion & photo conversion) – photovoltaic cell: design, working and its importance Non-conventional energy sources: (i) Hydropower include setup a hydropower plant (schematic diagram) (ii) Geothermal energy: Introduction-schematic diagram of a geothermal power plant (iii) Tidal and wave power: Introduction- Design and working-movement of tides and their effect on sea level. (iv) Ocean thermal energy: Introduction, closed-cycle, ocean thermal energy conversion (OTEC), open	UNIT - V Material Science And Engineering: Nanomaterials: Introduction to nanomaterial: nanoparticles, nanocluster, carbon nanotube (CNT) and nanowires. Chemical synthesis of nanomaterials: sol-gel method. Characterization: Principle and applications of scanning electron microscope (SEM) and transmission electron microscope (TEM). NanoTubes: Carbon nano tubes- Types of CNT's- preparation methods –Arc discharge, Laser abiliation and chemical vapour deposition – properties and applications. Green Chemistry: Introduction, priniciples of green chemistry (Ex: Solvent, Catalyst, Reactant) Band Theory of Solids:

	cycle OTEC, hybrid OTEC, schematic diagram and explanation. (v) Biomass and biofuels.	Introduction –Explanation of conductors, semi conductors, Insulators by Band Theory- Super conductors-Types- Preparation-Properties and Applications. Appendix: Introduction to Molecular Machines and Molecular Switches

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Department of Mechanical Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**Engineering Drawing**	**Engineering Graphics and Design**
Course Code	**171ES2T03**	**191ES2T02**
Syllabus	**UNIT-I:** **Introduction to Engineering Drawing:** Lettering, Dimensioning, Types of lines. **Geometrical Constructions:** Construction of regular polygons by general method and inscribing circle method. Special methods for pentagon and hexagon. **Conic Sections:** Ellipse, Parabola and Hyperbola by general method (eccentricity method) and special methods. **Scales:** Plain Scale, Diagonal Scale and Vernier Scales.	**Unit-I:** **Introduction to Engineering graphics:** Principles of Engineering Graphics and their significance- conventions in drawing- lettering – BIS Conventions- - Conic sections -Cycloid, epicycloids and hypocycloid-Involutes
	UNIT-II: **Orthographic Projections:** Introduction to orthographic projections, Projections of Points, Projections of Lines.	**UNIT-II:** **Projection of points, lines and planes:** Projection of points in any quadrant, lines inclined to one or both planes, finding true lengths, angle made by line. Projections of regular plane surfaces.
	UNIT-III: **Projections of Planes:** Regular planes perpendicular/parallel to one reference plane and inclined to other reference plane; inclined to both the reference planes.	**UNIT-III:** **Projections of solids:** Projections of regular solids inclined to one or both planes by rotational or auxiliary views method.
	UNIT-IV: **Projections of Solids:** Prisms, Pyramids, Cones and Cylinders with the axis parallel to both the reference planes and axis inclined to one of the reference planes.	**UNIT-IV:** **Computer Aided Drafting** **Introduction to Computer Aided Drafting:** Basic drawing and editing commands- Dimensioning principles and conventional representations, Systems of projections, Conventions and application to orthographic projections

	UNIT-V: **Isometric Projections** Isometric Scale, Isometric Projections, Conversion of Isometric views into Orthographic projections.	**UNIT-V:** **Isometric Projections:** Principles of isometric projection-Isometric scale; Isometric views: lines, planes, figures, simple and compound solids

Course Coordinator

Head of the Department

Head of the Department
Mechanical Engineering
Aditya Engineering College
Surampalem

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Department of Electronics and communication Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	ELECTRICAL & MECHANICAL TECHNOLOGY	Basic Electrical Engineering
Course Code	171ES2T06	191ES2T07
Syllabus	**UNIT – I:** **DC Machines:** Principle of operation of DC generator – emf equation – types of DC machine – torque equation of DC motor –applications – three point starter, speed control methods – OCC of DC generator Transformers: Principle of operation of single phase transformers – e.m.f equation – losses –efficiency and regulation.	**UNIT- I** **Dc Generators:** Principle of operation and construction of DC generators – EMF equation – types of generators – magnetization and load characteristics of DC generators.
	UNIT – II: **AC Rotating Machines:** Principle of operation of alternators – regulation by synchronous impedance method – principle of operation of 3-Phase induction motor – slip-torque characteristics - efficiency – applications	**UNIT- II** **Dc Motors:** Principle of operation and construction of DC Motors – types of DC Motors – Characteristics of DC motors – basic starting methods for DC shunt motor – losses and efficiency – Swinburne's test – speed control of DC shunt motor – flux and Armature voltage control methods.

	UNIT – III: **Measuring Instruments**: Classification – Deflection, controlling, damping torque, ammeter, voltmeter, wattmeter, MI, MC instruments –Energy meter – Construction of CRO.	**UNIT- III** **Transformers:** Principle of operation of single phase transformer – types – constructional features – phasor diagram on no-load and load – equivalent circuit, losses and efficiency of transformer – regulation of transformer – OC and SC tests – predetermination of efficiency and regulation.
	UNIT – IV: **Energy Sources:** Renewable and nonrenewable energy resources, renewable energy forms and conversions. Thermodynamic principles and laws. Internal combustion engines: classification – working principle - engine components. Four stroke and two stroke petrol and diesel engines, comparisons. Heat Transfer: Modes of heat transfer- Conduction, Convection, Radiation.	**UNIT- IV** **Three Phase Induction Machine:** Principle of operation and construction of three- phase induction motors –slip ring and squirrel cage motors – slip-torque characteristics, Losses,efficiency calculation – starting methods.
	UNIT – V: **Transmission of power & manufacturing methods:** Belt, rope and chain drives- Different types - power transmission by belts and ropes, initial tensions in the belt. Gears: classification of gears, applications. Metal joining: arc welding, resistance welding, gas welding, brazing and soldering. Metal forming: forging – operations, rolling and extrusion principles. Machine tool: lathe classification, specifications, and operations.	**UNIT- V** **Single Phase Machine & Special Machines:** Principle Of Operation And Construction – Single Phase Induction Motor – Shaded Pole Motors, Capacitor Motors, Universal Motor, Reluctance Motor.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Engineering /Applied Chemistry Lab	Engineering Chemistry Lab
Course Code	171BS1L01	191BS1L02/191BS2L04
Syllabus	Exercise 1: Introduction to Chemistry laboratory – Molarity, Normality, Primary, secondary standard solutions, Volumetric titrations, Quantitative analysis, Qualitative analysis, etc.	Exercise 1: Determination of Total Hardness of a water sample.
	Exercise 2: Trial experiment - Determination of HCl using standard Na2CO3 solution.	Exercise 2: Determination of Dissolved Oxygen in Water Sample.
	Exercise 3: Preparation of Phenol - Formaldehyde resin (Bakelite).	Exercise 3: Determination of Zinc by Complexometric method
	Exercise 4: Determination of KMnO4 using standard Oxalic acid solution.	Exercise 4: P H metric titration of (i) strong acid vs. strong base.
	Exercise 5: Determination of ferrous iron using standard K2Cr2O7 solution.	Exercise 5: Determination of Fe (II) in Mohr's salt by potentiometric method
	Exercise 6: Preparation of Bio-Diesel.	Exercise 6: Potentiometry – Titration between strong acid – strong base
	Exercise 7: Determination of temporary and permanent hardness of water using standard EDTA solution.	7: Conductometric titrations(Strong acid vs Strong base).
	Exercise 8: Determination of Copper using standard EDTA solution.	Exercise 8: Preparation of Phenol-Formaldehyde resin.
	Exercise 9: Determination of Iron by a Colorimetric method using thiocynate as reagent.	Exercise 9: Preparation of Urea-Formaldehyde resin
	Exercise 10: Determination of pH of the given sample solution using pH meter.	Exercise 10: Preparation of bio diesel
	Exercise 11: Conduct metric titration between strong acid and strong base.	Exercise.. Exercise 11: Determination of Vitamin – C.
	Exercise 12: Conduct metric titration between strong acid and weak base.	
	Exercise 13: Potentiometric titration between strong acid and strong base.	
	Exercise 14: Potentiometric titration	

	between strong acid and weak base.	
	Exercise 15: Determination of Zinc using standard EDTA solution.	
	Exercise 16: Determination of Vitamin – C.	

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Department of Electronics and communication Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**Computer Architecture and Organization**	**Computer Architecture and Organization**
Course Code	**R1631041**	**171EC5E01**
	UNIT -I: **Basic Structure Of Computers:** Functional unit, Basic Operational concepts, Bus structures, System Software, Performance, The history of computer development.	**UNIT I:** **Basic Structure of Computers:** Computer Types, Functional units, Basic operational concepts, Bus structures, Software, Performance. Computer Arithmetic: Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating point Arithmetic operations, Decimal Arithmetic unit, Decimal Arithmetic operations.
	UNIT-II: **Machine Instruction and Programs:** Instruction and Instruction Sequencing: Register Transfer Notation, Assembly Language Notation, Basic Instruction Types, Addressing Modes, Basic Input/output Operations, The role of Stacks and Queues in computer programming equation. Component of Instructions: Logic Instructions, shift and Rotate Instructions	**UNIT II:** **Register Transfer Language and Micro-Operations:** Register Transfer language. Register Transfer, Bus and memory Transfer, Types of Microoperations, Arithmetic logic shift unit, Instruction codes, Computer Registers, Computer instructions, Instruction cycle, Memory Reference Instructions, Input Output and Interrupt
	UNIT -III: **Type of Instructions:** Arithmetic and Logic Instructions, Branch Instructions, Addressing Modes, Input/output Operations	**UNIT III:** **central Processing Unit:** Stack organization, Instruction formats, Addressing modes, Data Transfer and manipulation, Program control, Reduced Instruction Set Computer (RISC). Micro Programmed Control: Control memory, Address sequencing, Micro program example, Design of

		control unit-Hard wired control, Micro programmed control
	UNIT -IV: **INPUT/OUTPUT ORGANIZATION**: Accessing I/O Devices, Interrupts: Interrupt Hardware, Enabling and Disabling Interrupts, Handling Multiple Devices, Direct Memory Access, Buses: Synchronous Bus, Asynchronous Bus, Interface Circuits, Standard I/O Interface: Peripheral Component Interconnect (PCI) Bus, Universal Serial Bus (USB)	**UNIT IV:** **The Memory System:** Memory Hierarchy, Main memory, Auxiliary memory, Associative memory, Cache memory, Virtual memory Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data Transfer Modes, Priority Interrupt, Direct Memory Access (DMA), Input –Output Processor (IOP)
	UNIT -V: **The MEMORY SYSTEMS:** Basic memory circuits, Memory System Consideration, Read-Only Memory: ROM, PROM, EPROM, EEPROM, Flash Memory, Cache Memories: Mapping Functions, INTERLEAVING Secondary Storage: Magnetic Hard Disks, Optical Disks,	**UNIT V:** **Pipeline and Vector Processing:** Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors. Multi Processors: Characteristics of Multiprocessors, Interconnection Structures, Inter-processor Arbitration, Inter-processor Communication and Synchronization, Cache Coherence.
	UNIT -VI: **Processing Unit:** Fundamental Concepts: Register Transfers, Performing An Arithmetic Or Logic Operation, Fetching A Word From Memory, Execution of Complete Instruction, Hardwired Control, Micro programmed Control: Microinstructions, Micro program Sequencing, Wide Branch Addressing Microinstructions with next –Address Field	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	**VLSI Design**	**VLSI Design**
Course Code	**R1632043**	**171EC6T14**
Syllabus	**UNIT-I:** **Introduction and Basic Electrical Properties of MOS Circuits:** Introduction to IC technology, Fabrication process: nMOS, pMOS and CMOS. Ids versus Vds Relationships, Aspects of MOS transistor Threshold Voltage, MOS transistor Trans, Output Conductance and Figure of Merit. nMOS Inverter, Pull-up to Pull-down Ratio for nMOS inverter driven by another nMOS inverter, and through one or more pass transistors. Alternative forms of pull-up, The CMOS Inverter, Latch-up in CMOS circuits, Bi-CMOS Inverter, Comparison between CMOS and BiCMOS technology.	**UNIT I:** **Introduction:** Introduction to IC Technology, MOS and related VLSI Technology, Basic MOS Transistors, Enhancement and Depletion modes of transistor action, IC production process, MOS and CMOS Fabrication processes, BiCMOS Technology, Comparison between CMOS and Bipolar technologies
	UNIT-II: **MOS and Bi-CMOS Circuit Design Processes:** MOS Layers, Stick Diagrams, Design Rules and Layout, General observations on the Design rules, 2μm Double Metal, Double Poly, CMOS/BiCMOS rules, 1.2μm Double Metal, Double Poly CMOS rules, Layout Diagrams of NAND and NOR gates and CMOSinverter,SymbolicDiagramsTranslation to Mask Form	**UNIT II:** **Basic Electrical Properties of MOS and Bi-CMOS Circuits:** Ids versus VdsRelationships, Aspects of MOS transistor Threshold Voltage, MOS transistorTrans, Output Conductance and Figure of Merit. The Pass transistor, NMOSInverter, Pull-up to Pull-down Ratio for NMOS inverter driven by anotherNMOS inverter. Alternative forms of pull-up, The CMOS Inverter, MOStransistor circuit model, BiCMOS Inverter, Latch-up in

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		CMOS circuits andBiCMOS Latch-up Susceptibility
	UNIT-III: **Basic Circuit Concepts:** Sheet Resistance, Sheet Resistance concept applied to MOS transistors and Inverters, Area Capacitance of Layers, Standard unit of capacitance, Some area Capacitance Calculations, The Delay Unit, Inverter Delays, Driving large capacitive loads, Propagation Delays, Wiring Capacitances, Choice of layers. Scaling of MOS Circuits: Scaling models and scaling factors, Scaling factors for device parameters, Limitations of scaling, Limits due to sub threshold currents, Limits on logic levels and supply voltage due to noise and current density. Switch logic, Gate logic.	**UNIT III:** **MOS and Bi-CMOS Circuit Design Processes:** MOS Layers, StickDiagrams, Design Rules and Layout, General observations of design rules, 2µm Double Metal, Double Poly, CMOS/BiCMOS rules, 1.2µmDouble Metal, Double Poly CMOS rules, Layout Diagrams of NAND andNOR gates and CMOS inverter, Symbolic Diagrams-Translation to MaskForm. **Basic Circuit Concepts**: Sheet Resistance, Sheet Resistance concept appliedtoMOStransistors and Inverters, Area Capacitance of Layers, Standard unitof capacitance, The Delay Unit, Inverter Delays, Propagation Delays, WiringCapacitances, Fan-in and fan-out characteristics, Choice of layers, Transistorswitches, Realization of gates using NMOS, PMOS and CMOS technologies.
	UNIT-IV: **Chip Input and Output circuits:** ESD Protection, Input Circuits, Output Circuits and L(di/dt) Noise, On-Chip clock Generation and Distribution. Design for Testability: Fault types and Models, Controllability and Observability, Ad Hoc Testable Design Techniques, Scan Based Techniques and Built-In Self Test techniques.	**UNIT IV:** **Scaling of MOS Circuits:** Scaling models, Scaling factors for deviceparameters, Limits due to sub threshold currents, current density limits onlogic levels and supply voltage due to noise. Subsystem Design: Architectural issues, switch logic, Gate logic, examples of structured design, clocked sequential circuits, system considerations, general considerations of subsystem design processes, an illustration of design processes.

