

**B. TECH. FOUR YEAR DEGREE**

**PROGRAM CURRICULUM**

(Applicable for the batches admitted from A.Y. 2025-26)

**COMPUTER SCIENCE AND  
ENGINEERING**  
(in association with Google Cloud)



**A D I T Y A**  
**U N I V E R S I T Y**

Aditya Nagar, ADB Road, Surampalem - 533 437



## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

### **Vision**

To be a globally recognized center of excellence in Computer Science through quality education, innovative practices, Sustainable technologies.

### **Mission**

M1: Provide transformative and inclusive education through robust curriculum, modern pedagogy, and state-of-art infrastructure.

M2: Foster innovation and research by developing sustainable technological solutions that address real-world challenges.

M3: Strengthen collaborations with industry, academia, and global partners to promote knowledge sharing and entrepreneurial growth.

### **Program Educational Objectives (PEOs)**

#### **Graduates of the Program will:**

#### **PROGRAM EDUCATIONAL OBJECTIVES (PEOs)**

PEO1: Apply emerging tools and technologies to solve interdisciplinary problems.

PEO2: Advance in education and research by applying innovative ideas and project-based learning.

PEO3: Work collaboratively and establish leadership with ethical, social, and financial accountability.

### **Program Specific Outcomes (PSOs)**

#### **After successful completion of the program, the graduates will be able to:**

PSO1: Apply advanced computing tools and technologies for effective software design, development, and deployment.

PSO2: Design, configure, and secure computing infrastructure services by applying emerging technologies

## PROGRAM OUTCOMES (PO's)

The 11 Program Outcomes are described as below.

After successful completion of the program, the graduates will be able to

- PO1 **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2 **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
- PO3 **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
- PO4 **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions
- PO5 **Engineering tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations
- PO6 **The Engineer and the world :** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
- PO7 **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
- PO8 **Individual and collaborative teamwork:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
- PO9 **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- PO10 **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO11 **Life-long learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## **Department of Computer Science and Engineering**

### **B.Tech (CSE) in association with Google Cloud**

**(Applicable for the batches admitted from the A.Y. 2025-26)**

#### **UG Programs Offered**

- B. Tech in (Computer Science and Engineering)
- B. Tech in (Computer Science and Engineering in collaboration with SAP)
- B. Tech in (Computer Science and Engineering in collaboration with Google Cloud)

#### **Minor Stream offered in B.Tech (Computer Science and Engineering)**

- Cloud Administration in collaboration with Google Cloud

#### **B. Tech in (Computer Science and Engineering) with Minor Degree in:**

- Minor Degree in Civil Engineering
- Minor Degree in Electrical and Electronics Engineering
- Minor Degree in Mechanical Engineering
- Minor Degree in Electronics and Communication Engineering
- Minor Degree in Petroleum Technology
- Minor Degree in Mining Engineering
- Minor Degree in Agricultural Engineering
- Minor Degree in Entrepreneurship Development and Incubation
- Minor Degree in Quantum Technologies

### Credit Division Category-wise

S.No	Broad Category of Course	UGC	Credits
1	Major Core Courses (MCC)	80	84
2	Minor Stream Courses (MSC)	32	32
3	Multidisciplinary Courses (MDC)	9	9
4	Ability Enhancement Courses (AEC)	8	9
5	Skill Enhancement Courses (SEC)	9	6
6	Value Added Courses (VAC)	6-8	4
7	Summer Internships (SI)	2-4	4
8	Full Semester Internship (PROJ)	12	12
9	Mandatory Courses (MC)	0	0
<b>Total Credits to be earned for B. Tech Degree</b>		<b>160</b>	<b>160</b>

**Foundation Courses – FC**

**Intermediate-level Courses – IC**

**Advanced Courses – AC**

### Major Core Courses (MCC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501MA01	Linear algebra & Calculus	FC	2	1		3	50	50	100	-
2501PH02	Modern Physics	FC	2		1	3	50	50	100	-
2501CS01	Programming for Problem Solving Using C	FC	2		2	4	50	50	100	-
2501IT01	Business Intelligence Lab	FC			2	2	50	50	100	-
2501ME01	Engineering Graphics	FC	1		2	3	50	50	100	-
2501MA02	Differential equations & Vector Calculus	FC	2	1		3	50	50	100	-
2501CS03	Data Structures	FC	2		2	4	50	50	100	PPSC
2501IT42	Programming with Python	FC	2		2	4	50	50	100	PPSC
2501CS71	Computer Organization & Architecture	FC	2	1		3	50	50	100	DLD
2501MA08	Discrete Mathematics	IC	2	1		3	50	50	100	LAC
2501CS08	Object Oriented Programming through C++	IC	2		2	4	50	50	100	PPSC
2501CS11	Theory of Computation	IC	2	1		3	50	50	100	DMS
2501IT05	Database Management Systems	IC	2		2	4	50	50	100	PPSC
2501IT07	Agile Software Engineering	IC	2		1	3	50	50	100	PPSC
2501MA09	Probability & Statistics	IC	2	1		3	50	50	100	LAC
2501IT06	Java Programming	IC	2		2	4	50	50	100	PPSC
2501CS13	Operating Systems	IC	2		1	3	50	50	100	-
2501AI02	Artificial Intelligence	IC	2		1	3	50	50	100	-
2501CS07	Computer Networks	IC	2		1	3	50	50	100	-
2501AI03	Data Mining	IC	1		2	3	50	50	100	-
2501CS10	Advanced Data Structures & Algorithm Analysis	AC	2		1	3	50	50	100	DS
2501IT04	Compiler Design	AC	2		1	3	50	50	100	TOC
2501AI05	Machine Learning	AC	2		2	4	50	50	100	DAE
2501AI04	Big Data Analytics	AC	2		1	3	50	50	100	DM
2501IT03	Cryptography & Network Security	AC	2		1	3	50	50	100	CN
2501CS15	Software Architecture	AC	2		1	3	50	50	100	ASE
<b>Total</b>			<b>48</b>	<b>6</b>	<b>30</b>	<b>84</b>				



