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

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Department of Mining Engineering

B.Tech - AR20 - Course Articulation Matrix

Note: Enter Correlation Levels 1 or 2 or 3. Where 1- Slight(Low), 2 - Moderate(Medium), 3 - Substantial (High).

	CO Statements	POs												PSOs		
I SEM																
Course Code	**201HS1T01-Communicative English**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	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.	-	-	-	-	-	-	**1**	-	-	**3**	-	-	-	-	-
CO2	Explain about world's most precious natural resources	-	-	-	-	-	-	**1**	-	-	**3**	-	-	-	-	-
CO3	Explain about importance of unity to aboilish war.	-	-	-	-	-	-	-	-	-	**3**	-	-	-	-	-
CO4	Respond well to the changing situations in life with independent knowledge for better decision making.	-	-	-	-	-	-	-	-	**2**	**3**	-	**2**	-	-	-
CO5	Demonstrate writing and concepts of effective writing skills.	-	**2**	-	-	-	-	-	-	**1**	**3**	-	-	-	-	-
Course Code	**201BS1T01-Differential equations and Linear algebra**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Apply the concepts of Mean Value theorem, Partial Differentiation and identify the maxima and minima of a given function.	**3**	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	Solve the linear differential equations and model various situations involving differential equations of first order.	**3**	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-

	CO Statements	POs												PSOs		
CO3	Solve linear differential equations of higher order and model various situations involving second order differential equations.	**3**	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	Calculate Rank of a matrix and solve the system of Linear equations and find the Eigen values and Eigen vectors.	**3**	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	Compute various powers of a matrix and identify the nature of the quadratic form.	**3**	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-
Course Code	**201BS1T02-Engineering Physics**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Explain the basic concepts of crystal structure and X-ray diffraction Techniques.	**2**	**1**	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	Apply the knowledge of acoustics to improve acoustic quality of concert halls and understand the concepts of flaw detection techniques using ultrasonics	**3**	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	Apply the structure-property relationship exhibited by solid materials within the elastic limit.	**3**	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	Explain the basic concepts of LASERs along with its Engineering applications and familiarize with types of sensors for various engineering applications	**2**	**1**	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	Explain about magnetic and dielectric properties of different materials	**3**	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-
Course Code	**201ES1T03-Essential Electrical and Electronics Engineering**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Construct simple electrical circuits using basic laws.	**3**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	Explain the constructional features of DC Machines and working	**2**	**1**	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	Examine the performance of single-phase transformer.	**3**	**2**	**2**	-	-	-	-	-	-	-	-	-	-	-	-
CO4	Illustrate the principle of AC rotating machines.	**3**	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	CO Statements	POs												PSOs		
CO5	Analyze the device structure, operation and application of Diode and Transistor.	**3**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Course Code	**201ES1T05-Engineering Graphics**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Sketch the polygons, conics and scales by using the principles of drawing	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO2	Draw Orthographic projections of points and lines..	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO3	Draw Orthographic projections of planes in various positions	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO4	Draw Orthographic projections of solids in various positions.	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO5	Construct isometric scale and isometric projections	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Course Code	**201HS1L01-Communicative English Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Make use of the concepts to communicate confidently and competently in English Language in all spheres	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**3**	**-**	**1**	**-**	**-**	**-**
CO2	Express Creative skills to construct Dialogues / Conversations in Spoken and Written forms.	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**3**	**-**	**2**	**-**	**-**	**-**
CO3	Identify Accent for intelligibility.	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**3**	**-**	**2**	**-**	**-**	**-**
CO4	Demonstrate communicative ability in everyday Conversation, JAM Sessions and Public Speaking.	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**3**	**-**	**1**	**-**	**-**	**-**
CO5	Demonstrate nuances of Language through Audio – Visual Experience and group activities.	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**3**	**-**	**1**	**-**	**-**	**-**
Course Code	**201BS1L01-Engineering Physics Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Determine the rigidity and young's modulus to understand material properties	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO2	Determine Acceleration due to Gravity and Radius of Gyration and spring constant by oscillatory mechanics	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