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	UNIT-V: **FPGA Design:** FPGA design flow, Basic FPGA architecture, FPGA Technologies, FPGA families- Altera Flex 8000FPGA, Altera Flex 10FPGA, Xilinx XC4000 series FPGA, Xilinx Spartan XL FPGA, Xilinx Spartan II FPGAs, Xilinx Vertex FPGA. Case studies: FPGA Implementation of Half adder and full adder. Introduction to synthesis: Logic synthesis, RTL synthesis, High level Synthesis.	**UNIT V:** **VLSI Design Issues**: VLSI Design issues and design trends, design process, design for testability, technology options, power calculations, package selection, clock mechanisms, mixed signal design, ASIC design flow, and introduction to SoC design. FPGA Design: Basic FPGA architecture, FPGA configuration, configuration modes, FPGA designs processFPGA design flow, FPGA families.
	UNIT- VI: **Introduction to Low Power VLSI Design:** Introduction to Deep submicron digital IC design, Low Power CMOS Logic Circuits: Over view of power consumption, Low – power design through voltage scaling, Estimation and optimisation of switching activity, Reduction of switching capacitance. Interconnect Design, Power Grid and Clock Design.	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	**Pre-Revision**	**Post-Revision**
Course Title	**VLSI LABORATORY**	**VLSI LAB**
Course Code	**R1632047**	**171EC6L08**
Syllabus	i. Design and Implementation of an Universal Gates. ii. Design and Implementation of an Inverter iii. Design and Implementation of Full Adder iv. Design and Implementation of Full Subtractor v. Design and Implementation of Decoder vi. Design and Implementation of RS-Latch vii. Design and Implementation of D-Latch viii. Design and Implementation asynchronous counter ix. Design and Implementation of static RAM cell x. Design and Implementation of 8 bit DAC using R-2R latter network	1. Digital circuit simulation 2. Digital circuits Schematics and its functional response verification of logic gates 3. Digital circuits Schematics and its functional response verification of complex logic gates and combinational circuits 4. Layout Extraction of Logic gates. 5. Layout Extraction of complex gates and combinational circuits 6. Performing DRC for logic gates 7. Performing DRC for complex gates and combinational circuits 8. Performing LVS / Net list extraction for logic gates 9. Performing LVS / Net list extraction for complex gates and combinational circuits 10. PEX estimation for the given logic circuits 11. PEX estimation for the given complex gates and combinational circuits **Augmented Experiments**: (Minimum of two experiments has to be performed) 1. Layout design for specific constraints (delay, power dissipation) 2. DRC / LVS / PEX verification of Multiplexer. 3. DRC / LVS / PEX verification of a given SOP(Z= (AB+C)D)

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Digital Communications Lab	Digital Communications Lab
Course Code	R1632048	171EC6L09
Syllabus	1. Time division multiplexing. 2. Pulse code modulation. 3. Differential pulse code modulation. 4. Delta modulation. 5. Frequency shift keying. 6. Phase shift keying . 7. Differential phase shift keying. 8. Companding 9. Source Encoder and Decoder 10. Linear Block Code-Encoder and Decoder 11. Binary Cyclic Code – Encoder and Decoder 12. Convolution Code – Encoder and Decoder	1. Verify Time division multiplexing and demultiplexing. 2. Obtain digital equivalent of analog voltage using Pulse code modulation. 3. Convert analog voltages into their digital equivalents using Delta modulation. 4. Observe the process of Frequency shift keying modulation and demodulation. 5. Verify the process of Phase shift keying modulation and demodulation. 6. Verify the operation of Differential phase shift keying. 7. Minimize coding redundancy using Source Encoder and Decoder. 8. Perform error detection and correction using Linear Block Code-Encoder and Decoder. 9. Perform error detection and correction using Binary Cyclic Code – Encoder and Decoder 10. Perform error detection and correction using Convolution Code – Encoder and Decoder. **Augmented experiments:** (Minimum of two experiments has to be performed) 1. Verify Differential pulse code modulation and demodulation. 2. Perform Non-Uniform quantization using Companding. 3. Verify Time Division Multiplexing and demultiplexing using MATLAB Simulink. 4. Observe the process of frequency shift keying modulation and demodulation using MATLAB Simulink. 5. Verify the operation of Differential Phase Shift Keying using MATLAB Simulink.

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	DIGITAL IMAGE PROCESSING	DIGITAL IMAGE PROCESSING
Course Code	RT41043	R1641042
Syllabus	**Unit: 1** **Introduction to Image Processing:** Overview of Image Processing, Nature of Image Processing, Image Processing Computer Graphics, Signal Processing, Machine Vision, video Processing, Optics, Statistics, Digital Image Representation, Types of Images, Digital Image Processing Operations, Fundamental steps in Image Processing, Image Processing Applications. Digital Imaging System Digital Imaging System: Physical Aspects of Imaging Acquisition, Biological Aspects of Image Acquisition, Properties of Human Visual System, Review of Digital Camera, Sampling and Quantization, Image Quality – Optical Resolution, Image Display Device and Device Resolution, Digital Halftone Process – Random Dithering, Ordered Dithering, Non-Periodic Dithering, Image Storage and File Formats – Need for File Format Types of File Formats – GIF, JPEG, PNG, DICOM, SVG Structure of TIFF File Format	**UNIT-1 Introduction:** Introduction to Image Processing, Fundamental steps in digital image processing, components of an image processing system, image sensing and acquisition, image sampling and quantization, some basic relationships between pixels, an introduction to the mathematical tools used in digital image processing. Image Transforms: Need for image transforms, Discrete Fourier transform (DFT) of one variable, Extension to functions of two variables, some properties of the 2-D Discrete Fourier transform, Importance of Phase, Walsh Transform. Hadamard transform, Haar Transform, Slant transform, Discrete Cosine transform, KL Transform, SVD and Radon Transform, Comparison of different image transforms

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	Unit: 2 : **Digital Image Processing Operations:** Basic Relationship and Distance Metrics, Classification of Image Processing Operations, Arithmetic and Logical Operations, Geometric Operations, Image Interpolation Techniques, Set Operations, Statistical Operations, Convolution and Correlation Operations, Data Structures and Image Processing Applications Development – Relational Structures, Hierarchical Data Structures, Pyramids, Quadtrees, Application Development. Digital Image Transforms: Need for Image Transforms, Spatial Frequencies in Image Processing, Introduction to Fourier Transform, Discrete Fourier Transform, Fast Fourier Transform and its algorithm, Properties of Fourier transform – Sampling Theorem, Parseval's Theorem, Discrete Cosine Transform, Discrete Sine Transform, Walsh Transform, Hadamard Transform, Haar Transform, Slant Transform, SVD and KL Transforms or Hotelling Transform.	**UNIT-2 :** **Intensity Transformations and Spatial Filtering:** Background, Some basic intensity transformation functions, histogram processing, fundamentals of spatial filtering, smoothing spatial filters , sharpening spatial filters, Combining spatial enhancement methods Filtering in the Frequency Domain: Preliminary concepts, The Basics of filtering in the frequency domain, image smoothing using frequency domain filters, Image Sharpening using frequency domain filters, Selective filtering
	Unit: 3 **Image Enhancement:** Image Quality and Need for Image Enhancement, Image Quality Metrics, Image Enhancement Point Operations Linear and Non-linear Functions, Piecewise Linear Functions, Histogram-based Techniques, Spatial Filtering Concepts, Image Smoothing Spatial Filters and its design, Image Sharpening Spatial Filters Frequency Domain Filtering Image Restoration: Image Degradation (Restoration) Model, Categories of Image Degradations, Noise Modeling, Blur and Distortions, Image Restoration in	**UNIT-3 :** **Image Restoration and Reconstruction:** A model of the image degradation / Restoration process, Noise models, restoration in the presence of noise only-Spatial Filtering, Periodic Noise Reduction by frequency domain filtering, Linear, Position –Invariant Degradations,Estimating the degradation function, Inverse filtering, Minimum mean square error (Wiener) filtering, constrained least squares filtering ,geometric mean filter ,image reconstruction from projections.

	the Presence of Noise Only, Mean Filters, Order-statistics Filters, Image Restoration Techniques, Constrained and Unconstrained Methods, Geometrical Transforms for Image Restoration	
	Unit: 4 : **Image Compression:** Image Compression Model, Compression Algorithm and its types – Entropy Coding, Predictive Coding, Transform Coding, Layered Coding, Types of Redundancy – Coding Redundancy, Inter-pixel Redundancy, Psychovisual Redundancy, Chromatic Redundancy. Lossless Compression Algorithms, Run-length Coding, Huffman Coding , Shannon–Fano Coding, Bit-plane Coding, Arithmetic Coding, Lossless Predictive Coding, Lossy Compression Algorithms, Block Transform Coding, Image and Video Compression standards, JPEG, Video Compression – MPEG.	**UNIT-4 :** **Image compression:** Fundamentals, Basic compression methods: Huffman coding, Golomb coding, Arithmetic coding, LZW coding, Run-Length coding, Symbol-Based coding, Bit-Plane coding, Block Transform coding, Predictive coding Wavelets and Multiresolution Processing: Image pyramids, subband coding, Multiresolution expansions, wavelet transforms in one dimensions & two dimensions, Wavelet coding.
	Unit: 5 **Image Segmentation**: Introduction – Classification of Image Segmentation Algorithms, Detection of Discontinuities, Edge Detection – Staged in Edge Detection – Types of Edge Detectors, First-order Edge Detection Operators – Second-order Derivative Filters, Edge Operator Performance, Edge Linking Algorithms, Principle of Thresholding - Effect of Noise over Threshold Process and Peakiness Test - Parametric Methods, Non-parametric Methods, Principle of Region-growing –Dynamic Segmentation approaches , Validation of Segmentation Algorithms	**UNIT-5 :** **Image segmentation:** Fundamentals, point, line, edge detection, thresholding, region –based segmentation. Morphological Image Processing: Preliminaries, Erosion and dilation, opening and closing, basic morphological algorithms for boundary extraction, thinning, gray-scale morphology, Segmentation using morphological watersheds.

G. Sridhar

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	Unit: 6 **Colour Image Processing:** Introduction – Colour Fundamentals, Devices for Colour Imaging, Colour Image Storage and Processing – Colour Models – RGB Colour Model, HIS Colour Model, HSV Colour Model, HLS Colour Model, TV Colour Model– YUV Model, YIQ Model, Y Cb Cr Colour Model, Printing ColourModelsCMK and CMYK Models. Colour Quantization – Popularity Algorithm, Median-cut Algorithm, Octreebased Algorithm, Pseudo Colour Image Processing. Full Colour Processing – Colour Transformation – Image Filters for Colour Images – Noise in Colour Images, Colour Image Segmentation– Thresholding, K-means Clustering Technique, RGB Colour Space Segmentation, Colour Features.	**UNIT-6** **Color image processing**: color fundamentals, color models, pseudo color image processing, basics of full color image processing, color transformations, smoothing and sharpening. Image segmentation based on color, noise in color images, color image compression.

Signature of the course coordinator

Signature of the HOD

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Recognised by UGC under sections 2(f) and 12(B) of UGC Act, 1956
Aditya Nagar, ADB Road, Surampalem - 533437, Near Kakinada, E.G.Dt., Ph:99498 76662

Department of Electronics and communication Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	DIGITAL SIGNAL PROCESSING LAB	DIGITAL SIGNAL PROCESSING LABORATORY
Course Code	RT32048	R1641048
Syllabus	1. To study the architecture of DSP chips – TMS 320C 5X/6X Instructions. 2. To verify linear convolution. 3. To verify the circular convolution. 4. To design FIR filter (LP/HP) using windowing technique a) Using rectangular window b) Using triangular window c) Using Kaiser window 5. To Implement IIR filter (LP/HP) on DSP Processors 6. N-point FFT algorithm. 7. MATLAB program to generate sum of sinusoidal signals. 8. MATLAB program to find frequency response of analog LP/HP filters. 9. To compute power density spectrum of a sequence. 10. To find the FFT of given 1-D signal and plot.	1) Generation of discrete time signals for discrete signals 2) To verify the Linear Convolution a) Using MATLAB b) Using Code Composer Studio(CCS) 3) To verify the Circular Convolution for discrete signals a) Using MATLAB b) Using Code Composer Studio(CCS) 4) To Find the addition of Sinusoidal Signals 5) To verify Discrete Fourier Transform(DFT) and Inverse Discrete Fourier Transform(IDFT) a) Using MATLAB b) Using Code Composer Studio(CCS) 6) Transfer Function Stability Analysis: using pole-zero plot, bode plot, Nyquist plot, z-plane plot.