### Multidisciplinary Courses (MDC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501EC95	Digital Logic Design	FC	2	1		3	50	50	100	-
2501EE01	Basic Electrical & Electronics Engineering	FC	2		2	4	50	50	100	-
2501MB01	Engineering Economics & Management	FC	2			2	50	50	100	-
<b>Total</b>			<b>6</b>	<b>1</b>	<b>2</b>	<b>9</b>				

### Ability Enhancement Courses (AEC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501EN01	Essential Cognitive Skills for Engineers	FC			1	1	100	-	100	-
2501UC07	Design Thinking using AI	FC			1	1	100	-	100	-
2501EN02	Advanced Cognitive Skills for Engineers (or) Proficiency in Foreign Language (Japanese/German/ Spanish/ French)	FC			1	1	100	-	100	ECSE
2501UC05										
2501UC04										
2501UC03										
2501UC06										
2501UC08	Universal Human Values	FC	2			2	100	-	100	-
2501UC09	Technical Paper Publication	AC			2	2	100	-	100	-
2501CS72	Student Activity Based Learning	AC				2	100	-	100	-
<b>Total</b>			<b>2</b>		<b>5</b>	<b>9</b>				

### Skill Enhancement Courses (SEC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501AI34	Web Application Development using MERN Stack	AC			2	2	50	50	100	-
2501CS17	Object Oriented Analysis & Design using UML	IC			2	2	50	50	100	ASE
2501IT08	Bigdata Spark	AC			2	2	50	50	100	-
<b>Total</b>					<b>6</b>	<b>6</b>				

### Value Added Courses (VAC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501UC11	Employability Skills-I	FC			3	0	100	-	100	-
2501UC13	Employability Skills-II	FC			3	0	100		100	ES-I
2501AI06	Data Analysis Essentials	IC			2	2	50	50	100	PP
2501UC14	Employability Skills-III	IC			3	0	100		100	ES-II
2501UC15	Employability Skills-IV	IC			3	0	100		100	ES-III
2501CS04	Internet of Things	FC			1	1	50	50	100	-
2501UC16	Employability Skills-V	AC			3	1	100		100	ES-IV
<b>Total</b>					<b>18</b>	<b>4</b>				

### Summer Internships (SI)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501CS20	Summer Internship-I	IC			2	2	100	-	100	-
2501CS21	Summer Internship-II	AC			2	2	100	-	100	-
<b>Total</b>					<b>4</b>	<b>4</b>				

### Full Semester Internship (PROJ)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501CS22	Full Semester Internship	AC			12	12	50	50	100	-
<b>Total</b>					<b>12</b>	<b>12</b>				