	CO Statements	POs												PSOs		
CO3	Find the strength of the magnetic field	**2**	**1**	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	Determine wavelength of unknown source, particle size using lasers.	**3**	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	Determination of velocity of sound, moment of inertia	**3**	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-
Course Code	**201ES1L03-Essential Electrical and Electronics Engineering Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Analyze the electrical networks using network theorems	**3**	**2**	**1**	**1**	-	-	-	-	-	-	-	-	-	-	-
CO2	Analyze the performance of AC and DC Machines.	**3**	**1**	**2**	-	-	-	-	-	-	-	-	-	-	-	-
CO3	Estimate the performance of 1-phase transformer.	**3**	**2**	**1**	**1**	-	-	-	-	-	-	-	-	-	-	-
CO4	Explain diode characteristics and its applications	**2**	**1**	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	Explain the simulation of diode and transistor.	**2**	**1**	-	-	-	-	-	-	-	-	-	-	-	-	-
Course Code	**201MC1T01-Environmental Science**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Identify the need for protecting the producers and consumers in various ecosystems and their role in the food web.	-	-	-	-	-	-	**2**	-	-	-	-	-	-	-	-
CO2	Outline the natural resources and their importance for the sustenance of the life.	-	-	-	-	-	-	**3**	-	-	-	-	-	-	-	-
CO3	List out the biodiversity of India, threats and its conservation methods	-	-	-	-	-	-	**2**	-	-	-	-	-	-	-	-
CO4	Illustrate various attributes of the pollution, impacts and measures to control the pollution along with waste management practices.	-	-	-	-	-	-	**3**	-	-	-	-	-	-	-	-
CO5	Describe social issues both rural and urban environment to combat the challenges.	-	-	-	-	-	-	**3**	-	-	-	-	-	-	-	-

	CO Statements	POs												PSOs		
II SEM																
Course Code	**201BS2T05-Partial Differential Equations and Vector Calculus**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Solve improper integrals using beta and gamma functions	**3**	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	Solve partial differential equations of first order.	**3**	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	Compute the double integral over a region and triple integral over a volume.	**3**	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	Calculate the gradient of a scalar function, divergence and curl of a vector function	**3**	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	Calculate line, surface and volume integrals.	**3**	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-
Course Code	**201BS2T08-Chemistry of Materials**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Compare the quality of drinking water and problems associated with hard water	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	Outline the difference between primary and secondary cells.	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	Explain polymers and engineering materials.	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	Explain corrosion and their control methods.	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	Summarize the importance of Nanomaterials and Green chemistry.	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Course Code	**201ES2T06-Engineering Mechanics**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Determine the resultant force and moment for a given force system	**3**	**1**	**1**	-	-	-	-	-	-	-	-	-	-	-	-
CO2	Solve the member forces in trusses.	**3**	**2**	**1**	-	-	-	-	-	-	-	-	-	-	-	-

	CO Statements	POs												PSOs		
CO3	Apply concept of Virtual work to find the work done by force and couple.	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO4	Solve the centre of gravity and moment of inertia for various geometric shapes	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO5	Determine the displacement, velocity and acceleration relations in dynamic systems	**3**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Course Code	**201ES2T08-Programming for Problem Solving Using C**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Illustrate the fundamental concepts of computers and basics of computer programming.	**2**	**3**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**
CO2	Make use of control structures and arraysin solving complex problems	**3**	**2**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**
CO3	Develop program on modular and strings fundamentals.	**2**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**
CO4	Demonstrate the ideasof pointers usage.	**2**	**3**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**
CO5	Solve real world problems using the concept of structures,unions and file operations.	**3**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**
Course Code	**201ES2L07-Engineering Workshop**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Prepare cross lap and dovetail joints using Carpentry tools	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**1**	**1**	**-**	**-**
CO2	Prepare V-Fit and Square Fit using Fitting tools	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**1**	**1**	**-**	**-**
CO3	Develop Tray and Funnel surfaces using Tin smithy tools	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**1**	**1**	**-**	**-**
CO4	Convert Round rod to Square and S-hook using Black smithy tools	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**1**	**1**	**-**	**-**
CO5	Check the circuit for Parallel and Series connection of bulbs using House wiring tools	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**1**	**1**	**-**	**-**