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		PART-2 (FILTERS) 7) Frequency Response of IIR low pass Butterworth Filter 8) Frequency Response of IIR high pass Butterworth Filter 9) Frequency Response of IIR low pass Chebyshev Filter 10) Frequency Response of IIR high pass Chebyshev Filter 11) Frequency Response of FIR low pass Filter using Rectangle Window 12) Frequency Response of FIR low pass Filter using Triangle Window PART – 3(IMAGE PROCESSING) 13) An image processing in a false contouring system 14) To generate the histogram equalization to the image 15) To verify the Normalized Cross Correlation to the addition of noise and removal of noise using filters to an image. 16) Compute the edge of an image using spatial filters. 17) Perform the image motion blur and calculate PSNR to the noise image and also noise free image. 18) To verify the PSNR to the Second order Decomposition of Discrete Wavelet transforms and to the reconstructed image using inverse Discrete Wavelet transform

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Signature of the HOD

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Program Name : B.Tech. in Computer Science and Engineering

Syllabus Revision for the Academic Year 2019-2020				
S.No	Semester	Course Code	Course Name	% of content revised for the existing year
1	I	191HS1T01	Communicative English	0
2	I	191BS1T01	Differential Equations and Linear Algebra	100
3	I	191BS1T03	Applied Physics	60
4	I	191ES1T01	Programming For Problem Solving Using C	100
5	I	191HS1L01	Communicative English Lab -I	0
6	I	191BS1L03	Applied Physics Lab	0
7	I	191ES1L01	Programming For Problem Solving Using C Lab	100
8	I	191ES1L02	Basic Engineering Workshop	0
9	I	191MC1A01	Environmental Science	0
10	I	191MC1A02	Constitution of India	100
11	II	191BS2T09	Engineering Chemistry	0
12	II	191BS2T10	Numerical Methods and Complex Variables	40
13	II	191ES2T02	Engineering Graphics and Design	100
14	II	191ES2T03	Essential Electrical and Electronics Engineering	100
15	II	191ES2T09	Data Structures through C++	100
16	II	191HS2L02	Communicative English Lab-II	100
17	II	191BS2L04	Engineering Chemistry Lab	0
18	II	191ES2L10	Data Structures Through C++ Lab	0
19	II	191ES2L11	IT Workshop	0
20	II	191PR2P01	Engineering Exploration Project	100
21	III	171BS3T08	Mathematical Foundations of Computer Science	0
22	III	171ES3T23	Digital Logic Design	0

S.No	Semester	Course Code	Course Name	% of content revised for the existing year
23	III	171CS3T02	Statistics with R Programming	0
24	III	171CS3T03	Object Oriented Programming Through C++	0
25	III	171HS3T04	Managerial Economics & Financial Analysis	0
26	III	171CS3T04	Advanced Data Structures	0
27	III	171CS3L01	Object Oriented Programming Lab	0
28	III	171CS3L02	Advanced Data Structures Lab	0
29	III	171HS3A10	Employability Skills – I	0
30	III	171HS3A09	Professional Ethics & Human Values	0
31	IV	171CS4T05	Software Engineering	0
32	IV	171CS4T06	Formal Languages & Automata Theory	0
33	IV	171CS4T07	Java Programming	0
34	IV	171CS4T08	Database Management Systems	0
35	IV	171CS4T09	Principles of Programming Languages	0
36	IV	171CS4T10	Computer Organization	0
37	IV	171CS4L03	Java Programming Lab	0
38	IV	171CS4L04	Database Management Systems Lab	0
39	IV	171HS4A11	Employability Skills – II	0
40	IV	171HS4A08	IPR & Patents	0
41	V	171CS5T11	Compiler Design	0
42	V	171CS5T12	Python Programming	0
43	V	171CS5T13	Design & Analysis of Algorithms	0
44	V	171CS5T14	Operating Systems	0
45	V	171CS5E01	Unix and Shell Programming	0
46	V	171CS5E02	Advanced Computer Architecture	100
47	V	171CS5E03	Computer Graphics	0
48	V	171CS5E04	Software Testing Methodologies	80
49	V	171HS5T06	Employability Skills – III	100

S.No	Semester	Course Code	Course Name	% of content revised for the existing year
50	V	171CS5L05	Operating System and Linux Lab	0
51	V	171CS5L06	Python Programming Lab	0
52	V	171CS5L07	Software Testing Lab	0
53	V	171CS5L08	Compiler Design Lab	0
54	V	171CS5S01	MOOCs – I	100
55	VI	171CS6T15	Computer Networks	0
56	VI	171CS6T16	Web Technologies	0
57	VI	171CS6T17	Data Ware Housing and Data Mining	0
58	VI	171CS6E05	Software Quality Assurance	100
59	VI	171CS6E06	Bio Informatics	100
60	VI	171CS6E07	Human Computer Interaction	100
61	VI	171CS6E08	Social Networks and Semantic Web	100
62	VI	171CS6E09	Pattern Recognition	100
63	VI	171CS6E10	Parallel Computing	100
64	VI	171CS6E11	Storage Area Networks	100
65	VI	171CS6E12	E - Commerce	100
66	VI	171HS6T07	Employability Skills – IV	100
67	VI	171CS6L09	Computer Networks Lab	0
68	VI	171CS6L10	Data Ware Housing and Data Mining Lab	0
69	VI	171CS6L11	Web Technologies Lab	0
70	VI	171CS6S02	MOOCs – II	100
71	VII	R1641051	Cryptography and Network Security	0
72	VII	R1641052	Software Architecture & Design Patterns	100
73	VII	R1641053	Web Technologies	0
74	VII	R1641054	Managerial Economics and Financial Analysis	100
75	VII	R1641057	Software Architectures & Design Patterns Lab	100

S.No	Semester	Course Code	Course Name	% of content revised for the existing year
76	VII	R1641058	Web Technologies Lab	0
77	VII	R164105A	Big Data Analysis	100
78	VII	R164105B	Information Retrieval Systems	100
79	VII	R164105C	Mobile Computing	0
80	VII	R164105D	Cloud Computing	0
81	VII	R164105E	Software Project Management	0
82	VII	R164105F	Scripting Languages	100
83	VIII	R1642051	Distributed Systems	0
84	VIII	R1642052	Management Science	0
85	VIII	R1642053	Machine Learning	0
86	VIII	R1642055	Seminar	0
87	VIII	R1642056	Project	0
88	VIII	R164205A	Concurrent and Parallel Programming	100
89	VIII	R164205B	Artificial Neural Network	100
90	VIII	R164205C	Operation Research	100

Total number of courses in the academic year 2019-2020	= 90
Number of courses having revision in syllabus content >/= 20% in the academic year 2019-2020	= 33
Percentage of syllabus revision carried out in the academic year 2019-2020= (33/90)*100	=36.6%

KSP

Program Coordinator

Head of the Department

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1.1.2
19-20

PROGRAM STRUCTURE

I SEMESTER

Course Code	Name of the Course	Course Component	Total Number of contact hours				Credits(C)
			Lecture (L)	Tutorial (T)	Practice (P)	Total Hours	
191HS1T01	Communicative English	HSMC	3	0	0	3	3
191BS1T01	Differential Equations and Linear Algebra	BSC	3	0	0	3	3
191BS1T03	Applied Physics	BSC	3	0	0	3	3
191ES1T01	Programming For Problem Solving Using C	ESC	3	0	0	3	3
191HS1L01	Communicative English Lab - I	HSMC	0	0	3	3	1.5
191BS1L03	Applied Physics Lab	BSC	0	0	3	3	1.5
191ES1L01	Programming For Problem Solving Using C Lab	ESC	0	0	3	3	1.5
191ES1L02	Basic Engineering Workshop	ESC	0	0	3	3	1.5
191MC1A01	Environmental Science	MC	2	0	0	2	0
191MC1A02	Constitution of India	MC	2	0	0	2	0
		TOTAL	**16**	**0**	**12**	**28**	**18**

II SEMESTER

Course Code	Name of the Course	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	Total Hours	
191BS2T09	Engineering Chemistry	BSC	3	0	0	3	3
191BS2T10	Numerical Methods and Complex Variables	BSC	3	0	0	3	3
191ES2T02	Engineering Graphics and Design	ESC	1	0	3	4	2.5
191ES2T03	Essential Electrical and Electronics Engineering	ESC	3	0	0	3	3
191ES2T09	Data Structures through C++	ESC	3	0	0	3	3
191HS2L02	Communicative English Lab-II	HSMC	0	0	2	2	1
191BS2L04	Engineering Chemistry Lab	BSC	0	0	3	3	1.5
191ES2L10	Data Structures Through C++ Lab	ESC	0	0	3	3	1.5
191ES2L11	IT Workshop	ESC	0	0	3	3	1.5
191PR2P01	Engineering Exploration Project	PROJ	0	0	2	2	1
		TOTAL	**13**	**0**	**16**	**29**	**21**

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III SEMESTER

Course Code	Name of the Course	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	Total Hours	
171BS3T08	Mathematical Foundations of Computer Science	BS	3	1	---	4	3
171ES3T23	Digital Logic Design	ES	3	1	---	4	3
171CS3T02	Statistics with R Programming	PC	3	---	2	5	3
171CS3T03	Object Oriented Programming Through C++	PC	3	1	---	4	3
171HS3T04	Managerial Economics & Financial Analysis	HSS	3	1	---	4	3
171CS3T04	Advanced Data Structures	PC	3	1	---	4	3
171CS3L01	Object Oriented Programming Lab	PC	---	---	3	3	2
171CS3L02	Advanced Data Structures Lab	PC	---	---	3	3	2
171HS3A10	Employability Skills – I	HSS	---	---	2	2	---
171HS3A09	Professional Ethics & Human Values	HSS	2	---	---	2	---
		TOTAL	20	5	10	35	22

IV SEMESTER

Course Code	Name of the Course	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	Total Hours	
171CS4T05	Software Engineering	PC	3	1	---	4	3
171CS4T06	Formal Languages & Automata Theory	PC	3	1	---	4	3
171CS4T07	Java Programming	PC	3	1	---	4	3
171CS4T08	Database Management Systems	PC	3	1	---	4	3
171CS4T09	Principles of Programming Languages	PC	3	1	---	4	3
171CS4T10	Computer Organization	PC	3	1	---	4	3
171CS4L03	Java Programming Lab	PC	---	---	3	3	2
171CS4L04	Database Management Systems Lab	PC	---	---	3	3	2
171HS4A11	Employability Skills – II	HSS	---	---	2	2	---
171HS4A08	IPR & Patents	HSS	2	---	---	2	---
		TOTAL	20	6	8	34	22

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V SEMESTER

Course Code	Name of the Course	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	Total Hours	
171CS5T11	Compiler Design	PC	3	1	---	4	3
171CS5T12	Python Programming	PC	3	1	---	4	3
171CS5T13	Design & Analysis of Algorithms	PC	3	1	---	4	3
171CS5T14	Operating Systems	PC	3	1	---	4	3
---	**Professional Elective - I**	PE	3	1	---	4	3
171HS5T06	Employability Skills – III	HSS	2	---	---	2	1
171CS5L05	Operating System and Linux Lab	PC	---	---	3	3	2
171CS5L06	Python Programming Lab	PC	---	---	3	3	2
171CS5L07	Software Testing Lab	PC	---	---	3	3	2
171CS5L08	Compiler Design Lab	PC	---	---	3	3	2
171CS5S01	MOOCs – I	SS	---	---	---	--	---
		TOTAL	17	5	12	34	24

VI SEMESTER

Course Code	Name of the Course	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	Total Hours	
171CS6T15	Computer Networks	PC	3	1	---	4	3
171CS6T16	Web Technologies	PC	3	1	---	4	3
171CS6T17	Data Ware Housing and Data Mining	PC	3	1	---	4	3
---	**Professional Elective - II**	PE	3	1	---	4	3
---	**Professional Elective - III**	PE	3	1	---	4	3
171HS6T07	Employability Skills – IV	HSS	2	---	---	2	1
171CS6L09	Computer Networks Lab	PC	---	---	3	3	2
171CS6L10	Data Ware Housing and Data Mining Lab	PC	---	---	3	3	2
171CS6L11	Web Technologies Lab	PC	---	---	3	3	2
171CS6S02	MOOCs – II	SS	---	---	---	--	---
		TOTAL	17	5	9	31	22

MOOCs – Massive Open Online Courses

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Professional Elective – I (V Semester)

S.No	Course Code	Name of the Course
1	171CS5E01	Unix and Shell Programming
2	171CS5E02	Advanced Computer Architecture
3	171CS5E03	Computer Graphics
4	171CS5E04	Software Testing Methodologies

Professional Elective – II (VI Semester)

S.No	Course Code	Name of the Course
1	171CS6E05	Software Quality Assurance
2	171CS6E06	Bio Informatics
3	171CS6E07	Human Computer Interaction
4	171CS6E08	Social Networks and Semantic Web

Professional Elective – III (VI Semester)

S.No	Course Code	Name of the Course
1	171CS6E09	Pattern Recognition
2	171CS6E10	Parallel Computing
3	171CS6E11	Storage Area Networks
4	171CS6E12	E - Commerce