### Mandatory Courses (MC)

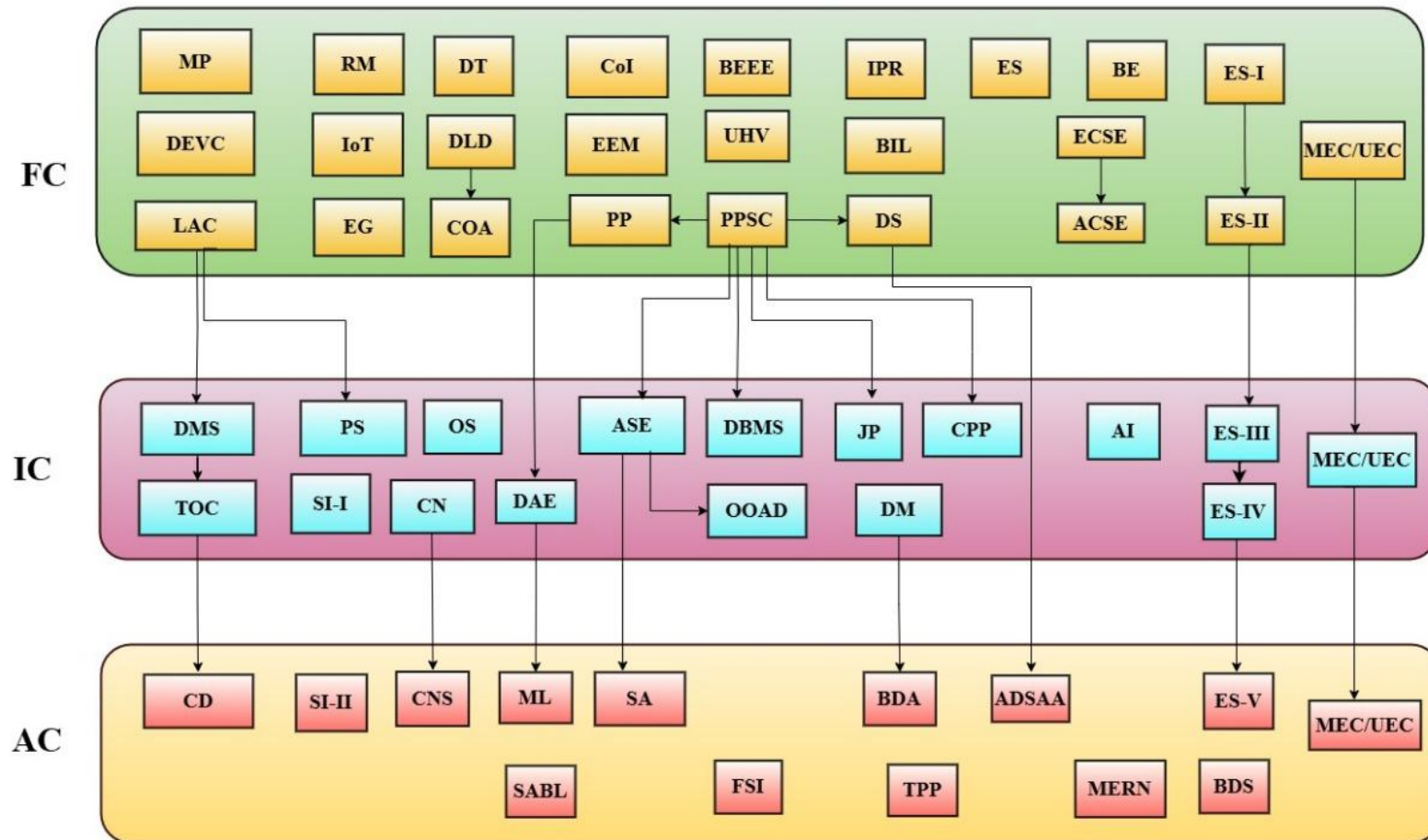
Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501AC01	Environmental Science	FC	2			0	100	-	100	-
2501AC02	Constitution of India	FC	2			0	100	-	100	-
2501AC03	Research Methodology	FC	2			0	100	-	100	-
2501AC04	Intellectual Property Rights & Patents	FC	2			0	100	-	100	-
2501AC05	Indian Knowledge Systems (IKS)	FC	2			0	100	-	100	-
<b>Total</b>			<b>10</b>			<b>0</b>				

### Minor Stream in Cloud Administration in collaboration with Google Cloud

Course Code	Course Name	Level	L	T	P	C	Total
2501CS81	Cloud Computing Foundations	FC	2		2	4	6
2501CS82	Cloud Data Analytics	FC	2		2	4	6
2501CS83	Cloud Cybersecurity	FC	2		2	4	6
2501CS84	Cloud GenAI	IC	2		1	3	4
2501CS25	Cloud IOT & Edge ML	AC	2		1	3	4
2501CS85	Cloud Digital Leader	AC	1		0	1	1
2501CS86	Cloud Engineering	AC	2		2	4	6
2501CS26	Block Chain Technologies	AC	2		1	3	4
2501AI24	API and Micro Services	IC	2		1	3	4
2501CS87	Devops Essentials	AC	2		1	3	4
<b>Total</b>			<b>19</b>		<b>13</b>	<b>32</b>	<b>45</b>



## B.Tech(CSE) Program Curriculum Pre-requisite Flow Chart



Foundation Level Courses:	Intermediate Level Courses:	Advanced Level Courses:
<p><b>LAC</b> - Linear algebra &amp; Calculus  <b>MP</b> - Modern Physics  <b>PPSC</b> - Programming for Problem Solving Using C  <b>BIL</b> - Business Intelligence Lab  <b>EG</b> - Engineering Graphics  <b>DLD</b> - Digital Logic Design  <b>ECSE</b> - Essential Cognitive Skills for Engineers  <b>DT</b> - Design Thinking using AI  <b>ES</b> - Environmental Science  <b>DEVC</b> - Differential equations &amp; vector calculus  <b>DS</b> - Data Structures  <b>PP</b> - Programming with Python  <b>COA</b> - Computer Organization &amp; Architectures  <b>EEM</b> - Engineering Economics &amp; Management  <b>BEEE</b> - Basic Electrical &amp; Electronics Engineering  <b>ACSE</b> - Advanced Cognitive Skills for Engineers (or) Proficiency in Foreign Language (Japanese/German/Spanish/French)  <b>UHV</b> - Universal Human Values  <b>ES-I</b> - Employability Skills-I  <b>ES-II</b> - Employability Skills-II  <b>CoI</b> - Constitution of India  <b>RM</b> - Research Methodology  <b>IPR</b> - Intellectual Property Rights &amp; Patents  <b>IoT</b> - Internet of Things  <b>BE</b> - Biology for Engineers  <b>MSC</b> - Courses from Minor Stream(s)</p>	<p><b>DMS</b> - Discrete Mathematics  <b>CPP</b> - Object Oriented Programming through C++  <b>TOC</b> - Theory of Computation  <b>DBMS</b> - Database Management Systems  <b>ASE</b> - Agile Software Engineering  <b>DAE</b> - Data Analysis Essentials  <b>PS</b> - Probability &amp; Statistics  <b>JP</b> - Java Programming  <b>OS</b> - Operating Systems  <b>AI</b> - Artificial Intelligence  <b>ES-III</b> - Employability Skills-III  <b>CN</b> - Computer Networks  <b>ES-IV</b> - Employability Skills-IV  <b>OOAD</b> - Object Oriented Analysis &amp; Design using UML  <b>SI-I</b> - Summer Internship - I  <b>DM</b> - Data Mining  <b>MSC</b> - Courses from Minor Stream(s)</p>	<p><b>ADSAA</b> - Advanced Data Structures and Algorithm Analysis  <b>MERN</b> - Web Application Development using MERN Stack  <b>CD</b> - Compiler Design  <b>ML</b> - Machine Learning  <b>BDA</b> - Big Data Analytics  <b>CNS</b> - Cryptography &amp; Network Security  <b>SA</b> - Software Architecture  <b>BDS</b> - Bigdata Spark  <b>SI-II</b> - Summer Internship - II  <b>TPP</b> - Technical Paper Publication  <b>ABL</b> - Student Activity Based Learning  <b>ES-V</b> - Employability Skills-V  <b>FSI</b> - Full Semester Internship  <b>MEC</b> - Minor Elective Courses</p>

