



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**  
**KAKINADA – 533 003, Andhra Pradesh, India**

**DEPARTMENT OF CSE - ARTIFICIAL INTELLIGENCE & MACHINE LEARNING**

## **COURSE STRUCTURE AND SYLLABUS**

**For UG – R20**

**B. Tech - COMPUTER SCIENCE AND ENGINEERING with Specialization**

**Common to**

- (i) **CSE (ARTIFICIAL INTELLIGENCE and MACHINE LEARNING)-Branch Code:42**
- (ii) **ARTIFICIAL INTELLIGENCE and MACHINE LEARNING - Branch Code: 61**

*(Applicable for batches admitted from 2020-2021)*



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**  
**KAKINADA - 533 003, Andhra Pradesh, India**


**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**
**KAKINADA – 533 003, Andhra Pradesh, India**
**DEPARTMENT OF CSE - ARTIFICIAL INTELLIGENCE & MACHINE LEARNING**
**COURSE STRUCTURE**

<b>I Year – I SEMESTER</b>						
<b>S. No</b>	<b>Course Code</b>	<b>Courses</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>
1	HS1101	Communicative English	3	0	0	3
2	BS1101	Mathematics – I	3	0	0	3
3	BS1102	Applied Chemistry	3	0	0	3
4	ES1101	Programming for Problem Solving using C	3	0	0	3
5	ES1102	Computer Engineering Workshop	1	0	4	3
6	HS1102	English Communication Skills Laboratory	0	0	3	1.5
7	BS1103	Applied Chemistry Lab	0	0	3	1.5
8	ES1103	Programming for Problem Solving using C Lab	0	0	3	1.5
9	MC1101	Environmental Science*	2	0	0	0
<b>Total Credits</b>			<b>19.5</b>			

<b>I Year – II SEMESTER</b>						
<b>S. No</b>	<b>Course Code</b>	<b>Courses</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>
1	BS1201	Mathematics – II	3	0	0	3
2	BS1202	Applied Physics	3	0	0	3
3	ES1201	Digital Logic Design	3	0	0	3
4	ES1202	Python Programming	3	0	0	3
5	CS1201	Data Structures	3	0	0	3
6	BS1203	Applied Physics Lab	0	0	3	1.5
7	ES1203	Python Programming Lab	0	0	3	1.5
8	CS1202	Data Structures Lab	0	0	3	1.5
9	MC1201	Constitution of India *	2	0	0	0
<b>Total Credits</b>			<b>19.5</b>			

\*Internal Evaluation



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**  
**KAKINADA – 533 003, Andhra Pradesh, India**

**DEPARTMENT OF CSE - ARTIFICIAL INTELLIGENCE & MACHINE LEARNING**

<b>II Year – I SEMESTER</b>						
<b>S. No</b>	<b>Course Code</b>	<b>Courses</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>
1	BS	Mathematics III	3	0	0	3
2	CS	Mathematical Foundations of Computer Science	3	0	0	3
3	CS	Introduction to Artificial Intelligence and Machine Learning	3	0	0	3
4	CS	Object Oriented Programming with Java	3	0	0	3
5	CS	Database Management Systems	3	0	0	3
6	CS	Introduction to Artificial Intelligence and Machine Learning Lab	0	0	3	1.5
7	CS	Object Oriented Programming with Java Lab	0	0	3	1.5
8	CS	Database Management Systems Lab	0	0	3	1.5
9	SO	Mobile App Development	0	0	4	2
10	MC	Essence of Indian Traditional Knowledge	2	0	0	0
<b>Total Credits</b>			<b>21.5</b>			

<b>II Year – II SEMESTER</b>						
<b>S. No</b>	<b>Course Code</b>	<b>Courses</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>
1	BS	Probability and Statistics	3	0	0	3
2	CS	Computer Organization	3	0	0	3
3	CS	Data Warehousing and Mining	3	0	0	3
4	ES	Formal Languages and Automata Theory	3	0	0	3
5	HS	Managerial Economics and Financial Accountancy	3	0	0	3
6	CS	R Programming Lab	0	0	3	1.5
7	CS	Data Mining using Python Lab	0	0	3	1.5
8	ES	Web Application Development Lab	0	0	3	1.5
9	SO	Natural Language Processing with Python	0	0	4	2
<b>Total Credits</b>			<b>21.5</b>			
10	Minor	Introduction to Artificial Intelligence and Machine Learning <sup>\$</sup>	3	0	2	4

\$- Integrated Course



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**  
**KAKINADA – 533 003, Andhra Pradesh, India**

**DEPARTMENT OF CSE - ARTIFICIAL INTELLIGENCE & MACHINE LEARNING**

<b>III B. Tech – I Semester</b>						
<b>S.No</b>	<b>Course Code</b>	<b>Courses</b>	<b>Hours per week</b>			<b>Credits</b>
			<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
1	PC	Compiler Design	3	0	0	3
2	PC	Operating Systems	3	0	0	3
3	PC	Machine Learning	3	0	0	3
4	Open Elective/Job Oriented	<b>Open Elective-I</b> Open Electives offered by other departments/ Optimization in Operations Research(Job oriented course)	3	0	0	3
5	PE	<b>Professional Elective-I</b> 1. Software Engineering 2. Computer Vision 3. Data Visualization 4. DevOps 5. Machine Learning for Engineering and Science Applications (NPTEL) ( <a href="https://nptel.ac.in/courses/106106198">https://nptel.ac.in/courses/106106198</a> )	3	0	0	3
6	PC	Operating Systems & Compiler Design Lab	0	0	3	1.5
7	PC	Machine Learning Lab	0	0	3	1.5
8	SO	<b>Skill Oriented Course - III</b> Continuous Integration and Continuous Delivery using DevOps	0	0	4	2
9	MC	Employability Skills-I	2	0	0	0
10	PR	<b>Summer Internship 2 Months (Mandatory) after second year(to be evaluated during V semester</b>	0	0	0	1.5
<b>Total credits</b>						<b>21.5</b>
11	Minor	Machine Learning <sup>\$</sup>	3	0	2	<b>4</b>