Professional Elective – IV (VII Semester)

S.No	Course Code	Name of the Course
1	171CS7E13	Software Project Management
2	171CS7E14	Big Data Analytics
3	171CS7E15	Image Processing
4	171CS7E16	Cyber Laws

Professional Elective – V (VII Semester)

S.No	Course Code	Name of the Course
1	171CS7E17	Middleware Technologies
2	171CS7E18	Artificial Intelligence and Machine Learning
3	171CS7E19	Information Retrieval Systems
4	171CS7E20	Mobile Computing

Professional Elective – VI (VIII Semester)

S.No	Course Code	Name of the Course
1	171CS8E21	Agile Methodologies
2	171CS8E22	Cyber Security
3	171CS8E23	Distributed Databases
4	171CS8E24	Distributed Systems

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IV Year - I Semester

S. No.	Subjects	L	T	P	Credits
1	Cryptography and Network Security	4	--	--	3
2	Software Architecture & Design Patterns	4	--	--	3
3	Web Technologies	4	--	--	3
4- HS	Managerial Economics and Financial Analysis	4	--	--	3
5	**Elective-I** i. Big Data Analytics ii. Information Retrieval Systems iii. Mobile Computing	4	--	--	3
6	**Elective-II** i. Cloud Computing ii. Software Project Management iii. Scripting Languages	4	--	--	3
7	Software Architecture& Design Patterns Lab	--	--	3	2
8	Web Technologies Lab	--	--	3	2
	Total Credits				**22**

IV Year - II Semester

S. No.	Subjects	L	T	P	Credits
1	Distributed Systems	4	--	--	3
2- HS	Management Science	4	--	--	3
3	Machine Learning	4	--	--	3
4	**Elective-III** i.Concurrent and Parallel Programming ii.Artificial Neural Networks iii. Operations Research	4	--	--	3
5	Seminar	--	3	--	2
6	Project	--	--	--	10
	Total Credits				**24**

Total Course Credits = 48+44 + 42 + 46 = 180

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APPLIED PHYSICS

I Semester
Course Code: 191BS1T03

L	T	P	C
3	0	0	3

(Common to ECE& CSE)

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Apply the principles of interference and diffraction to design and enhance the resolving power of various optical instruments.
CO 2: Explain the fundamental concepts of Quantum behaviour of matter.
CO 3: Classify the solids based on energy band structure.
CO 4: Explain the basic concepts of Semi-Conductors and Identify the type of semiconductors using Hall Effect.
CO 5: Explain about magnetic and dielectric properties of different materials.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	2	1	-	-	-	-	-	-	-	-	-	-
CO3	2	1	-	-	-	-	-	-	-	-	-	-
CO4	2	1	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1	PSO 2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

UNIT-I

Wave Optics: Principle of Superposition - Interference of light - Conditions for sustained Interference - Interference in thin films (reflected geometry) - Newton's Rings (reflected geometry).

Diffraction - Fraunhofer Diffraction - Diffraction due to Single slit (quantitative), Double slit, N -slits and circular aperture (qualitative) – Intensity distribution curves - Diffraction Grating – Grating spectrum – missing order– resolving power – Rayleigh's criterion – Resolving powers of Microscope, Telescope and grating (qualitative).

UNIT-II

Quantum Mechanics: Introduction – Matter waves – de Broglie's hypothesis – Davisson-Germer experiment – G.P.Thomson experiment – Heisenberg's Uncertainity Principle –interpretation of wave function – Schröedinger Time Independent and Time Dependent wave equations – Particle in a potential box.

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UNIT-III

Free Electron Theory: Introduction – Classical free electron theory (merits and demerits only) - Quantum Free electron theory – electrical conductivity based on quantum free electron theory – Fermi Dirac distribution function – Temperature dependence of Fermi-Dirac distribution function - expression for Fermi energy -Density of states .

BAND THEORY OF SOLIDS Bloch's theorem (qualitative) – Kronig-Penney model(qualitative) – energy bands in crystalline solids – E Vs K diagram – classification of crystalline solids – effective mass of electron – m^* Vs K diagram - concept of hole.

UNIT-IV

Semiconductor Physics: Introduction– Intrinsic semi-conductors - density of charge carriers - Electrical conductivity – Fermi level – extrinsic semiconductors - p-type & n-type - Density of charge carriers - Dependence of Fermi energy on carrier concentration and temperature – Hall effect- Hall coefficient - Applications of Hall effect - Drift and Diffusion currents – Einstein's equation.

UNIT-V

Magnetism: Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr magneton – Classification of magnetic materials: Dia, para & Ferro – Domain concept of Ferromagnetism - Hysteresis – soft and hard magnetic materials – applications of Ferromagnetic material.

Dielectrics: Introduction - Dielectic polarization – Dielectric Polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative) – Lorentz Internal field – Claussius-Mossoti equation - Frequency dependence of polarization – Applications of dielectrics.

Text Books:

1. " A Text book of Engineering Physics" by M.N. Avadhanulu, P.G.Kshirsagar – S.Chand Publications, 2017.
2. "Engineering Physics" by D.K.Bhattacharya and Poonam Tandon, Oxford press (2015).
3. "Engineering Physics" by R.K Gaur. and S.L Gupta., - Dhanpat Rai publishers, 2012.

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NUMERICAL METHODS AND COMPLEX VARIABLES

II Semester **L T P C**

Course Code: 191BS2T10 **3 0 0 3**

(Common to CSE & IT)

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1: Apply numerical methods to obtain approximate solution of equations.
CO 2: Apply various numerical methods to interpolate polynomials.
CO 3: Apply numerical methods to initial value problems and problems involvingintegration.
CO 4: Identify the analyticity of functions of complex variables.
CO 5: Apply Cauchy's theorem, Cauchy's integral formula and Cauchy's residue theorem.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO /PO	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

UNIT I:

Solution of Algebraic and Transcendental Equations:

Introduction to Numerical methods, Bisection method, Secant method, Method of false position, Iteration method, Newton - Raphson method.

UNIT II:

Interpolation:

Introduction to Interpolation, Finite differences, Forward differences, Backward differences, Relation between operators, Newton's formula for interpolation, Lagrange's interpolation, Newton's divided difference interpolation.

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UNIT III:

Numerical Integration and solution of Ordinary Differential equations:
Trapezoidal rule, Simpson's 1/3rd and 3/8th rule, Solution of ordinary differential equations by Taylor's series, Picard's method of successive approximations, Euler's method, Modified Euler's method, Runge - Kutta method (fourth order).

UNIT - IV:

Functions of Complex variables:
Introduction, Continuity, Differentiability, Analyticity, Properties of analytic functions, Cauchy-Riemann equations in Cartesian and polar co-ordinates, Harmonic functions, Milne Thompson method.

UNIT V:

Complex Integration:
Introduction to complex integration, Cauchy's integral theorem, Cauchy integral formula, Liouville's theorem, Taylor's series, Maclaurin's series, Laurent's series (All theorems without proof), Singular point, Types of singularities-Isolated, Essential and Removable singularities, pole of order m, Residues, Cauchy Residue theorem.

Text Books:

1. Advanced Engineering Mathematics, R.K.Jain, S.R.K.Iyenkar, Alpha Science Publications.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India.
3. B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, KhannaPublishers.
4. P.Sivaramakrishna Das, C.Vijayakumari, Engineering Mathematics, Pearson Publications.

Reference Books:

1. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRCPress.
2. Dass H.K., Rajnish Verma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd,Delhi.
3. Higher engineering mathematics by John Bird, 5th edition Elsevier Limited,2006.

Web Links:

1. https://nptel.ac.in/courses/111107108/25
2. https://nptel.ac.in/courses/111103021/
3. https://nptel.ac.in/courses/111107105/
4. http://mathworld.wolfram.com
5. https://www.khanacademy.org

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SOFTWARE TESTING METHODOLOGIES
(Common to CSE & IT)

V Semester
Course Code: 171CS5E04

L	T	P	C
3	1	0	3

Course Outcomes:

At the end of the Course, Student will be able to:

CO1: Explain the fundamentals of software testing.
CO2: Compare SDLC with STLC.
CO3: Summarize verification and validation activities.
CO4: Design the test cases using different testing strategies.
CO5: Outline the importance of static testing and various levels of software testing.
CO6: Discuss about various Automation Testing tools.

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	-	-	-	-	-	-	-	-	-	-
CO2	1	3	-	-	-	-	-	-	-	-	-	-
CO3	2	2	-	-	-	-	-	-	-	-	-	-
CO4	2	-	3	-	-	-	-	-	-	-	-	-
CO5	2	2	-	-	-	-	-	-	-	-	-	-
CO6	1	2	-	-	3	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes:

CO/PSO	PSO1	PSO2
CO1	2	-
CO2	1	-
CO3	2	-
CO4	1	-
CO5	1	-
CO6	1	-

Unit - I

Software Testing: Introduction, Evolution, Myths & Facts, Goals, Psychology, Definition, Model for testing, Effective Vs Exhaustive Software Testing.

Software Testing Terminology and Methodology: Software Testing Terminology, Software Testing Life Cycle, relate STLC to SDLC, Software Testing Methodology.

Unit – II

Verification and Validation: Verification & Validation Activities, Verification, Verification of Requirements, High level and low level designs, How to verify code, Validation.

Dynamic Testing I: Black Box testing techniques: Boundary Value Analysis, Equivalence class Testing, State Table based testing, Decision table based testing, Cause-Effect Graphing based testing, Error guessing.

Unit – III

Dynamic Testing II: White-Box Testing: need, Logic coverage criteria, Basis path testing, Graph matrices, Loop testing, data flow testing, mutation testing.

Static Testing: Inspections, Structured Walkthroughs, Technical reviews.

Unit – IV

Validation activities: Unit testing, Integration Testing, Function testing, system testing, acceptance testing.

Regression testing: Progressives Vs regressive testing, Regression testability, Objectives of regression testing, When regression testing done?, Regression testing types, Regression testing techniques.

Unit – V

Software Testing Tools: Introduction to Testing, need for Automated Testing, Taxonomy of Testing tools, Regression and performance Testing tools, Testing management tools, Source code testing tools, How to select a testing tool. Introduction to list of tools like Win runner, Load Runner, Jmeter, About Win Runner, Using Win runner, Mapping the GUI, Recording Test, working with Test, Enhancing Test, Checkpoints, Test Script Language, putting it all together, Running and Debugging Tests, Analyzing Results, Batch Tests, Rapid Test Script Wizard.

Text Books:

1. Software Testing, Principles and Practices, Naresh Chauhan, 2nd Edition, Oxford.
2. Software Testing Tools, Dr. K V K K Prasad, Dreamtech press.

Reference Books:

1. Software Testing- Yogesh Singh, Camebridge.
2. Software Testing, Principles, techniques and Tools, M G Limaye, TMH 3.
3. Effective Methods for Software testing, Willian E Perry, Wiley.
4. The Art of Software Testing, Glenford J.Myers, Tom Badgett, Corey Sandler,John Wiley & Sons publication.
5. Software testing, Ron Patton, Pearson education.

Web Links:

1. https://www.guru99.com/software-testing-lifecycle
2. http://www.softwaretestinghelp.com/what-is-verification-and-validation/
3. http://nptel.ac.in/courses/106105150/
4. http://www.cigniti.com/blog/top-3-regression-testing-types-how-to-execute
5. https://www.utest.com/search-result/tag/Tools

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Department of CSE
ADITYA ENGINEERING COLLEGE (A9)

Date: 01-06-2019

Department of Computer Science and Engineering

Syllabus revision Index 2019-2020

S.No	Name of the course	Percentage of syllabus change
1	Applied Physics	60%
2	Numerical Methods and Complex Variables	20%
3	Software Testing Methodologies	80%

KSP
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Department of Humanities & Basic Sciences

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Applied Physics	Applied Physics
Course Code	171BS1T04/171BS2T04	191BS1T03/191BS2T07
Syllabus	UNIT-I: Interference: Principle of Superposition – Coherence– Interference in thin films (reflection geometry) – Newton's rings – construction and working principle of Interferometer.	UNIT-I Wave Optics: Principle of Superposition - Interference of light - Conditions for sustained Interference - Interference in thin films (reflected geometry) - Newton's Rings (reflected geometry). Diffraction - Fraunhofer Diffraction - Diffraction due to Single slit (quantitative), Double slit, N -slits and circular aperture (qualitative) – Intensity distribution curves - Diffraction Grating – Grating spectrum – missing order– resolving power – Rayleigh's criterion – Resolving powers of Microscope, Telescope and grating (qualitative).
	UNIT-II: Diffraction: Fraunhofer diffraction at single slit – Cases of double slit, N-slits, & circular aperture, grating equation – Rayleigh criterion of resolving power- Resolving power of a grating, Telescope and Microscopes	UNIT-II Quantum Mechanics: Introduction – Matter waves – de Broglie's hypothesis – Davisson-Germer experiment – G.P. Thomson experiment – Heisenberg's Uncertainity Principle –interpretation of wave function – Schröedinger Time Independent and Time Dependent wave equations – Particle in a potential box.
	UNIT-III: Polarization: Types of Polarization – Methods of production – Nicol Prism – Quarter wave plate and Half Wave plate- working principle of polarimeter (Sacharimeter). LASERS: Characteristics– Stimulated emission – Einstein's Transition Probabilities Pumping schemes- Ruby laser – Helium Neon laser-CO2 Laser-Applications	. UNIT-III Free Electron Theory: Introduction – Classical free electron theory (merits and demerits only) - Quantum Free electron theory – electrical conductivity based on quantum free electron theory – Fermi Dirac distribution function – Temperature dependence of Fermi Dirac distribution function - expression for Fermi energy -Density of states. BAND THEORY OF SOLIDS Bloch's theorem (qualitative) – Kronig-Penney model(qualitative) – energy

		bands in crystalline solids – E Vs K diagram – classification of crystalline solids – effective mass of electron – m* Vs K diagram - concept of hole.
	UNIT-IV: Quantum Mechanics: Introduction –Matter waves – Schrödinger Time Independent and Time Dependent wave equations – Particle in a box. FREE ELECTRON THEORY: Defects of classical free electron theory –Quantum Free electron theory – concept of Fermi Energy..	UNIT-IV Semiconductor Physics: Introduction– Intrinsic semi conductors - density of charge carriers - Electrical conductivity – Fermi level – extrinsic semiconductors - p-type & ntype - Density of charge carriers - Dependence of Fermi energy on carrier concentration and temperature – Hall effect- Hall coefficient - Applications of Hall effect - Drift and Diffusion currents – Einstein's equation.
	UNIT-V: Band Theory of Solids: Bloch's theorem (qualitative) – Kronig – Penney model (Qualitative) – energy bands in crystalline solids – classification of crystalline solids– effective mass of electron & concept of hole. Semiconductor Physics: Conduction – Density of carriers in Intrinsic and Extrinsic semiconductors – Drift & Diffusion – relevance of Einstein's equation- Hall effect in semiconductors.–	UNIT-V Magnetism: Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr magneton – Classification of magnetic materials: Dia, para & Ferro – Domain concept of Ferromagnetism - Hysteresis – soft and hard magnetic materials – applications of Ferromagnetic material. Dielectrics: Introduction - Dielectic polarization – Dielectric Polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative) – Lorentz Internal field – Claussius- Mossoti equation - Frequency dependence of polarization – Applications of dielectrics.