## Suggestive Semester-wise Curriculum

### I SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
2501MA001	Linear Algebra & Calculus	MCC	FC	2	1		3	3
2501PH002	Modern Physics	MCC	FC	2		1	3	4
2501CS001	Programming for Problem Solving Using C	MCC	FC	2		2	4	6
2501IT001	Business Intelligence Lab	MCC	FC			2	2	4
2501ME001	Engineering Graphics	MCC	FC	1		2	3	5
2501EC095	Digital Logic Design	MDC	FC	2	1		3	3
2501EN001	Essential Cognitive Skills for Engineers	AEC	FC			1	1	2
2501UC007	Design Thinking using AI	AEC	FC			1	1	2
2501AC001	Environmental Science	MC	FC	2			0	2
<b>Total</b>				<b>11</b>	<b>2</b>	<b>9</b>	<b>20</b>	<b>31</b>

### II SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
2501MA02	Differential Equations & Vector Calculus	MCC	FC	2	1		3	3
2501CS03	Data Structures	MCC	FC	2		2	4	6
2501IT42	Programming with Python	MCC	FC	2		2	4	6
2501CS71	Computer Organization & Architecture	MCC	FC	2	1		3	3
2501EE01	Basic Electrical & Electronics Engineering	MDC	FC	2		2	4	6
2501EN02	Advanced Cognitive Skills for Engineers (or) Proficiency in Foreign Language (Japanese/German/Spanish/French)	AEC	FC			1	1	2
2501UC05								
2501UC04								
2501UC06								
2501UC03								
2501UC08	Universal Human Values	AEC	FC	2			2	2
2501CS81	Cloud Computing Foundations (Google Certification)	MSC	FC	2		2	4	4
2501UC11	Employability Skills-I *	VAC	FC			3	0	3
<b>Total</b>				<b>14</b>	<b>2</b>	<b>12</b>	<b>25</b>	<b>35</b>

\* Indicates online course.

### III SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
2501MA08	Discrete Mathematics	MCC	IC	2	1		3	3
2501CS08	Object Oriented Programming through C++	MCC	IC	2		2	4	6
2501CS11	Theory of Computation	MCC	IC	2	1		3	3
2501IT05	Database Management Systems	MCC	IC	2		2	4	6
2501IT07	Agile Software Engineering	MCC	IC	2		1	3	4
2501UC13	Employability Skills-II	VAC	FC			3	0	3
2501AI06	Data Analysis Essentials	VAC	IC			2	2	4
2501CS82	<b>Cloud Data Analytics (Google Certification)</b>	MSC	IC	2		2	4	6
2501AC02	Constitution of India	MC	FC	2			0	2
<b>Total</b>				<b>14</b>	<b>2</b>	<b>12</b>	<b>23</b>	<b>37</b>

### IV SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
2501MA09	Probability & Statistics	MCC	IC	2	1		3	3
2501IT06	Java Programming	MCC	IC	2		2	4	6
2501CS13	Operating Systems	MCC	IC	2		1	3	4
2501AI02	Artificial Intelligence	MCC	IC	2		1	3	4
2501CS10	Advanced Data Structures & Algorithm Analysis	MCC	AC	2		1	3	4
2501AI34	Web Application Development using MERN Stack	SEC	AC			2	2	4
2501CS83	<b>Cloud Cybersecurity (Google Certification)</b>	MSC	IC	2		2	4	6
2501UC14	Employability Skills-III	VAC	IC			3	0	3
2501AC03	Research Methodology	MC	FC	2			0	2
<b>Total</b>				<b>14</b>	<b>1</b>	<b>12</b>	<b>22</b>	<b>36</b>