	CO Statements	POs												PSOs		
Course Code	**201ES2L12-Computer Aided Drafting Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Explain the basic functions of drawing software.	**1**	-	-	-	-	-	-	-	-	**2**	-	-	-	-	-
CO2	Select the Construction and editing commands for specified drawings.	**1**	-	-	-	-	-	-	-	-	**2**	-	-	-	-	-
CO3	Apply the concepts of Blocks, Hatching and Layers.	**1**	-	-	-	-	-	-	-	-	**2**	-	-	-	-	-
CO4	Draw the isometric views & orthographic views with dimensions	**1**	-	-	-	-	-	-	-	-	**2**	-	**2**	-	-	-
CO5	Draw the 3D Model for mechanical components	**1**	-	-	-	-	-	-	-	-	**2**	-	**2**	-	-	-
Course Code	**201HS2L02-Professional Communications Skills Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Make effective use of Body language in all situations and contexts to enhance effective communication in all aspects.	-	-	-	-	-	-	-	-	-	**3**	-	**2**	-	-	-
CO2	Identify communicative competency to respond to others in different situations.	-	-	-	-	-	-	-	-	-	**3**	-	**2**	-	-	-
CO3	Make use of effective delivery strategies to select,compile and synthesize information for oral presentation.	-	-	-	-	-	-	-	-	-	**3**	-	**2**	-	-	-
CO4	Demonstrate in mock interviews, group discussion and public speaking.	-	-	-	-	-	-	-	-	-	**3**	-	**2**	-	-	-
CO5	Illustrate interpersonal skills using English language confidently and effectively for personal and professional growth.	-	-	-	-	-	-	-	-	-	**3**	-	**2**	-	-	-
Course Code	**201BS2L05-Engineering Chemistry Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Demonstrate Complexometric titrations by volumetric analysis.	**2**	-	-	-	-	-	-	-	**1**	-	-	**1**	-	-	-
CO2	Demonstrate Acid – Base titrations by instrumental analysis.	**2**	-	-	-	-	-	-	-	**1**	-	-	**1**	-	-	-
CO3	Estimate Vitamin C using volumetric analysis	**2**	-	-	-	-	-	-	-	**1**	-	-	**1**	-	-	-

	CO Statements	POs												PSOs		
CO4	Prepare polymer like Bakelite.	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**1**	**-**	**-**	**-**
CO5	Prepare alternative fuel like Bio-Diesel.	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**1**	**-**	**-**	**-**
Course Code	**201ES2L10-Programming for Problem Solving Using C Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Develop the basic programs in C and draw the flowcharts using Raptor.	**2**	**1**	**-**	**-**	**3**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**-**
CO2	Make use of conditional and iterative statements to solve real time scenarios in C.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**2**	**-**	**-**	**-**
CO3	Apply the concept of arrays, modularity and strings to handle complex problems.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**2**	**-**	**-**	**-**
CO4	Apply the dynamic memory allocation functions using pointers	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**1**	**-**	**-**	**-**
CO5	Develop programs using structures, and files.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**2**	**-**	**-**	**-**
Course Code	**201MC2T02-Constitution of India**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Explain historical background of the constitution making and its importance for building a democratic India.	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO2	Compare the functioning of three wings of the government i.e.., executive, legislative and judiciary.	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO3	Interpret the value of the fundamental rights and duties for becoming good citizen of India.	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO4	Compare the decentralization of power between central, state and local self-government.	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO5	Extend the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

	CO Statements	POs												PSOs		
III SEM																
Course Code	**201BS3T14-Numerical-Methods-and-Integral-Transforms**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Apply numerical methods to solve equations and interpolation of polynomials.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**
CO2	Apply numerical methods to solve initial value problems and problems involving integration.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**
CO3	Compute Fourier series of a function	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**
CO4	Compute the Fourier transform of a function.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**
CO5	Apply Laplace transform to solve initial value problems.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**
Course Code	**201ES3T17-Basic Mechanical Engineering**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Apply different laws of thermodynamics.	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO2	Analyze various engine system along with the function and working.	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO3	Explain the concepts of Fluid statics, kinematics and dynamics.	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO4	Explain the concepts of Fluid kinematics and dynamics.	**1**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO5	Explain the concept of Boundary layer theory	**1**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Course Code	**201MI3T01--Mining-Geology**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Explain the general facts of the earth.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**3**	**-**	**-**
CO2	Classify the different minerals and their properties.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**3**	**-**	**-**