G. Ratnakumari

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Mathematics-II	Numerical Methods and Complex Variables
Course Code	171BS2T02	191BS2T10
Syllabus	UNIT I: Solution of Algebraic and Transcendental Equations and Interpolation: Introduction- Bisection method – Method of false position – Iteration method – Newton - Raphson method.Errors in polynomial interpolation – Finite differences- Forward differences- Backward differences –Central differences – Relation between operators - Differences of a polynomial-Newton's formulae for interpolation – Interpolation with unequal intervals - Lagrange's interpolation formula.	UNIT I: Solution of Algebraic and Transcendental Equations: Introduction to Numerical methods, Bisection method, Secant method, Method of false position, Iteration method, Newton - Raphson method.
	UNIT II: Numerical Integration and solution of Ordinary Differential equations: Trapezoidal rule- Simpson's 1/3rd and 3/8th rule-Solution of ordinary differential equations by Taylor's series-Picard's method of successive approximations- Euler's method, Modified Euler's method – Runge - Kutta method (fourth order).	UNIT II: Interpolation: Introduction to Interpolation, Finite differences, Forward differences, Backward differences, Relation between operators, Newton's formula for interpolation, Lagrange's interpolation, Newton's divided difference interpolation.
	UNIT III: Fourier Series: Fourier series of periodic function - Dirichlet's conditions for Fourier expansion - Functions having points of discontinuities–Change of interval – Even and odd functions – Half-range series.	UNIT III: Numerical Integration and solution of Ordinary Differential equations: Trapezoidal rule, Simpson's 1/3rd and 3/8th rule, Solution of ordinary differential equations by Taylor's series, Picard's method of successive approximations, Euler's method, Modified Euler's method, Runge - Kutta method (fourth order).
	UNIT IV: Fourier Transforms: Fourier integral theorem (without proof) – Fourier sine and cosine integrals - sine and cosine transforms – properties – inverse	UNIT - IV: Functions of Complex variables: Introduction, Continuity, Differentiability, Analyticity, Properties of analytic functions, CauchyRiemann equations in Cartesian and

	transforms – Finite Fourier transforms.	polar co-ordinates, Harmonic functions, Milne Thompson method.
	UNIT V: Applications of Partial Differential Equations: Classification of Higher order P.D.E - Method of separation of Variables-Solution of One dimensional Wave equation, Heat equation and two-dimensional Laplace equation.	UNIT V: Complex Integration: Introduction to complex integration, Cauchy's integral theorem, Cauchy integral formula, Liouville's theorem, Taylor's series, Maclaurin's series, Laurent's series (All theorems without proof), Singular point, Types of singularities-Isolated, Essential and Removable singularities, pole of order m, Residues, Cauchy Residue theorem.

Signature of the course coordinator

Signature of the HOD

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Department of Computer Science and Engineering

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Software Testing Methodologies	Software Testing Methodologies
Course Code	R1632054	171CS5E04
Syllabus	**UNIT-I:** **Introduction: Purpose of Testing,** Dichotomies, Model for Testing, Consequences of Bugs,Taxonomy of Bugs. **Flow graphs and Path testing:** Basics Concepts of Path Testing, Predicates, Path Predicates andAchievable Paths, Path Sensitizing, Path Instrumentation, Application of Path Testing.	**UNIT-I:** **Software Testing:** Introduction, Evolution, Myths & Facts, Goals, Psychology, Definition, Model for testing, Effective Vs Exhaustive Software Testing. **Software Testing Terminology and Methodology:** Software Testing Terminology, Software Testing Life Cycle, relate STLC to SDLC, Software Testing Methodology.
	UNIT-II: **Transaction Flow Testing:** Transaction Flows, Transaction Flow Testing Techniques. **Dataflow testing:** Basics of Dataflow Testing, Strategies in Dataflow Testing, Application ofDataflow Testing.	**UNIT-II:** **Verification and Validation**: Verification & Validation Activities, Verification, Verification of Requirements, High level and low level designs, How to verify code, Validation. **Dynamic Testing I:** Black Box testing techniques: Boundary Value Analysis, Equivalence class Testing, State Table based testing, Decision table based testing, Cause-Effect Graphing based testing, Error guessing.
	UNIT-III: **Domain Testing:** Domains and Paths, Nice & Ugly Domains, Domain testing, Domains And Interfaces Testing, Domain and Interface Testing, Domains and Testability. **Paths, Path products and Regular expressions:** Path Products & Path Expression, Reduction Procedure, Applications, Regular Expressions &	**UNIT-III:** **Dynamic Testing II:** White-Box Testing: need, Logic coverage criteria, Basis path testing, Graph matrices, Loop testing, data flow testing, mutation testing. **Static Testing:** Inspections, Structured Walkthroughs, Technical reviews.

	Flow Anomaly Detection.	
	UNIT-IV: **Syntax Testing:** Why, What and How, A Grammar for formats, Test Case Generation, Implementation and Application and Testability Tips. **Logic Based Testing:** Overview, Decision Tables, Path Expressions, KV Charts, and Specifications.	**UNIT-IV:** **Validation activities:** Unit testing, Integration Testing, Function testing, system testing, acceptance testing. **Regression testing:** Progressives Vs regressive testing, Regression testability, Objectives of regression testing, When regression testing done?, Regression testing types, Regression testing techniques.
	UNIT-V: **State, State Graphs and Transition Testing:** State Graphs, Good & Bad State Graphs, State Testing, and Testability Tips. .**Graph Matrices and Application:-** Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm.	**UNIT-V:** **Software Testing Tools:** Introduction to Testing, need for Automated Testing, Taxonomy of Testing tools, Regression and performance Testing tools, Testing management tools, Source code testing tools, How to select a testing tool. Introduction to list of tools like Win runner, Load Runner, Jmeter, About Win Runner, Using Win runner, Mapping the GUI, Recording Test, working with Test, Enhancing Test, Checkpoints, Test Script Language, putting it all together, Running and Debugging Tests, Analyzing Results, Batch Tests, Rapid Test Script Wizard.
	UNIT-VI **Software Testing Tools**: Introduction to Testing, Automated Testing, Concepts of Test Automation, **Introduction to list of tools like Win** runner, Load Runner, Jmeter, About Win Runner ,Using Win runner, Mapping the GUI, Recording Test, Working with Test, Enhancing Test, Checkpoints, Test Script Language, Putting it all together, Running and Debugging Tests, Analyzing Results, Batch Tests, Rapid Test Script Wizard.	

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Program Name : B.Tech. in Information Technology

Syllabus Revision for the Academic Year 2019-2020

S.No	Semester	Course Code	Course Name	% of content revised for the existing year
1	I	191HS1T01	Communicative English	0
2	I	191BS1T01	Differential Equations and Linear Algebra	0
3	I	191BS1T03	Applied Physics	60
4	I	191ES1T01	Programming For Problem Solving Using C	0
5	I	191HS1L01	Communicative English Lab -I	0
6	I	191BS1L03	Applied Physics Lab	0
7	I	191ES1L01	Programming For Problem Solving Using C Lab	0
8	I	191ES1L02	Basic Engineering Workshop	0
9	I	191MC1A01	Environmental Science	0
10	I	191MC1A02	Constitution of India	100
11	II	191BS2T10	Numerical Methods and Complex Variables	40
12	II	191BS2T09	Engineering Chemistry	0
13	II	191ES2T02	Engineering Graphics and Design	0
14	II	191ES2T03	Essential Electrical and Electronics Engineering	100
15	II	191ES2T09	Data Structures through C++	100
16	II	191HS2L02	Communicative English Lab-II	0
17	II	191BS2L04	Engineering Chemistry Lab	0
18	II	191ES2L10	Data Structures Through C++ Lab	100
19	II	191ES2L11	IT Workshop	0
20	II	191PR2P01	Engineering Exploration Project	100
21	III	171BS3T08	Mathematical Foundations of Computer Science	0
22	III	171ES3T23	Digital Logic Design	0
23	III	171CS3T02	Statistics with R Programming	0
24	III	171CS3T03	Object Oriented Programming through C++	0
25	III	171HS3T04	Managerial Economics & Financial Analysis	0
26	III	171CS3T04	Advanced Data Structures	0
27	III	171CS3L01	Object Oriented Programming Lab	0
28	III	171CS3L02	Advanced Data Structures Lab	0
29	III	171HS3A10	Employability Skills – I	0
30	III	171HS3A09	Professional Ethics & Human Values	0
31	IV	171CS4T05	Software Engineering	0
32	IV	171IT4T01	Language Processors	0
33	IV	171CS4T07	Java Programming	0
34	IV	171CS4T08	Database Management Systems	0
35	IV	171HS4T05	Management Science	0
36	IV	171CS4T10	Computer Organization	0

37	IV	171CS4L03	Java Programming Lab	0
38	IV	171CS4L04	Database Management Systems Lab	0
39	IV	171HS4A11	Employability Skills – II	0
40	IV	171HS4A08	IPR & Patents	0
41	V	171IT5T02	Computer Networks	100
42	V	171CS5T12	Python Programming	0
43	V	171IT5T03	Unix and Shell Programming	0
44	V	171CS5T14	Operating Systems	0
45	V	171IT5E01	Artificial Intelligence	100
46	V	171CS5E02	Advanced Computer Architecture	100
47	V	171CS5E03	Computer Graphics	0
48	V	171CS5E04	Software Testing Methodologies	80
49	V	171HS5T06	Employability Skills – III	100
50	V	171IT5L01	Operating Systems and Computer Networks Lab	60
51	V	171CS5L06	Python Programming Lab	0
52	V	171CS5L07	Software Testing Lab	0
53	V	171IT5L02	Unix and Shell Programming Lab	0
54	V	171IT5S01	MOOCs – I	100
55	VI	171IT6T04	Object Oriented Analysis and Design Using UML	0
56	VI	171CS6T16	Web Technologies	0
57	VI	171CS6T17	Data Warehousing and Data Mining	0
58	VI	171CS6E05	Software Quality Assurance	100
59	VI	171IT6E02	Neural Networks	100
60	VI	171CS6E08	Social Networks and Semantic Web	100
61	VI	171IT6E03	Design and Analysis of Algorithms	100
62	VI	171IT6E04	Advanced Computer Networks	100
63	VI	171CS6E10	Parallel Computing	100
64	VI	171IT6E05	Multimedia Programming	100
65	VI	171CS6E12	E – Commerce	100
66	VI	171HS6T07	Employability Skills – IV	100
67	VI	171IT6L03	Unified Modeling Language Lab	100
68	VI	171CS6L10	Data Warehousing and Data Mining Lab	0
69	VI	171CS6L11	Web Technologies Lab	0
70	VI	171IT6S02	MOOCs – II	100
71	VII	R1641051	Cryptography and Network Security	0
72	VII	R164105C	Mobile Computing	0
73	VII	R1641121	Data Ware Housing and Business Intelligence	100
74	VII	R1641054	Managerial Economics and Financial Analysis	0
75	VII	R164105A	Big Data Analytics	100
76	VII	R164105B	Information Retrieval Systems	100
77	VII	R164112A	Internet of Things	100
78	VII	R164112B	Multimedia Programming	100
79	VII	R164105D	Cloud Computing	0
80	VII	R164105E	Software Project Management	0
81	VII	R164112C	Machine Learning	100
82	VII	R164112D	Decision Support System	100
83	VII	R1641127	Mobile Computing Lab	100
84	VII	R1641128	Cryptography and Network Security Lab	100

85	VIII	R1642051	Distributed Systems	0
86	VIII	R1642052	Management Science	0
87	VIII	R1642121	Management Information System	100
88	VIII	R164205A	Concurrent and Parallel Programming	0
89	VIII	R164212A	Cyber Security	100
90	VIII	R164205B	Artificial Neural Networks	100
91	VIII	R164212B	Software Quality Assurance	100
92	VIII	R1642055	Seminar	0
93	VIII	R1642056	Project	0
Total number of courses in the academic year 2019-2020				**= 93**
Number of courses having revision in syllabus content >/= 20% in the academic year 2019-2020				**38**
Percentage of syllabus revision carried out in the academic year 2019-2020 = (49/135)*100				**= 40.86%**