### V SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
2501CS07	Computer Networks	MCC	IC	2		1	3	4
2501IT04	Compiler Design	MCC	AC	2		1	3	4
2501AI05	Machine Learning	MCC	AC	2		2	4	6
2501UC15	Employability Skills-IV	VAC	IC			3	0	3
2501CS17	Object Oriented Analysis & Design using UML	SEC	IC			2	2	4
2501CS20	Summer Internship-I	SI	IC			2	2	4
2501CS84	<b>Cloud GenAI</b> <b>(Google Certification)</b>	MSC	IC	2		1	3	4
2501CS25	Cloud IOT & Edge ML	MSC	IC	2		1	3	4
2501AC04	Intellectual Property Rights & Patents	MC	FC	2			0	2
<b>Total</b>				<b>12</b>		<b>13</b>	<b>20</b>	<b>35</b>

### VI SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
2501AI03	Data Mining	MCC	IC	1		2	3	5
2501AI04	Big Data Analytics	MCC	AC	2		1	3	4
2501CS10	Engineering Economics & Management	MDC	FC	2			2	2
2501CS04	Internet of Things	VAC	FC			1	1	2
2501CS85	<b>Cloud Digital Leader</b> <b>(Google Certification)</b>	MSC	AC	1		0	1	1
2501CS86	<b>Cloud Engineering</b> <b>(Google Certification)</b>	MSC	AC	2		2	4	6
2501CS26	Block Chain Technologies	MSC	AC	2		1	3	4
2501AC05	Indian Knowledge Systems (IKS)	MC	FC	2			0	2
<b>Total</b>				<b>14</b>		<b>9</b>	<b>21</b>	<b>32</b>

### VII SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
2501IT03	Cryptography & Network Security	MCC	AC	2		1	3	4
2501CS15	Software Architecture	MCC	AC	2		1	3	4
2501IT08	Bigdata Spark	SEC	AC			2	2	4
2501AI24	API and Micro Services	MSC	IC	2		1	3	4
2501CS87	Devops Essentials	MSC	AC	2		1	3	4
2501CS21	Summer Internship-II	SI	AC			2	2	4
<b>Total</b>				<b>8</b>		<b>8</b>	<b>16</b>	<b>24</b>

### VIII SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
2501UC09	Technical Paper Publication	AEC	AC			2	2	4
2501CS72	Student Activity Based Learning	AEC	AC				2	
2501UC16	Employability Skills-V	VAC	AC			3	1	3
2501CS22	Full Semester Internship	PROJ	AC			12	12	24
<b>Total</b>						<b>17</b>	<b>17</b>	<b>31</b>

**Total Credits:160**

**Minor Degree in Computer Science and Engineering (offered to other branches students):**

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501CS13	Operating Systems	IC	2		1	3	50	50	100	-
2501CS07	Computer Networks	IC	2		1	3	50	50	100	-
2501IT07	Agile Software Engineering	IC	2		1	3	50	50	100	PPSC
2501AI03	Data Mining	IC	1		2	3	50	50	100	-
2501CS08	Object Oriented Programming through C++ (or) Java Programming	IC	2		2	4	50	50	100	PPSC
2501IT06										
2501CS16	Introduction to MERN Stack Development(or) Information Security Analysis & Audit	IC	2			2	50	50	100	JP
2501CS30										
2501CS18	Advanced MERN Stack Development (or) Flutter Fundamentals	AC			2	2	50	50	100	IMSD
2501IT12										
<b>Total</b>			<b>11</b>		<b>9</b>	<b>20</b>				

**Minor Degree in Civil Engineering**

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501CE25	Repair & Rehabilitation of Structures	FC	3			3	50	50	100	-
2501CE43	Building Planning & Computer-Aided Drawing	FC			2	2	50	50	100	-
2501CE27	Green Buildings	FC	3			3	50	50	100	-
2501CE40	Fundamentals of Soil Behaviour	FC	2	1		3	50	50	100	-
2501CE54	Railway Engineering (or)Docks & Harbour Engineering	FC	3			3	50	50	100	-
2501CE47										
2501CE36	Environmental Impact & Risk Management(or) Environmental Management	IC	3			3	50	50	100	-
2501CE37										
2501CE56	Urban Transportation Planning (or) Intelligent Transportation Systems	IC	3			3	50	50	100	-
2501CE49										
<b>Total</b>			<b>17</b>	<b>1</b>	<b>2</b>	<b>20</b>				

### Minor Degree in Electrical and Electronics Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501EE55	Operation & Control of Electric machines	FC	2			2	50	50	100	BEEE
2501EE56	Fundamentals of Power Electronics	FC	2			2	50	50	100	BEEE
2501EE13	Electrical Measurements & Instrumentation	FC	2	1	1	4	50	50	100	ENA-1/BEEE
2501EE53	Electric Power Generation, Transmission and Distribution Systems	IC	3			3	50	50	100	ENA-1/BEEE
2501EE34	Alternative Energy Sources (or)	IC	3			3	50	50	100	EPGDS / BEEE / ISM
2501EE27	Utilization of Electrical Energy									
2501EE37	Hybrid Electric Vehicles (or)	AC	3			3	50	50	100	FPE / OCEM
2501EE35	Special Electric machines									
2501EE43	Electrical Safety (or)	AC	3			3	50	50	100	EPGDS/PS A
2501EE30	Methods & Algorithms for Intelligent Control									
<b>Total</b>			<b>18</b>	<b>1</b>	<b>1</b>	<b>20</b>				