	CO Statements	POs												PSOs		
CO3	Compare and classify the different rocks.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**3**	**-**	**-**
CO4	Explain and classify the different structural discontinuities.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**3**	**-**	**-**
CO5	Explain the occurrence of groundwater and water bearing rocks	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**3**	**-**	**-**
Course Code	**201MI3T02-Mine-Surveying**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Explain problems on correction of errors. Simple problems of compass surveying.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO2	Explain problems on differential leveling and reciprocal leveling. Able to plot contours on map.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO3	Analysis of super elevation and distinguish types of curves and curves setting methods.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO4	Explain the calculation of distance and elevation with the help of theodolite and tacheometer.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO5	Explain the calculation of areas and volumes with the help of different formulae.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
Course Code	**201MI3T03--Development-of-Mineral-Deposits**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Summarize different stages in the life of a mine.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO2	Choose a suitable location for opening to a deposit.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO3	Explain Exploratory and Production Drilling.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO4	Categorize the use of explosives and blasting.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO5	Summarize material handling and transportation in mining	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**

	CO Statements	POs												PSOs		
Course Code	**201MI3L01--Geology-Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Study and identify different minerals.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**1**	**3**	**-**	**-**
CO2	Study and identify different rocks.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**1**	**3**	**-**	**-**
CO3	Construct strike and dip of outcrops.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**1**	**3**	**-**	**-**
CO4	Prepare the geological map.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**1**	**3**	**-**	**-**
CO5	Study and identify the rocks and structures in the field.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**1**	**3**	**-**	**-**
Course Code	**201MI3L02-Basic-Mechanical-Engineering-Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Calculate the coefficient of discharge for venture meter of pipes and orifice meter.	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**1**	**-**	**-**	**-**
CO2	Estimate the head losses in pipe flow.	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**1**	**-**	**-**	**-**
CO3	Analyse the performance characteristics of impulse of reaction turbines.	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**1**	**-**	**-**	**-**
CO4	Determine the coefficient of discharge slip and efficiency of Reciprocating Pump.	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**1**	**-**	**-**	**-**
CO5	Analyse the performance of characteristics of single stage and multi-stage centrifugal pumps	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**1**	**-**	**-**	**-**
Course Code	**201MI3L03-Mine-Surveying-Lab-I**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Measure distance using Chain & Tape.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**1**	**3**	**-**	**-**
CO2	Calculate Magnitude of errors occurred during Measurement of distance.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**1**	**3**	**-**	**-**
CO3	Measure distances even obstacles are encountered.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**1**	**3**	**-**	**-**

	CO Statements	POs												PSOs		
CO4	Calculate bearings and angles using Prismatic compass.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**1**	**3**	**-**	**-**
CO5	Do temporary adjustments before taking readings with Dumpylevel.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**1**	**3**	**-**	**-**
Course Code	**201SC3L09-Geo-StatisticsThrough-Surpac**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Explain about arithmetic mean, median ,mode etc.	**1**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**
CO2	Gain knowledge on theories of probabilities.	**1**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**
CO3	Analyze types of sampling.	**1**	**3**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**
CO4	Estimate reserve deposits by various reser e estimation technique.	**1**	**3**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**
CO5	Estimate deposits using surpac software.	**1**	**3**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**
Course Code	**201MC3T03--Biology-for-Engineers**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Apply biological engineering principles, procedures needed to solvereal world problems.	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO2	Demonstrate the fundamentals of living things, their classification, cell structure and biochemical constituents.	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO3	Apply the concept of plant, animal and micro bial system sand grow thin real life Situations.	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO4	Explain genetics and the immune system to know the cause, symptoms, diagnosis and treatment of common diseases.	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO5	Demonstrate basic knowledge of the applications of biological systems in relevant industries.	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