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Department of IT
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19-20

PROGRAM STRUCTURE

I SEMESTER

Course Code	Name of the Course	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	Total Hours	
191HS1T01	Communicative English	HSMC	3	0	0	3	3
191BS1T01	Differential Equations and Linear Algebra	BSC	3	0	0	3	3
191BS1T03	Applied Physics	BSC	3	0	0	3	3
191ES1T01	Programming For Problem Solving Using C	ESC	3	0	0	3	3
191HS1L01	Communicative English Lab -I	HSMC	0	0	3	3	1.5
191BS1L03	Applied Physics Lab	BSC	0	0	3	3	1.5
191ES1L01	Programming For Problem Solving Using C Lab	ESC	0	0	3	3	1.5
191ES1L02	Basic Engineering Workshop	ESC	0	0	3	3	1.5
191MC1A01	Environmental Science	MC	2	0	0	2	0
191MC1A02	Constitution of India	MC	2	0	0	2	0
		TOTAL	**16**	**0**	**12**	**28**	**18**

II SEMESTER

Course Code	Name of the Course	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practice (P)	Total Hours	
191BS2T10	Numerical Methods and Complex Variables	BSC	3	0	0	3	3
191BS2T09	Engineering Chemistry	BSC	3	0	0	3	3
191ES2T02	Engineering Graphics and Design	ESC	1	0	3	4	2.5
191ES2T03	Essential Electrical and Electronics Engineering	ESC	3	0	0	3	3
191ES2T09	Data Structures through C++	ESC	3	0	0	3	3
191HS2L02	Communicative English Lab-II	HSMC	0	0	2	2	1
191BS2L04	Engineering Chemistry Lab	BSC	0	0	3	3	1.5
191ES2L10	Data Structures Through C++ Lab	ESC	0	0	3	3	1.5
191ES2L11	IT Workshop	ESC	0	0	3	3	1.5
191PR2P01	Engineering Exploration Project	PROJ	0	0	2	2	1
		TOTAL	**13**	**0**	**16**	**29**	**21**

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III SEMESTER

Course Code	Course Title	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practical (P)	Total Hours	
171BS3T08	Mathematical Foundations of Computer Science	BS	3	1	---	4	3
171ES3T23	Digital Logic Design	ES	3	1	---	4	3
171CS3T02	Statistics with R Programming	PC	3	---	2	5	3
171CS3T03	Object Oriented Programming through C++	PC	3	1	---	4	3
171HS3T04	Managerial Economics & Financial Analysis	HSS	3	1	---	4	3
171CS3T04	Advanced Data Structures	PC	3	1	---	4	3
171CS3L01	Object Oriented Programming Lab	PC	---	---	3	3	2
171CS3L02	Advanced Data Structures Lab	PC	---	---	3	3	2
171HS3A10	Employability Skills – I	HSS	---	---	2	2	0
171HS3A09	Professional Ethics & Human Values	HSS	2	---	---	2	0
		Total	**20**	**5**	**10**	**35**	**22**

IV SEMESTER

Course Code	Course Title	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practical (P)	Total Hours	
171CS4T05	Software Engineering	PC	3	1	---	4	3
171IT4T01	Language Processors	PC	3	1	---	4	3
171CS4T07	Java Programming	PC	3	1	---	4	3
171CS4T08	Database Management Systems	PC	3	1	---	4	3
171HS4T05	Management Science	HSS	3	1	---	4	3
171CS4T10	Computer Organization	PC	3	1	---	4	3
171CS4L03	Java Programming Lab	PC	---	---	3	3	2
171CS4L04	Database Management Systems Lab	PC	---	---	3	3	2
171HS4A11	Employability Skills – II	HSS	---	---	2	2	0
171HS4A08	IPR & Patents	HSS	2	---	---	2	0
		Total	**20**	**6**	**8**	**34**	**22**

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V SEMESTER

Course Code	Course Title	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practical (P)	Total Hours	
171IT5T02	Computer Networks	PC	3	1	---	4	3
171CS5T12	Python Programming	PC	3	1	---	4	3
171IT5T03	Unix and Shell Programming	PC	3	1	---	4	3
171CS5T14	Operating Systems	PC	3	1	---	4	3
---	**Professional Elective – I**	PE	3	1	---	4	3
171HS5T06	Employability Skills – III	HSS	2	---	---	2	1
171IT5L01	Operating Systems and Computer Networks Lab	PC	---	---	3	3	2
171CS5L06	Python Programming Lab	PC	---	---	3	3	2
171CS5L07	Software Testing Lab	PC	---	---	3	3	2
171IT5L02	Unix and Shell Programming Lab	PC	---	---	3	3	2
171IT5S01	MOOCs – I	SS	---	---	---	0	0
		Total	**17**	**5**	**12**	**34**	**24**

VI SEMESTER

Course Code	Course Title	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practical (P)	Total Hours	
171IT6T04	Object Oriented Analysis and Design Using UML	PC	3	1	---	4	3
171CS6T16	Web Technologies	PC	3	1	---	4	3
171CS6T17	Data Warehousing and Data Mining	PC	3	1	---	4	3
---	**Professional Elective – II**	PE	3	1	---	4	3
---	**Professional Elective – III**	PE	3	1	---	4	3
171HS6T07	Employability Skills – IV	HSS	2	---	---	2	1
171IT6L03	Unified Modeling Language Lab	PC	---	---	3	3	2
171CS6L10	Data Warehousing and Data Mining Lab	PC	---	---	3	3	2
171CS6L11	Web Technologies Lab	PC	---	---	3	3	2
171IT6S02	MOOCs – II	SS	---	---	---	0	0
		Total	**17**	**5**	**9**	**31**	**22**

MOOCs – Massive Open Online Courses

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IV Year - I Semester

S. No.	Subjects	L	T	P	Credits
1	Cryptography and Network Security	4	--	--	3
2	Mobile Computing	4	--	--	3
3	Data Ware Housing and Business Intelligence	4	--	--	3
4- HS	Managerial Economics and Financial Analysis	4	--	--	3
5	**Elective-I** i. Big Data Analytics ii. Information Retrieval Systems iii. Internet of Things iv. Multimedia Programming	4	--	--	3
6	**Elective-II** i. Cloud Computing ii. Software Project Management iii. Machine Learning iv. Decision Support System	4	--	--	3
7	Mobile Computing Lab	--	--	3	2
8	Cryptography and Network Security Lab	--	--	3	2
	Total Credits				**22**

IV Year - II Semester

S. No.	Subjects	L	T	P	Credits
1	Distributed Systems	4	--	--	3
2- HS	Management Science	4	--	--	3
3	Management Information System	4	--	--	3
4	**Elective-III** i. Concurrent and Parallel Programming ii. Cyber Security iii. Artificial Neural Networks iv. Software Quality Assurance	4	--	--	3
5	Seminar	--	3	--	2
6	Project	--	--	--	10
	Total credits				**24**

Total Course Credits = 48+44 + 42 + 46 = 180

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Professional Elective – I (V Semester)

S.No	Course Code	Name of the Course
1	171IT5E01	Artificial Intelligence
2	171CS5E02	Advanced Computer Architecture
3	171CS5E03	Computer Graphics
4	171CS5E04	Software Testing Methodologies

Professional Elective – II (VI Semester)

S.No	Course Code	Name of the Course
1	171CS6E05	Software Quality Assurance
2	171IT6E02	Neural Networks
3	171CS6E08	Social Networks and Semantic Web
4	171IT6E03	Design and Analysis of Algorithms

Professional Elective – III (VI Semester)

S.No	Course Code	Name of the Course
1	171IT6E04	Advanced Computer Networks
2	171CS6E10	Parallel Computing
3	171IT6E05	Multimedia Programming
4	171CS6E12	E - Commerce

Professional Elective – IV (VII Semester)

S.No	Course Code	Name of the Course
1	171CS7E13	Software Project Management
2	171IT7E06	Machine Learning
3	171CS7E15	Image Processing
4	171CS7E16	Cyber Laws

Professional Elective – V (VII Semester)

S.No	Course Code	Name of the Course
1	171CS7E19	Information Retrieval Systems
2	171IT7E07	Human Computer Interaction
3	171IT7E08	Distributed Systems
4	171IT7E09	Decision Support System

Professional Elective – VI (VIII Semester)

S.No	Course Code	Name of the Course
1	171CS8E21	Agile Methodologies
2	171CS8E22	Cyber Security
3	171CS8E23	Distributed Databases
4	171IT8E10	Pattern Recognition

Open Elective (VIII Semester)

S.No	CourseCode	Name of the Course
1	171IT8O01	Management Information System
2	171CS8O01	Microprocessor and Multi Core Systems
3	171CS8O02	Embedded Systems
4	171IT8O02	Computer Vision
5	171EE8O05	Robotics
6	171CS8O04	Operations Research
7	171CS8O05	Optical Communications
8	171EE8O07	Internet of Things
9	171EC8O02	Disaster Management
10	171CS8O07	Nano Technology and its Applications

II Year - I Semester

S. No.	Subjects	L	T	P	Credits
1-HS	Statistics with R Programming	4	--	--	3
2	Mathematical Foundations of Computer Science	4	--	--	3
3	Digital Logic Design	4	--	--	3
4	Python Programming	4	--	--	3
5	Data Structures through C++	4	--	--	3
6	Software Engineering	4	--	--	3
7	Data Structures through C++ Lab	--	--	3	2
8	Python Programming Lab	--	--	3	2
	Total Credits				**22**

II Year - II Semester

S. No.	Subjects	L	T	P	Credits
1	Computer Graphics	4	--	--	3
2	Java Programming	4	--	--	3
3	E-Commerce	4	--	--	3
4	Computer Organization	4	--	--	3
5	Object Oriented Analysis and Design using UML	4	--	--	3
6	Principles of Programming Languages	4	--	--	3
7	Unified Modeling Languages Lab	--	--	3	2
8	Java Programming Lab	--	--	3	2
	Total Credits				**22**

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STRUCTURE OF THE CURRICULUM

I SEMESTER

Course Code	Course Title	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practical (P)	Total Hours	
171HS1T01	English – I	HSS	3	1	---	4	3
171BS1T01	Mathematics – I	BS	3	1	2	6	3
171BS1T02	Mathematics – II	BS	3	1	---	4	3
171BS1T04	Applied Physics	BS	3	1	---	4	3
171ES1T03	Engineering Drawing	ES	3	1	---	4	3
171ES1T01	Computer Programming	ES	3	1	---	4	3
171HS1L01	English Communication Skills Lab – I	HSS	---	---	3	3	2
171BS1L04	Applied Physics Lab	BS	---	---	3	3	2
171ES1L01	Computer Programming Lab	ES	---	---	3	3	2
		Total	**18**	**6**	**11**	**35**	**24**

II SEMESTER

Course Code	Course Title	Course Component	Total Number of contact hours				Credits (C)
			Lecture (L)	Tutorial (T)	Practical (P)	Total Hours	
171HS2T03	English – II	HSS	3	1	---	4	3
171BS2T06	Mathematics – III	BS	3	1	2	6	3
171HS2T02	Environmental Studies	HSS	2	1	---	3	2
171BS2T05	Applied Chemistry	BS	3	1	---	4	3
171ES2T02	Engineering Mechanics	ES	3	1	---	4	3
171CS2T01	Data Structures through C	PC	3	1	2	6	3
171HS2L02	English Communication Skills Lab – II	HSS	---	---	3	3	2
171BS2L03	Applied Chemistry Lab	BS	---	---	3	3	2
171ES2L02	Engineering Workshop & IT Workshop	ES	---	---	3	3	2
		Total	**17**	**6**	**13**	**36**	**23**

BS: Basic Sciences; HSS: Humanities and Social Sciences; ES: Engineering Sciences; PC: Professional Core; PE: Professional Elective; OE: Open Elective; SS: Self Study Course; PR: Project.

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APPLIED PHYSICS

(Common to EEE& IT)

II Semester **L T P C**
Course Code: 191BS2T07 **3 0 0 3**

Course Outcomes:
At the end of the Course, Student will be able to:

CO 1: Apply the principles of interference and diffraction to design and enhance the resolving power of various optical instruments.
CO 2: Explain the fundamental concepts of Quantum behaviour of matter.
CO 3: Classify the solids based on energy band structure.
CO 4: Explain the basic concepts of Semi-Conductors and Identify the type of semiconductors using Hall Effect.
CO 5: Explain about magnetic and dielectric properties of different materials.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	2	1	-	-	-	-	-	-	-	-	-	-
CO3	2	1	-	-	-	-	-	-	-	-	-	-
CO4	2	1	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO / PSO	PSO 1	PSO 2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

UNIT-I

Wave Optics: Principle of Superposition - Interference of light - Conditions for sustained Interference - Interference in thin films (reflected geometry) - Newton's Rings (reflected geometry).
Diffraction - Fraunhofer Diffraction - Diffraction due to Single slit (quantitative), Double slit, N -slits and circular aperture (qualitative) – Intensity distribution curves - Diffraction Grating – Grating spectrum – missing order– resolving power – Rayleigh's criterion – Resolving powers of Microscope, Telescope and grating (qualitative).

UNIT-II

Quantum Mechanics: Introduction – Matter waves – de Broglie's hypothesis – Davisson-Germer experiment – G.P.Thomson experiment – Heisenberg's Uncertainity Principle –interpretation of wave function – Schröedinger Time Independent and Time Dependent wave equations – Particle in a potential box.