### Minor Degree in Mechanical Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501ME74	Basic Mechanical Engineering	FC	2			2	50	50	100	-
2501ME04	Engineering Thermodynamics	IC	2	1		3	50	50	100	SSP/MP
2501ME77	Introduction to Automobile Engineering (or)	IC	3			3	50	50	100	SSP/MP
2501ME78	Mechanics of Solids									
2501ME12	Heat Power Engineering (or)	IC	2	1		3	50	50	100	ETD
2501ME40	Refrigeration & Air Conditioning									
2501ME75	Production Technology	IC	3			3	50	50	100	EW
2501ME76	Metallurgy & Material Science	IC	3			3	50	50	100	SSP/MP
2501ME79	Theory of Machines (or)	AC	3			3	50	50	100	SSP/MP
2501ME80	Advanced Engineering Metrology									
<b>Total</b>			<b>18</b>	<b>2</b>		<b>20</b>				

### Minor Degree in Electronics & Communication Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501EC87	Fundamentals of Communications	FC	2		1	3	50	50	100	-
2501EC88	Fundamentals of Signal Processing	FC	2		1	3	50	50	100	-
2501EC89	Analog & Digital Circuits	IC	2			2	50	50	100	BEEE
2501EC42	Wireless LAN's & PAN's	IC	2	1		3	50	50	100	-
2501EC90	Linear & Digital IC Applications (or)	IC	3			3	50	50	100	ADC
2501EC91	Sensors & Actuators									
2501EC92	Embedded Microcontrollers (or)	IC	2		1	3	50	50	100	ADC, PPSC
2501EC93	Digital System Design									
2501EC67	Introduction to Internet of things (or) Modern Wireless Communications	AC	2		1	3	50	50	100	EM, WLAN's & PAN's
2501EC74			3			3	50	50	100	FC
<b>Total</b>			<b>15</b>	<b>1</b>	<b>4</b>	<b>20</b>				

### Minor Degree in Petroleum Technology

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501PT27	Introduction to Petroleum Engineering	FC	2			2	50	50	100	-
2501PT35	Unit Operations in Petroleum Industry	FC	3			3	50	50	100	-
2501PT47	Fundamentals of Geology & Reservoir Engineering	IC	3			3	50	50	100	-
2501PT48	Fundamentals of Drilling & Production Engineering (or) Unconventional Hydrocarbon Resources	IC	3			3	50	50	100	-
2501PT16										
2501PT49	Natural Gas Hydrates (or) Fundamentals of Liquefied Natural Gas	AC	3			3	50	50	100	-
2501PT05										
2501PT50	Artificial Lift Techniques (or) Enhanced Oil Recovery	AC	3			3	50	50	100	-
2501PT03										
2501PT12	Petroleum Refinery Engineering	AC	3			3	50	50	100	-

<b>Total</b>	<b>20</b>			<b>20</b>						
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### Minor Degree in Mining Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501MN03	Development of Mineral Deposits	FC	3			3	50	50	100	-
2501MN41	Green Mining	FC	3			3	50	50	100	-
2501MN06	Surface Mining	IC	3			3	50	50	100	DMD
2501MN24	Drilling & Blasting	IC	3			3			100	DMD
2501MN07	Underground Coal Mining Technology (or)	IC	3			3	50	50	100	DMD
2501MN08	Underground Metal Mining Technology									
2501MN14	Mine Legislation & General Safety (or)	AC	3			3	50	50	100	UCMT/ UMMT
2501MN28	Environmental Pollution & Control									
2501MN45	Industrial Safety Practices(or)	AC	2			2	50	50	100	-
2501MN46	Ground Control									
<b>Total</b>			<b>20</b>			<b>20</b>				

### Minor Degree in Agricultural Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501AE82	Fundamentals of Renewable Energy Sources	FC	3			3	50	50	100	-
2501AE83	Post-harvest Engineering of Cereal Crops	FC	3			3	50	50	100	-
2501AE84	Ground Water Hydrology	FC	3			3	50	50	100	-
2501AE85	Micro Irrigation Systems	IC	2			2	50	50	100	-
2501AE86	Surface Water Hydrology (or)	IC	3			3	50	50	100	GWH
2501AE87	Land & Water Management Engineering									
2501AE88	Agricultural Process Engineering & Food Quality (or)	AC	3			3	50	50	100	PHECC
2501AE89	Post-harvest Engineering for Horticultural Produce									
2501AE90	Agricultural Machinery & Equipment (or)	AC	3			3	50	50	100	FRES
2501AE91	Design of Bio-energy systems									
<b>TOTAL</b>			<b>20</b>			<b>20</b>				

