



## **School of Engineering**

**Department of Computer Science and Engineering**

**B. TECH**

**COMPUTER SCIENCE AND ENGINEERING**

**(Cyber Security)**

**CURRICULUM**

**MARCH 2022**

### SEMESTER - I

Sl. No	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
<b>THEORY</b>							
1.	Communicative English	HSS	3	2	1	0	3
2.	Linear Algebra	BS	4	3	1	0	4
3.	Engineering Physics	BS	3	3	0	0	3
4.	Cyber Security Essentials	PC	3	3	1	0	4
5.	Programming in C	ES	3	3	0	0	3
6.	Digital Design + lab	ES	4	2	0	2	3
7.	Extra Academic Activity	AEA*	2	0	0	0	1
<b>PRACTICALS</b>							
7.	Programming in C Lab (Linux based)	ES	4	0	0	4	2
8.	Engineering Physics Lab	BS	4	0	0	4	2
<b>TOTAL</b>			<b>29 + 2(AEA)</b>	<b>16</b>	<b>3</b>	<b>10</b>	<b>25</b>

### SEMESTER – II

Sl. No	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
<b>THEORY</b>							
1.	English for Engineers	HSS	3	2	1	0	3
2.	Probability and Statistics	BS	4	3	0	0	3
3.	Programming in Python	ES	2	2	0	0	2
4.	Data Structures	PC	3	3	0	0	3
5.	Computer Organization	ES	3	3	0	0	3
6.	Classical Cryptography	ES	3	3	0	0	3
7.	Extra Academic Activity	AEA*	2	0	0	0	1
<b>PRACTICALS</b>							
8.	Data Structures Lab	PC	4	0	0	4	2
9.	Programming in Python Lab	ES	4	0	0	4	2
<b>TOTAL</b>			<b>25 + 2(AEA)</b>	<b>16</b>	<b>1</b>	<b>8</b>	<b>22</b>

**\*Ability Enhancement Activity – 40 Hours per semester**

**SEMESTER - III**

SI. No	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
<b>THEORY</b>							
1.	Discrete Mathematics	BS	3	3	0	0	3
2.	Object Oriented Programming	PC	3	3	0	0	3
3.	Operating Systems + Lab	PC	5	3	0	2	4
4.	Database Management System	PC	3	3	0	0	3
5.	Modern Cryptography	PC	2	2	0	0	2
6.	Cognitive Psychology	HSS	2	2	0	0	2
<b>PRACTICALS</b>							
7.	OOP Lab	PC	4	0	0	4	2
8.	Database Management Lab	PC	4	0	0	4	2
<b>TOTAL</b>			<b>26</b>	<b>16</b>	<b>0</b>	<b>10</b>	<b>21</b>

**SEMESTER - IV**

SI. No	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
<b>THEORY</b>							
1.	Design and Analysis of Algorithms	PC	3	3	0	0	3
2.	Graph Theory	PC	3	3	1	0	4
3.	Computer Networks	PC	3	3	0	0	3
4.	Machine Learning Techniques	PC	3	3	0	0	3
5.	Open Elective - I	OE	3	3	0	0	3
6.	System Security Management +Lab	PC	5	3	0	2	4
<b>PRACTICALS</b>							
7.	Computer Networks Lab	PC	4	0	0	4	2
8.	Machine Learning Lab	PC	4	0	0	4	2
<b>TOTAL</b>			<b>29</b>	<b>18</b>	<b>1</b>	<b>10</b>	<b>24</b>

**SEMESTER - V**

SI. No	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
<b>THEORY</b>							
1.	Optimization Techniques	BS	3	3	0	0	3
2.	High Performance Computing (HPC) and Big Data for Cyber Security	PC	3	3	0	0	3
3.	Artificial Intelligence	PC	3	3	0	0	3
4.	Network Penetration Testing, Ethical Hacking and Social Engineering(Industry Colab)	PC	3	3	0	0	3
5.	Principles of Management	HSS	2	2	0	0	2
6.	Professional Elective – I	PE	3	3	0	0	3
<b>PRACTICALS</b>							
8.	Penetration Testing& Ethical HackingLab (Industry Colab)	PC	4	0	0	4	2
9.	CyberSecurity Lab	PC	2	0	0	2	1
<b>TOTAL</b>			<b>23</b>	<b>17</b>	<b>0</b>	<b>6</b>	<b>20</b>

**SEMESTER - VI**

SI. No	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
<b>THEORY</b>							
1.	Image and video Processing	ES	3	3	0	0	3
2.	Network Security	PC	2	2	0	0	2
3.	Cloud Computing and Security	PC	3	3	0	0	3
4.	Cyber Forensics (Industry colab)	PC	3	3	0	0	3
5.	Professional Elective II	PE	3	3	0	0	3
6.	Open Elective - II	OE	3	3	0	0	3
<b>PRACTICALS</b>							
7.	Cloud Security Lab (Industry Colab)	PC	4	0	0	4	2
8.	Image and video Processing Lab	PC	4	0	0	4	2
<b>TOTAL</b>			<b>25</b>	<b>17</b>	<b>0</b>	<b>8</b>	<b>21</b>