UNIT-III

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Free Electron Theory: Introduction – Classical free electron theory (merits and demerits only) - Quantum Free electron theory – electrical conductivity based on quantum free electron theory – Fermi Dirac distribution function – Temperature dependence of Fermi-Dirac distribution function - expression for Fermi energy -Density of states .
BAND THEORY OF SOLIDS Bloch's theorem (qualitative) – Kronig-Penney model(qualitative) – energy bands in crystalline solids – E Vs K diagram – classification of crystalline solids – effective mass of electron – m^* Vs K diagram - concept of hole.

UNIT-IV
Semiconductor Physics: Introduction– Intrinsic semi-conductors - density of charge carriers - Electrical conductivity – Fermi level – extrinsic semiconductors - p-type & n-type - Density of charge carriers - Dependence of Fermi energy on carrier concentration and temperature – Hall effect- Hall coefficient - Applications of Hall effect - Drift and Diffusion currents – Einstein's equation.

UNIT-V
Magnetism: Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr magneton – Classification of magnetic materials: Dia, para & Ferro – Domain concept of Ferromagnetism - Hysteresis – soft and hard magnetic materials – applications of Ferromagnetic material.
Dielectrics: Introduction - Dielectic polarization – Dielectric Polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative) – Lorentz Internal field – Claussius-Mossoti equation - Frequency dependence of polarization – Applications of dielectrics.

Text Books:

1. " A Text book of Engineering Physics" by M.N. Avadhanulu, P.G.Kshirsagar – S.Chand Publications, 2017.
2. "Engineering Physics" by D.K.Bhattacharya and Poonam Tandon, Oxford press (2015).
3. "Engineering Physics" by R.K Gaur. and S.L Gupta., - Dhanpat Rai publishers, 2012.

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SOFTWARE TESTING METHODOLOGIES

(Professional Elective – I)
(Common to CSE & IT)

VSemester	**L**	**T**	**P**	**C**
Course Code:171CS5E04	**3**	**1**	**0**	**3**

Course Outcomes: At the end of the Course, Student will be able to:

CO1: Explain the fundamentals of software testing.
CO2: Compare SDLC with STLC.
CO3: Summarize verification and validation activities.
CO4: Design the test cases using different testing strategies.
CO5: Outline the importance of static testing and various levels of software testing.
CO6: Discuss about various Automation Testing tools.

Mapping of Course Outcomes with Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	-	-	-	-	-	-	-	-	-	-
CO2	1	3	-	-	-	-	-	-	-	-	-	-
CO3	2	2	-	-	-	-	-	-	-	-	-	-
CO4	2	-	3	-	-	-	-	-	-	-	-	-
CO5	2	2	-	-	-	-	-	-	-	-	-	-
CO6	1	2	-	-	3	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes:

CO/PSO	PSO1	PSO2
CO1	2	-
CO2	1	-
CO3	2	-
CO4	1	-
CO5	1	-
CO6	1	-

Unit – I

Software Testing: Introduction, Evolution, Myths & Facts, Goals, Psychology, Definition, Model for testing, Effective Vs Exhaustive Software Testing.

Software Testing Terminology and Methodology: Software Testing Terminology, Software Testing Life Cycle, relate STLC to SDLC, Software Testing Methodology.

Unit – II

Verification and Validation: Verification & Validation Activities, Verification, Verification of Requirements, High level and low level designs, How to verify code, Validation.

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Dynamic Testing I: Black Box testing techniques: Boundary Value Analysis, Equivalence class Testing, State Table based testing, Decision table based testing, Cause-Effect Graphing based testing, Error guessing.

Unit – III

Dynamic Testing II: White-Box Testing: need, Logic coverage criteria, Basis path testing, Graph matrices, Loop testing, data flow testing, mutation testing.

Static Testing: Inspections, Structured Walkthroughs, Technical reviews.

Unit – IV

Validation activities: Unit testing, Integration Testing, Function testing, system testing, acceptance testing.

Regression testing: Progressives Vs regressive testing, Regression testability, Objectives of regression testing, When regression testing done?, Regression testing types, Regression testing techniques.

Unit – V

Software Testing Tools: Introduction to Testing, need for Automated Testing, Taxonomy of Testing tools, Regression and performance Testing tools, Testing management tools, Source code testing tools, How to select a testing tool. Introduction to list of tools like Win runner, Load Runner, Jmeter, About Win Runner, Using Win runner, Mapping the GUI, Recording Test, working with Test, Enhancing Test, Checkpoints, Test Script Language, putting it all together, Running and Debugging Tests, Analyzing Results, Batch Tests, Rapid Test Script Wizard.

Text Books:

1. Software Testing, Principles and Practices, Naresh Chauhan, 2nd Edition, Oxford.
2. Software Testing Tools, Dr. K V K K Prasad, Dreamtech press.

Reference Books:

1. Software Testing- Yogesh Singh, Camebridge.
2. Software Testing, Principles, techniques and Tools, M G Limaye, TMH 3.
3. Effective Methods for Software testing, Willian E Perry, Wiley.
4. The Art of Software Testing, Glenford J.Myers, Tom Badgett, Corey Sandler,John Wiley & Sons publication.
5. Software testing, Ron Patton, Pearson education.

Web Links:

1. https://www.guru99.com/software-testing-lifecycle
2. http://www.softwaretestinghelp.com/what-is-verification-and-validation/
3. http://nptel.ac.in/courses/106105150/
4. http://www.cigniti.com/blog/top-3-regression-testing-types-how-to-execute
5. https://www.utest.com/search-result/tag/Tools

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NUMERICAL METHODS AND COMPLEX VARIABLES

(Common to CSE & IT)

II Semester **L T P C**

Course Code: 191BS2T10 **3 0 0 3**

Course Outcomes:

At the end of the Course, Student will be able to:

CO 1: Apply numerical methods to obtain approximate solution of equations.

CO 2: Apply various numerical methods to interpolate polynomials.

CO 3: Apply numerical methods to initial value problems and problems involvingintegration.

CO 4: Identify the analyticity of functions of complex variables.

CO 5: Apply Cauchy's theorem, Cauchy's integral formula and Cauchy's residue theorem.

Mapping of Course Outcomes with Program Outcomes

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes

CO /PO	PSO1	PSO2
CO1	-	-
CO2	-	-
CO3	-	-
CO4	-	-
CO5	-	-

UNIT I:

Solution of Algebraic and Transcendental Equations:

Introduction to Numerical methods, Bisection method, Secant method, Method of false position, Iteration method, Newton - Raphson method.

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UNIT II:
Interpolation:

Introduction to Interpolation, Finite differences, Forward differences, Backward differences, Relation between operators, Newton's formula for interpolation, Lagrange's interpolation, Newton's divided difference interpolation.

UNIT III:
Numerical Integration and solution of Ordinary Differential equations:

Trapezoidal rule, Simpson's 1/3rd and 3/8th rule, Solution of ordinary differential equations by Taylor's series, Picard's method of successive approximations, Euler's method, Modified Euler's method, Runge - Kutta method (fourth order).

UNIT - IV:
Functions of Complex variables:

Introduction, Continuity, Differentiability, Analyticity, Properties of analytic functions, Cauchy-Riemann equations in Cartesian and polar co-ordinates, Harmonic functions, Milne Thompson method.

UNIT V:
Complex Integration:

Introduction to complex integration, Cauchy's integral theorem, Cauchy integral formula, Liouville's theorem, Taylor's series, Maclaurin's series, Laurent's series (All theorems without proof), Singular point, Types of singularities-Isolated, Essential and Removable singularities, pole of order m, Residues, Cauchy Residue theorem.

Text Books:

1. Advanced Engineering Mathematics, R.K.Jain, S.R.K.Iyenkar, Alpha Science Publications.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India.
3. B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, KhannaPublishers.
4. P.Sivaramakrishna Das, C.Vijayakumari, Engineering Mathematics, Pearson Publications.

Reference Books:

1. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRCPress.
2. Dass H.K., Rajnish Verma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd,Delhi.
3. Higher engineering mathematics by John Bird, 5th edition Elsevier Limited,2006.

Web Links:

1. https://nptel.ac.in/courses/111107108/25
2. https://nptel.ac.in/courses/111103021/
3. https://nptel.ac.in/courses/111107105/
4. http://mathworld.wolfram.com
5. https://www.khanacademy.org

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OPERATING SYSTEMS AND COMPUTER NETWORKS LAB

Common to CSE & IT

V Semester
Course Code:191CS5L04

L	T	P	C
0	0	3	1.5

Course Outcomes:

At the end of the Course, Student will be able to:

CO1: Summarize various process scheduling algorithms.
CO2: Experiment with various system calls.
CO3: Develop algorithm to implement deadlocks avoidance and memory management algorithms.
CO4: Summarize various Framing methods.
CO5: Make use of various routing algorithms for effective data transmission.

Mapping of Course Outcomes with Program Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	3	2	-	-	-	-	-	-	-	-	-
CO2	3	2	2	-	-	-	-	-	-	-	-	-
CO3	2	2	3	-	-	-	-	-	-	-	-	-
CO4	1	3	2	-	-	-	-	-	-	-	-	-
CO5	2	1	3	-	-	-	-	-	-	-	-	-

Mapping of Course Outcomes with Program Specific Outcomes:

	PSO1	PSO2
CO1	2	-
CO2	2	-
CO3	3	-
CO4	2	-
CO5	2	-

List of Experiments:
OPERATING SYSTEMS LAB

1) CPU Scheduling Algorithms
1.1) Simulate the FCFSCPU scheduling algorithm.
1.2) Simulate the SJFCPU scheduling algorithm.
1.3) Simulate the Priority CPU scheduling algorithm.
1.4) Simulate the Round Robin CPU scheduling algorithm.

2) System calls
2.1) Implementation of fork (), wait(), exec(),and exit(), System calls.
2.2) Implementation of cp command with the use of open(),read(), write () system calls.

3) Deadlock Avoidance
3.1) Simulate Bankers Algorithm for Dead Lock Avoidance.

4) Page Replacement Algorithms
4.1) Simulate the FIFO page replacement algorithm.
4.2) Simulate the LRU page replacement algorithm.
4.3) Simulate the LFU page replacement algorithm.

5) Multiprogramming
5.1) Simulate the Multiprogramming with affixed number of tasks (MFT).
5.2) Simulate the Multiprogramming with a variable number of tasks (MVT).

6) File Allocation
6.1) Simulate the Sequenced File allocation strategies.
6.2) Simulate the Indexed File allocation strategies.
6.3) Simulate the Linked File allocation strategies.

COMPUTER NETWORKS LAB
7) Framing Method
7.1) Implement data link layer framing method of Character Stuffing.
7.2) Implement data link layer framing method of Bit stuffing

8) Cyclic Redundancy Check
8.1) Implement CRC12.
8.2) Implement CRC16.
8.3) Implement CRC CCIT.

9) Implement Dijkstra's algorithm to compute the shortest path through a graph

10) Implement distance vector routing algorithm

11) Implement subnet of hosts to obtain Broadcasting

12) Implement Sliding Window Protocol for Go – BackN.

List of Augmented Experiments: (Weeks 13 – Week 16)
(Any two of the following experiments can be performed)
13) Simulate Best-Fit contiguous memory allocation technique.
14) Simulate FCFS Disk Scheduling algorithm.
15) Implementation of link state routing algorithm.
16) Implement Sliding Window Protocol for Selective Repeat.

Reference Books:
1. Operating Systems: Design and Implementation, Andrew S.Tanenbaum, Albert S.Woodhu, 2nd Edition,.
2. Instructors Manual to Accompany Operating.
3. A Practical Guide to Computer Network & Internet Technologies, Babu Ram Dawadi Institute of Engineering, Pulchowk Campus, Tribhuvan University.

Web Links:
1. https://www.coursera.org/learn/fundamentals-network-communications.
2. http://www.indiastudychannel.com/resources/150255-Computer-Networks-Lab-Programs - for-BTech-Computer-Science-and-Engineering-CSE.aspx
3. http://www.askforprogram.in/p/computer-ne.htm

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Department of Information Technology

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Applied Physics	Applied Physics
Course Code	171BS1T04	191BS1T03
Syllabus	**UNIT-I:** Interference: Principle of Superposition – Coherence– Interference in thin films (reflection geometry) – Newton's rings – construction and working principle of Interferometer	**UNIT-I:** **Wave Optics:** Principle of Superposition - Interference of light - Conditions for sustained Interference - Interference in thin films (reflected geometry) - Newton's Rings (reflected geometry). Diffraction - Fraunhofer Diffraction - Diffraction due to Single slit (quantitative), Double slit, N -slits and circular aperture (qualitative) – Intensity distribution curves - Diffraction Grating – Grating spectrum – missing order – resolving power – Rayleigh's criterion – Resolving powers of Microscope, Telescope and grating.
	UNIT-II: **Diffraction:** Fraunhofer diffraction at single slit – Cases of double slit, N-slits, & circular aperture, Grating equation – Rayleigh criterion of resolving power-Resolving power of a grating, Telescope and Microscopes	**UNIT-II:** **Quantum Mechanics:** Introduction – Matter waves – de Broglie's hypothesis – Davisson- Germer experiment – G.P.Thomson experiment – Heisenberg's Uncertainity Principle – interpretation of wave function – Schröedinger Time Independent and Time Dependent wave equations – Particle in a potential box.
	UNIT-III: Polarization: Types of Polarization – Methods of production – Nicol Prism –Quarter wave plate and Half Wave plate- working principle of polarimeter (Sacharimeter). LASERS: Characteristics– Stimulated emission – Einstein's Transition	**UNIT-III:** **Free Electron Theory:** Introduction – Classical free electron theory (merits and demerits only) - Quantum Free electron theory – electrical conductivity based on quantum free electron theory – Fermi Dirac distribution function – Temperature dependence of Fermi-

	Probabilities- Pumping schemes- Ruby laser – Helium Neon laser-CO2 Laser-Applications	Dirac distribution function - expression for Fermi energy -Density of states . **BAND THEORY OF SOLIDS** Bloch's theorem (qualitative) – Kronig-Penney model(qualitative) – energy bands in crystalline solids – E Vs K diagram – classification of crystalline solids – effective mass of electron – m* Vs K diagram - concept of hole.
	UNIT-IV: **Quantum Mechanics**: Introduction – Matter waves – Schrödinger Time Independent and Time Dependent wave equations – Particle in a box. FREE ELECTRON THEORY: Defects of classical free electron theory –Quantum Free electron theory – concept of Fermi Energy.	**UNIT-IV:** **Semiconductor Physics:** Introduction – Intrinsic semi conductors - density of charge carriers Electrical conductivity – Fermi level – extrinsic semiconductors - p-type & n-type - Density of charge carriers - Dependence of Fermi energy on carrier concentration and temperature – Hall effect- Hall coefficient - Applications of Hall effect - Drift and Diffusion currents – Einstein's equation.
	UNIT-V: (Qualitative) – energy bandsin crystalline solids – classification of crystalline solids– effective mass of electron & concept of hole. **Semiconductor Physics**: Conduction – Density of carriers in Intrinsic and Extrinsic semiconductors – Drift & Diffusion – relevance of Einstein's equation- Hall effect in semiconductors.	**UNIT-V:** **Magnetism:** Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr magneton – Classification of magnetic materials: Dia, para & Ferro – Domain concept of Ferromagnetism Hysteresis – soft and hard magnetic materials – applications of Ferromagnetic material. **Dielectrics:** Introduction - Dielectic polarization – Dielectric Polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative) – Lorentz Internal field – Claussius-Mossoti equation Frequency dependence of polarization Applications of dielectrics.