### Minor Degree in Entrepreneurship Development & Incubation

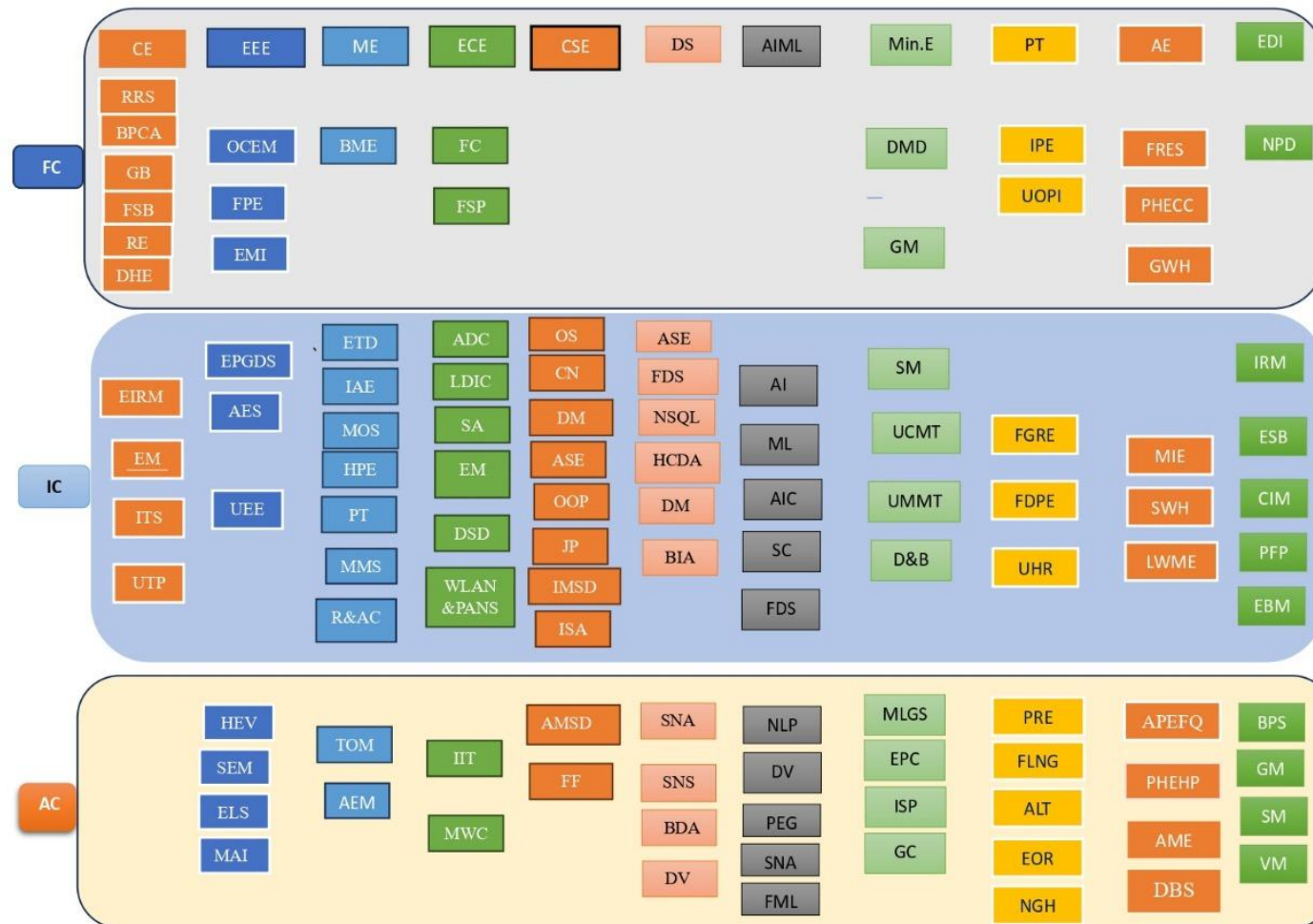
Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
2501MB07	New Product Development	FC	3			3	50	50	100	-
2501MB08	Entrepreneurship & Small Business Management	IC	2			2	50	50	100	-
2501MB09	Insurance & Risk Management	IC	3			3	50	50	100	-
2501MB10	Change & Innovations Management	IC	3			3	50	50	100	-
2501MB11	Personal Financial Planning (or) E-Business management	IC	3			3	50	50	100	-
2501MB12										
2501MB13	Business Policy & Strategic Management (or) Green Marketing	AC	3			3	50	50	100	-
2501MB14										
2501MB15	Startup Management (or) Venture Management	AC	3			3	50	50	100	-
2501MB16										
Total			<b>20</b>			<b>20</b>				

### Minor Degree in Quantum Technologies

S.No.	Course Code	Course Name	L	T	P	C	Semester
<b>Mandatory Courses</b>							
1	251EC097	Survey of Quantum technologies and Application	3	0	0	3	IV
2	251EC098	Foundations of Quantum Technologies	3	0	0	3	V
3	251EC099	Basic Programming Lab (or)	1	0	2	3	V
	251EC100	Basic Laboratory Course for Quantum Technologies					
4	251EC101	Quantum Algorithms and Cryptography	12 week 3 Credit - NPTEL MOOC			3	VII/VIII

<b>Any One course from the below</b>							
5	251EC102	Introduction to Quantum Computation	3	0	0	3	VI
6	251EC103	Introduction to Quantum Communication	3	0	0	3	VI
7	251EC104	Introduction to Quantum Sensing	3	0	0	3	VI
8	251EC105	Introduction to Quantum Materials	3	0	0	3	VI
<b>Any One course from the below</b>							
9	251EC106	Engineering Foundations of Quantum Technologies	3	0	0	3	VII
10	251EC107	Solid State Physics for Quantum Technologies	3	0	0	3	VII
11	251EC108	Quantum Optics	3	0	0	3	VII
12	251EC109	Quantum Cybersecurity	3	0	0	3	VII
13	251EC110	Quantum Machine Learning	3	0	0	3	VII
<b>Total</b>			<b>18</b>	<b>0</b>	<b>0</b>	<b>18</b>	