	CO Statements	POs												PSOs		
IV SEM																
Course Code	**201BS4T17-Complex Variables and Statistical Methods**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic and find the differentiation and integration of complex functions used in engineering problems.	**3**	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	Make use of the Cauchy residue theorem to evaluate certain integrals.	**3**	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	Apply discrete and continuous probability distributions.	**3**	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	Design the components of a classical hypothesis test.	**3**	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	Infer the statistical inferential methods based on small and large sampling tests.	**3**	**2**	-	-	-	-	-	-	-	-	-	-	-	-	-
Course Code	**201MI4T04-Fundamentals of Rock Mechanics**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Estimate stress and strain in various mining applications.	**3**	**2**	-	-	-	-	-	-	-	-	-	-	**3**	-	-
CO2	Evaluate the properties of rocks.	**3**	**2**	-	-	-	-	-	-	-	-	-	-	**3**	-	-
CO3	Use various measuring devices to measure the load.	**3**	**2**	-	-	-	-	-	-	-	-	-	-	**3**	-	-
CO4	Analyze the failure criteria in mines.	**3**	**2**	-	-	-	-	-	-	-	-	-	-	**3**	-	-
CO5	Analyze stress concentration around mine openings.	**3**	**2**	-	-	-	-	-	-	-	-	-	-	**3**	-	-

	CO Statements	POs												PSOs		
Course Code	**201MI4T05-Surface Mining**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Analyze different surface mining methods.	**3**	**1**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO2	Design the layout and open of a large open cast mine.	**3**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO3	Design drilling and blasting for Surface mining.	**3**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO4	Choose the better excavation and loading method.	**3**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO5	Organize the transportation system.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
Course Code	**201MI4T06-Underground Coal Mining Technology**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Illustrate the fundamentals of underground coal mining.	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**3**	**-**
CO2	Explain the various mine development methods.	**2**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**
CO3	Explain the long wall mining method.	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**
CO4	Analyze the various thick and deep seam mining methods.	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**
CO5	Categorize the various modern mining methods.	**2**	**-**	**-**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**
Course Code	**201BS4T18-Managerial Economics and Financial Accountancy**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Explain the Managerial Economic concepts for decision making and forward planning.	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**
CO2	Illustrate the law of demand and its exceptions, to use different forecasting methods for predicting demand for various products and services.	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**1**	**-**	**-**	**-**	**-**

	CO Statements	POs												PSOs		
CO3	Identify the cost behavior, costs useful for managerial decision making and Break Even Point (BEP) of an enterprise.	-	**1**	-	-	-	-	-	-	-	-	**3**	**1**	-	-	-
CO4	Outline the different types of business organizations long with basic knowledge on businesscycle.	-	-	-	-	-	-	-	-	-	-	-	**1**	-	-	-
CO5	Make use of the process & principles of accounting and prepare Journal, Ledger, Trial Balance, Trading A/c., Profit & Loss A/c. and Balance Sheet of an enterprise.	**1**	**1**	-	-	-	-	-	**1**	-	**3**	-	**1**	-	-	-
Course Code	**201MI4L04-Rock Mechanics Lab**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Prepare rock samples for testing.	**3**	**2**	-	-	-	-	-	-	**1**	**1**	-	**1**	**3**	-	-
CO2	Evaluate rock properties.	**3**	**2**	-	-	-	-	-	-	**1**	**1**	-	**1**	**3**	-	-
CO3	Estimate weathering effects on rock	**3**	**2**	-	-	-	-	-	-	**1**	**1**	-	**1**	**3**	-	-
CO4	Examine various mechanical properties of rock.	**3**	**2**	-	-	-	-	-	-	**1**	**1**	-	**1**	**3**	-	-
CO5	Choose appropriate support system.	**3**	**2**	-	-	-	-	-	-	**1**	**1**	-	**1**	**3**	-	-
Course Code	**201MI4L05-Mine Surveying Lab -II**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Determine the area by triangulation survey using theodolite.	**3**	**2**	**1**	-	-	-	-	-	**1**	**1**	-	**1**	**3**	-	-
CO2	Measure horizontal angles by method of repetition and reiteration using theodolite .	**3**	**2**	**1**	-	-	-	-	-	**1**	**1**	-	**1**	**3**	-	-
CO3	Determine the area using Total Station.	**3**	**2**	**1**	-	-	-	-	-	**1**	**1**	-	**1**	**3**	-	-
CO4	Determination of remote height using Total Station.	**3**	**2**	**1**	-	-	-	-	-	**1**	**1**	-	**1**	**3**	-	-
CO5	Find distance, gradient, difference, height between two inaccessible points using Total Stations.	**3**	**3**	**1**	-	-	-	-	-	**1**	**1**	-	**1**	**3**	-	-