Signature of the Course Coordinator

Signature of the HOD

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Department of Information Technology

1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Software Testing Methodologies	Software Testing Methodologies
Course Code	R1632054	171CS5E04
Syllabus	**UNIT-I:** **Introduction:** Purpose of Testing, Dichotomies, Model for Testing, Consequences of Bugs,Taxonomy of Bugs. **Flow graphs and Path testing:** Basics Concepts of Path Testing, Predicates, Path Predicates andAchievable Paths, Path Sensitizing, Path Instrumentation, Application of Path Testing.	**UNIT-I:** **Software Testing:** Introduction, Evolution, Myths & Facts, Goals, Psychology, Definition, Model for testing, Effective Vs Exhaustive Software Testing. **Software Testing Terminology and Methodology:** Software Testing Terminology, Software Testing Life Cycle, relate STLC to SDLC, Software Testing Methodology.
	UNIT-II: **Transaction Flow Testing:** Transaction Flows, Transaction Flow Testing Techniques. **Dataflow testing:** Basics of Dataflow Testing, Strategies in Dataflow Testing, Application ofDataflow Testing.	**UNIT-II:** **Verification and Validation:** Verification & Validation Activities, Verification, Verification of Requirements, High level and low level designs, How to verify code, Validation. **Dynamic Testing I:** Black Box testing techniques: Boundary Value Analysis, Equivalence class Testing, State Table based testing, Decision table based testing, Cause-Effect Graphing based testing, Error guessing.
	UNIT-III: **Domain Testing:** Domains and Paths, Nice & Ugly Domains, Domain testing, Domains And Interfaces Testing, Domain and Interface Testing, Domains and Testability. **Paths, Path products and Regular expressions:** Path Products & Path Expression, Reduction Procedure, Applications, Regular Expressions &	**UNIT-III:** **Dynamic Testing II:** White-Box Testing: need, Logic coverage criteria, Basis path testing, Graph matrices, Loop testing, data flow testing, mutation testing. **Static Testing:** Inspections, Structured Walkthroughs, Technical reviews.

	Flow Anomaly Detection.	
	UNIT-IV: **Syntax Testing:** Why, What and How, A Grammar for formats, Test Case Generation, Implementation and Application and Testability Tips. **Logic Based Testing:** Overview, Decision Tables, Path Expressions, KV Charts, and Specifications.	**UNIT-IV:** **Validation activities:** Unit testing, Integration Testing, Function testing, system testing, acceptance testing. **Regression testing:** Progressives Vs regressive testing, Regression testability, Objectives of regression testing, When regression testing done?, Regression testing types, Regression testing techniques.
	UNIT-V: **State, State Graphs and Transition Testing:** State Graphs, Good & Bad State Graphs, State Testing, and Testability Tips. .**Graph Matrices and Application:-** Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm.	**UNIT-V:** **Software Testing Tools:** Introduction to Testing, need for Automated Testing, Taxonomy of Testing tools, Regression and performance Testing tools, Testing management tools, Source code testing tools, How to select a testing tool. Introduction to list of tools like Win runner, Load Runner, Jmeter, About Win Runner, Using Win runner, Mapping the GUI, Recording Test, working with Test, Enhancing Test,Checkpoints, Test Script Language, putting it all together, Running and Debugging Tests, Analyzing Results, Batch Tests, Rapid Test Script Wizard.
	UNIT-VI **Software Testing Tools**: Introduction to Testing, Automated Testing, Concepts of Test Automation, Introduction to list of tools like Win runner, Load Runner, Jmeter, About Win Runner ,Using Win runner, Mapping the GUI, Recording Test, Working with Test, Enhancing Test, Checkpoints, Test Script Language, Putting it all together, Running and Debugging Tests, Analyzing Results, Batch Tests, Rapid Test Script Wizard.	

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Operating Systems and Computer Networks Lab	Operating Systems and Computer Networks Lab
Course Code	161IT5L01	171IT5L01
Syllabus	**UNIT-I:** 1) CPU schedulingalgorithms 1.1) Simulate the FCFS CPU scheduling algorithm. 1.2) Simulate the SJF CPU schedulingalgorithm. 1.3) Simulate the Priority CPU schedulingalgorithm. 1.4) Simulate the Round Robin CPU schedulingalgorithm.	**UNIT-I:** 1) CPU Scheduling Algorithms 1.1) Simulate the FCFSCPU scheduling algorithm. 1.2) Simulate the SJFCPU scheduling algorithm. 1.3) Simulate the Priority CPU scheduling algorithm. 1.4) Simulate the Round Robin CPU scheduling algorithm
	UNIT-II: System calls 2.1) Implementation of fork (), wait (), exec(), and exit (), Systemcalls. 2.2) Implementation of cp command with the use of open(), read(), write() systemcalls. 2.3) Simulate Bankers Algorithm for Dead LockAvoidance	**UNIT-II:** 2) System calls 2.1) Implementation of fork (), wait(), exec(),and exit(), System calls. 2.2) Implementation of cp command with the use of open(),read(), write () system calls.
	UNIT-III: 3) Page ReplacementAlgorithms 3.1) Simulate the FIFO page replacement algorithm. 3.2) Simulate the LRU page replacement algorithm. 3.3) Simulate the LFU page replacement algorithm.	**UNIT-III:** 3) Deadlock Avoidance 3.1) Simulate Bankers Algorithm for Dead Lock Avoidance
	UNIT-IV: 4) Multiprogramming 4.1) Simulate the Multiprogramming with a fixed number of tasks (MFT). 4.2) Simulate the Multiprogramming with a variable number of tasks (MVT).	**UNIT-IV:** 4) Page Replacement Algorithms 4.1) Simulate the FIFO page replacement algorithm. 4.2) Simulate the LRU page replacement algorithm. 4.3) Simulate the LFU page replacement algorithm.
	UNIT-V: 5) FileAllocation 5.1) Simulate the Sequenced File allocation strategies. 5.2) Simulate the Indexed File allocation strategies. 5.3) Simulate the Linked File allocation strategies.	**UNIT-V:** 5) Multiprogramming 5.1) Simulate the Multiprogramming with affixed number of tasks (MFT). 5.2) Simulate the Multiprogramming with a variable number of tasks (MVT).
	6) Data Link LayerFraming 6.1) Implement data link layer framing method of Character stuffing 6.2) Implement data	6) File Allocation 6.1) Simulate the Sequenced File allocation strategies. 6.2) Simulate the Indexed File allocation

	link layer framing method of Bit stuffing	strategies. 6.3) Simulate the Linked File allocation strategies.
	7) ErrorDetection 7.1) On a data set of characters, implement CRC12 7.2) On a data set of characters, implement CRC16 7.3) On a data set of characters, implement CRCCCIP	7) Framing Method 7.1) Implement data link layer framing method of Character Stuffing. 7.2) Implement data link layer framing method of Bit stuffing
	8) Implement Dijkstra's algorithm to compute the shortest path through agraph	8) Cyclic Redundancy Check 8.1) Implement CRC12. 8.2) Implement CRC16. 8.3) Implement CRC CCIT.
	9) On a weighted subnet graph, obtain routing table at each node using distance vector routingalgorithm	9) Implement Dijkstra's algorithm to compute the shortest path through a graph
	10)On a subnet of hosts, obtain broadcasttree.	10) Implement distance vector routing algorithm
	11)Generate the Subnet Address for the given IP Address	11) Implement subnet of hosts to obtain Broadcasting
		12) Implement Sliding Window Protocol for Go – BackN

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1.1.2. Table-Prior/Post revision of syllabus

Regulation	Pre-Revision	Post-Revision
Course Title	Numerical methods and complex variables	Numerical methods and complex variables
Course Code	171BS2T10	191BS2T10
Syllabus	**UNIT-I:** Introduction to Information Storage and Retrieval System: Introduction, Domain Analysis of IR systems and other types of Information Systems, IR System Evaluation. Introduction to Data Structures and Algorithms related to Information Retrieval: Basic Concepts, Data structures, Algorithms	**UNIT-I:** Introduction to Information Storage and Retrieval System: Introduction, Domain Analysis of IR systems and other types of Information Systems, IR System Evaluation. Introduction to Data Structures and Algorithms related to Information Retrieval: Basic Concepts, Data structures, Algorithms
	UNIT-II: Inverted files: Introduction, Structures used in Inverted Files, Building Inverted file using a sorted array, Modifications to Basic Techniques.	**UNIT-II:** Inverted files: Introduction, Structures used in Inverted Files, Building Inverted file using a sorted array, Modifications to Basic Techniques.
	UNIT-III: Signature Files: Introduction, Concepts of Signature Files, Compression, Vertical Partitioning, Horizontal Partitioning.	**UNIT-III:** Signature Files: Introduction, Concepts of Signature Files, Compression, Vertical Partitioning, Horizontal Partitioning.
	UNIT-IV: New Indices for Text: PAT Trees and PAT Arrays: Introduction, PAT Tree structure, algorithms on the PAT Trees, Building PAT trees as PATRICA Trees, PAT representation as arrays.	**UNIT-IV:** New Indices for Text: PAT Trees and PAT Arrays: Introduction, PAT Tree structure, algorithms on the PAT Trees, Building PAT trees as PATRICA Trees, PAT representation as arrays.
	UNIT-V: Stemming Algorithms: Introduction, Types of Stemming Algorithms, Experimental Evaluations of Stemming to Compress Inverted Files	**UNIT-V:** Stemming Algorithms: Introduction, Types of Stemming Algorithms, Experimental Evaluations of Stemming to Compress Inverted Files
	UNIT-VI: Thesaurus Construction: Introduction, Features of Thesauri, Thesaurus Construction, Thesaurus	**UNIT-VI:** Thesaurus Construction: Introduction, Features of Thesauri, Thesaurus Construction, Thesaurus

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Regulation	Pre-Revision	Post-Revision
Course Title	Numerical methods and complex variables	Numerical methods and complex variables
Course Code	171BS2T10	191BS2T10
Syllabus	**UNIT-I:** Introduction to Information Storage and Retrieval System: Introduction, Domain Analysis of IR systems and other types of Information Systems, IR System Evaluation. Introduction to Data Structures and Algorithms related to Information Retrieval: Basic Concepts, Data structures, Algorithms	**UNIT-I:** Introduction to Information Storage and Retrieval System: Introduction, Domain Analysis of IR systems and other types of Information Systems, IR System Evaluation. Introduction to Data Structures and Algorithms related to Information Retrieval: Basic Concepts, Data structures, Algorithms
	UNIT-II: Inverted files: Introduction, Structures used in Inverted Files, Building Inverted file using a sorted array, Modifications to Basic Techniques.	**UNIT-II:** Inverted files: Introduction, Structures used in Inverted Files, Building Inverted file using a sorted array, Modifications to Basic Techniques.
	UNIT-III: Signature Files: Introduction, Concepts of Signature Files, Compression, Vertical Partitioning, Horizontal Partitioning.	**UNIT-III:** Signature Files: Introduction, Concepts of Signature Files, Compression, Vertical Partitioning, Horizontal Partitioning.
	UNIT-IV: New Indices for Text: PAT Trees and PAT Arrays: Introduction, PAT Tree structure, algorithms on the PAT Trees, Building PAT trees as PATRICA Trees, PAT representation as arrays.	**UNIT-IV:** New Indices for Text: PAT Trees and PAT Arrays: Introduction, PAT Tree structure, algorithms on the PAT Trees, Building PAT trees as PATRICA Trees, PAT representation as arrays.
	UNIT-V: Stemming Algorithms: Introduction, Types of Stemming Algorithms, Experimental Evaluations of Stemming to Compress Inverted Files	**UNIT-V:** Stemming Algorithms: Introduction, Types of Stemming Algorithms, Experimental Evaluations of Stemming to Compress Inverted Files
	UNIT-VI: Thesaurus Construction: Introduction, Features of Thesauri, Thesaurus Construction, Thesaurus	**UNIT-VI:** Thesaurus Construction: Introduction, Features of Thesauri, Thesaurus Construction, Thesaurus

	construction from Texts, Merging existing Thesauri	construction from Texts, Merging existing Thesauri

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