\$- Integrated Course



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**  
**KAKINADA – 533 003, Andhra Pradesh, India**

**DEPARTMENT OF CSE - ARTIFICIAL INTELLIGENCE & MACHINE LEARNING**

<b>III B. Tech – II Semester</b>						
<b>S.No</b>	<b>Course Code</b>	<b>Courses</b>	<b>Hours per week</b>			<b>Credits</b>
			<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
1	PC	Computer Networks	3	0	0	3
2	PC	Deep Learning	3	0	0	3
3	PC	Design and Analysis of Algorithms	3	0	0	3
4	PE	<b>Professional Elective-II</b> 1. Software Project Management 2. Distributed Systems 3. Internet of Things 4. Network Programming	3	0	0	3
5	Open Elective/Job Oriented	<b>Open Elective-II</b> Open Electives offered by other departments/ MEAN Stack Development (Job Oriented Course)	3	0	0	3
6	PC	Computer Networks Lab	0	0	3	1.5
7	PC	Algorithms for Efficient Coding Lab	0	0	3	1.5
8	PC	Deep Learning with Tensorflow	0	0	3	1.5
9	SO	<b>Skill Oriented Course - IV</b> MEAN Stack Technologies-Module I- HTML 5, JavaScript, Node.js, Express.js and TypeScript <b>OR</b> Big Data : Apache Spark	0	0	4	2
10	MC	Employability skills-II	2	0	0	0
<b>Total credits</b>						<b>21.5</b>
<b>Industrial/Research Internship(Mandatory) 2 Months during summer vacation</b>						
11	Minor	Deep Learning <sup>s</sup>	3	0	2	4
<b>Minor courses through SWAYAM</b>			0	0	0	2



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**  
**KAKINADA – 533 003, Andhra Pradesh, India**

**DEPARTMENT OF CSE - ARTIFICIAL INTELLIGENCE & MACHINE LEARNING**

IV B. Tech –I Semester (Tentative)						
S.No	Course Code	Course Title	Hours per week			Credits
			L	T	P	
1	PE	<b>Professional Elective-III</b> 1.Reinforcement Learning 2.Soft Computing 3. Cryptography and Network Security 4. Block Chain Technologies 5. Speech Processing	3	0	0	3
2	PE	<b>Professional Elective-IV</b> 1. Robotic Process Automation 2. Cloud Computing 3. Big Data Analytics 4. NOSQL Databases 5. Video Analytics	3	0	0	3
3	PE	<b>Professional Elective-V</b> 1. Social Network Analysis 2. Recommender Systems 3. AI Chatbots 4. Object Oriented Analysis and Design 5. Semantic Web	3	0	0	3
4	Open Elective /Job Oriented	<b>Open Elective-III</b> Open Electives offered by other departments/API and Microservices (Job Oriented Course)	3	0	0	3
5	Open Elective /Job Oriented	<b>Open Elective-IV</b> Open Electives offered by other departments/Secure Coding Techniques (Job Oriented Course)	3	0	0	3
6	HS	Universal Human Values 2: Understanding Harmony	3	0	0	3
7	SO	1.Machine Learning with Go (Infosys Spring Board) <b>OR</b> 2.MEAN Stack Technologies-Module II- Angular JS and MongoDB	0	0	4	2
8	PR	<b>Industrial/Research Internship 2 months (Mandatory) after third year (to be evaluated during VII semester</b>	0	0	0	3
<b>Total credits</b>						<b>23</b>
9	Minor	Reinforcement Learning	4	0	0	4
<b>Minor courses through SWAYAM</b>			0	0	0	2



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**  
**KAKINADA – 533 003, Andhra Pradesh, India**

**DEPARTMENT OF CSE - ARTIFICIAL INTELLIGENCE & MACHINE LEARNING**

IV B. Tech –II Semester						
S.No	Course Code	Course Title	Hours per week			Credits
			L	T	P	C
1	Project	Major Project Work, Seminar, Internship	-	-	-	12
<b>Total credits</b>						<b>12</b>

**SUGGESTED COURSES MINOR ENGINEERING IN B.TECH.CSE- AI**

**Eligibility for Minor in CSE-AI: -**

**Note:**

1. TWO, NPTEL courses of EIGHT week duration covering a total of 4 credits (offered by CSE Department only), Student can register at any time after the completion of II B.Tech. I Sem.

S.No.	Subject Title	Credits
1	Introduction to Artificial Intelligence and Machine Learning	4
2	Machine Learning	4
3	Deep Learning	4
4	Reinforcement Learning	4
5	MOOCS Courses ** 1. Introduction to Soft Computing(NPTEL) ( <a href="https://nptel.ac.in/courses/106105173">https://nptel.ac.in/courses/106105173</a> ) 2. Digital Speech Processing (NPTEL) ( <a href="https://nptel.ac.in/courses/117105145">https://nptel.ac.in/courses/117105145</a> ) 3. Cloud Computing (NPTEL) ( <a href="https://nptel.ac.in/courses/106105167">https://nptel.ac.in/courses/106105167</a> ) 4. Practical Machine Learning with Tensorflow (NPTEL) ( <a href="https://nptel.ac.in/courses/106106213">https://nptel.ac.in/courses/106106213</a> )	4
<b>Total</b>		<b>20</b>

**\*\*Choose 02 MOOCS courses @ 2credits each from SWAYAM/NPTEL**