### Minor Degree Pre-requisite Flow Chart



Dept.	FOUNDATION COURSE		INTERMEDIATE- LEVEL COURSE		ADVANCED COURSE	
CE	RRS	Repair & Rehabilitation of Structures	EIRM	Environmental Impact & Risk Management		
	BPCA	Building Planning & Computer-Aided Drawing	EM	Environmental Management		
	GB	Green Building	UTP	Urban Transportation Planning		
	FSB	Fundamental of Soil Behaviour	ITS	Intelligent Transportation Systems		
	RE	Railway Engineering				
	DHE	Docks & Harbour Engineering				
EEE	OCEM	Operation control of Electric Machines	AES	Alternative Energy Sources	MAI	Methods & Algorithms for Intelligent Control
	FPE	Fundamentals of Power Electronics	EPGDS	Electric Power Generation & Distribution Systems	HEV	Hybrid Electric Vehicles
	EMI	Electrical Measurements & Instrumentation	UEE	Utilization of Electrical Energy	SEM	Special Electric Machines
					ES	Electrical Safety
ME	BME	Basic Mechanical Engineering	ETD	Engineering Thermodynamics	TOM	Theory of Machines
			IAE	Introduction to Automobile Engineering	AEM	Advanced Engineering Metrology
			MOS	Mechanics of Solids		
			HPE	Heat Power Engineering		
			PT	Production Technology		
			MMS	Metallurgy & Material Science		
			R&AC	Refrigeration & Air Conditioning		
ECE	FC	Fundamentals of Communications	ADC	Analog & Digital Circuits	IIT	Introduction to Internet of things
			LDIC	Linear & Digital IC Applications		
			SA	Sensors & Actuators		
	FSP	Fundamentals of Signal Processing	EM	Embedded Microcontrollers	MWC	Modern Wireless Communications
			DSD	Digital System Design		
		WLAN&PAN	Wireless LANS & PANS			
CSE			ASE	Agile Software Engineering	AMSD	Advanced MERN Stack Development
			OOP	Object Oriented Programming through C++		
			OS	Operating Systems	FF	Flutter Fundamentals
			CN	Computer Networks		
			JP	Java Programming		

			IMSD	Introduction to MERN Stack Development		
			ISA	Information Security Analysis and Audit		
			DM	Data Mining		
<b>DS</b>			DM	Data Mining	SNA	Social Network Analysis
			FDS	Fundamentals of Data Science	DV	Data Visualization
			ASE	Agile Software Engineering	BDA	Big Data Analytics
			NSQL	NoSQL Databases	SNSW	Social Networks and Semantic Web
			BIA	Business Intelligence & Analytics		
			HCDA	Health Care Data Analysis		
<b>AIML</b>			ML	Machine Learning	DV	Data Visualization
			AI	Artificial Intelligence	PEG	Prompt Engineering and GenAI
			AI C	AI Chatbot	SNA	Social Network Analysis
			FDS	Fundamentals of Data Science	FML	Federated Machine Learning
			SC	Soft Computing	NLP	Natural Language Processing
<b>Min. E</b>	DMD	Development of Mineral Deposits	SM	Surface Mining	MLGS	Mine Legislation and General Safety
	GM	Green Mining	UCMT	Underground Coal Mining Technology	EPC	Environmental Pollution & Control
			UMMT	Underground Metal Mining Technology	ISP	Industrial Safety Practices
			DB	Drilling & Blasting	GC	Ground Control
<b>PT</b>	IPE	Introduction to Petroleum Engineering	FGRE	Fundamentals of Geology and Reservoir Engineering	PRE	Petroleum Refinery Engineering
	UOPI	Unit operations in Petroleum Industry	FDPE	Fundamentals of Drilling and Production Engineering	FLNG	Fundamentals of Liquefied Natural Gas
					NGH	Natural Gas Hydrates
			UHR	Unconventional Hydrocarbon Resources	ALT	Artificial Lift Techniques
					EOR	Enhanced Oil Recovery
<b>Ag.E</b>	GWH	Ground Water Hydrology	LWME	Land and Water Management	DBS	Design of Bio-Energy Systems
	PHEC	Post-harvest Engineering of Cereal Crops	SWH	Surface Water Hydrology	PHEHP	Post-Harvest Engineering for Horticultural Produce
			MIE	Micro Irrigation Systems		
	FRES	Fundamentals of Renewable Energy Sources			AME	Agricultural Machinery and Equipment
				APEFQ	Agriculture Process Engineering and Food Quality	

<b>EDC</b>	NPD	New Product Development	ESB	Entrepreneurship and Small Business Management	BPS	Business Policy & Strategic Management
			CIM	Change & Innovations Management	GM	Green Marketing
			PFP	Personal Financial Planning	SM	Startup Management
			EBM	E-Business Management	VM	Venture Management
			IRM	Insurance and Risk Management		