	CO Statements	POs												PSOs		
Course Code	**201SC4L20-Data Analytics for Mining using Python**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Execute the Python Programming.	**2**	**3**	**1**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**3**	**-**
CO2	Explain the Boolean Values, Basic indexing and slicing.	**1**	**1**	**1**	**1**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**3**	**-**
CO3	Explain the domains of Data Analysis, Understanding structured and unstructured data, Data Analysis process.	**2**	**3**	**1**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**3**	**-**
CO4	Identify the Handle Missing Values and basic descriptive statistical information, such as mean, median, mode, and quartile values.	**2**	**3**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**3**	**-**
CO5	Use simple linear regression and multiple linear regression models	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**3**	**-**
Course Code	**201MC4T04-Essence of Indian Traditional Knowledge**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Identify the concept of Traditional knowledge and its importance.	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO2	Explain the need and importance of protecting traditional knowledge.	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO3	Illustrate the various enactments related to the protection of traditional knowledge.	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO4	Interpret the concepts of Intellectual property to protect the traditional knowledge.	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
CO5	Explain the importance of Traditional knowledge in Agriculture and Medicine.	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Course Code	**201MI4M01-Introduction To Mining Technology (Minor Program)**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Summarize different stages in the life of a mine.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO2	Choose a suitable location for opening to a deposit.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO3	Explain Exploratory and Production Drilling.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**

	CO Statements	POs												PSOs		
CO4	Categorize the use of explosives and blasting.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO5	Summarize material handling and transportation in mining	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
Course Code	**201MI4M02-Mining Geology (Minor Program)**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Explain the general facts of the earth.	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO2	Classify the different minerals and their properties.	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO3	Compare and classify the different rocks.	**2**	**1**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO4	Explain the different structural discontinuities.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO5	Explain the occurrence of groundwater and water bearing rocks.	**2**	**1**	**-**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
Course Code	**201MI4M03-Mine Surveying (Minor Program)**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Explain problems on correction of errors. Simple problems of compass surveying.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO2	Explain problems on differential leveling and reciprocal leveling. Able to plot contours on map.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO3	Analysis of super elevation and distinguish types of curves and curves setting methods.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO4	Explain the calculation of distance and elevation with the help of theodolite and tacheometer.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO5	Explain the calculation of areas and volumes with the help of different formulae.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
Course Code	**201MI4H01-Introduction to Rock Mechanics (Honor Program)**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Estimate stress and strain in various mining applications.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**

	CO Statements	POs												PSOs		
CO2	Evaluate the properties of rocks.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO3	Use various measuring devices to measure the load.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO4	Analyze the failure criteria in mines.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO5	Analyze stress concentration around mine openings	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
Course Code	**201MI4H02-Planning of Surface Mining Project (Honor Program)**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Prepare feasibility report.	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**
CO2	Design open pit slope angels & ultimate pit limit.	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**
CO3	Select transport and dumping systems.	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**
CO4	Examine stability analysis	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**
CO5	Explain transition of underground to opencast mines.	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**
Course Code	**201MI4H03-Mine Ventilation (Honor Program)**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Outline various gases-origins, occurrence, physiological effects.	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO2	Identify mine climatic conditions by using various devices.	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO3	Analyze the necessity of mine ventilation systems.	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO4	Analyze the operation of mine fans and related laws.	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**
CO5	Assess the ventilation planning, design and ventilation survey.	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**

	CO Statements	POs												PSOs		
Course Code	**201MI4H04-Occupational Health Diseases (Honor Program)**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Identify various occupational health diseases in mines.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**
CO2	Explain the physical occupational health hazard.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**
CO3	Explain the chemical occupational health hazard.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**
CO4	Explain the biological occupational health hazard.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**
CO5	Explain the physiology and toxicology occupational health hazard.	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**