**SEMESTER - VII**

Sl. No	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
<b>THEORY</b>							
1.	Deep Learning	PC	3	3	0	0	3
2.	Web Application Security	PC	3	3	0	0	3
3.	Professional Elective III	PE	3	3	0	0	3
4.	Professional Elective IV	PE	3	3	0	0	3
5.	Open Elective III	OE	3	3	0	0	3
<b>PRACTICALS</b>							
6.	Deep Learning Lab	PC	4	0	0	4	2
7.	Capstone Project I (Industry Colab)	EEC	8	0	0	8	4
<b>TOTAL</b>			<b>27</b>	<b>15</b>	<b>0</b>	<b>12</b>	<b>21</b>

**SEMESTER - VIII**

Sl. No	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
<b>THEORY</b>							
1.	Professional Elective V	PE	3	3	0	0	3
2.	Professional Elective VI	PE	3	3	0	0	3
<b>PRACTICALS</b>							
3.	Capstone ProjectII (Industry Colab)	EEC	12	0	0	12	6
<b>TOTAL</b>			<b>18</b>	<b>6</b>	<b>0</b>	<b>12</b>	<b>12</b>

**TOTAL NO. OF CREDITS: 166****\*Ability Enhancement Activity – 40 hours per semester**

## Program Structure

S. No	Topics	Credit Breakup for B. Tech CSE (Cybersecurity)	AICTE Breakup for CSE
1.	HS: Humanities and Social Sciences including Management courses	10	12
2.	BS: Basic Science courses	19	24
3.	ES: Engineering Science Courses	21	29
4.	PC: Professional Core Courses	77	49
5.	PE: Professional Elective courses relevant to chosen specialization/branch	18	18
6.	OE: Open electives	9	12
7.	EEC: Project Work, Seminar and internship in industry, etc. and ability enhancement activity (AEA)	12	15
	<b>Total</b>	<b>166</b>	<b>159</b>

## SEMESTER-WISE CREDITS BREAKUP

Category\Sem	HS	BS	ES	PC	PE	OE	EEC/AEA	Total
1	3	9	8	4			1	25
2	3	3	10	5			1	22
3	2			19				21
4		4		17		3		24
5	2	3		12	3			20
6			3	12	3	3		21
7				8	6	3	4	21
8					6		6	12
<b>Total</b>	<b>10</b>	<b>19</b>	<b>21</b>	<b>77</b>	<b>18</b>	<b>9</b>	<b>12</b>	<b>166</b>

### OPEN ELECTIVES (OE)

Each department of the University (under school of Engineering), will offer three open-elective courses (typically, 3 credits each) to the students of other departments. The list of offered courses will be provided by the departments, based on current requirements.

**1. Artificial Intelligence and Data Science**(Semesters IV, VI and VII)(Shall be offered to all the programs except B. Tech (AI & DS))

Sl. No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.		AI for Precision Healthcare	OE	3	3	0	0	3
2.		Robotics Fundamentals	OE	3	3	0	0	3
3.		AI for Precision Agriculture	OE	3	3	0	0	3

**2. Internet of Things** (Semesters IV, V and VI)(Shall be offered to all the programs except B. Tech-CSE (IoT))

Sl. No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.		Introduction to IoT	OE	3	3	0	0	3
2.		Industry 4.0	OE	3	3	0	0	3
3.		Sensors for Healthcare	OE	3	3	0	0	3

**3. Cybersecurity** (Semesters IV, VI and VII)(Shall be offered to all the programs except B. Tech - CSE(Cybersecurity))

Sl. No	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.		Introduction to Cybersecurity	OE	3	3	0	0	3
2.		Cryptography	OE	3	3	0	0	3
3.		Digital forensics	OE	3	3	0	0	3

## **MICRO-SPECIALIZATION**

**The University proposes to offer Micro-Specializations to UG students. Its salient features are as follows:**

1. Each Micro-Specialization has a defined structure in terms of three sequential components:
  - **Component-I** – One Foundation course that constitutes a mandatory requirement and also a pre-requisite for subsequent components
  - **Component-II**- Two courses from a specified stream
  - **Component-III**- Project/Design/Term Paper
  
2. A Student would be required to complete all the three components (10-12 credits) from the specified stream in order to earn a Micro-Specialization.

### **Eligibility for Micro-Specialisation registration**

In order to register for a Micro-Specialization, the student must have completed all curricular requirements up to the previous semester and have a CGPA  $\geq 8.0$ . Thereafter the student must maintain a CGPA  $\geq 8.0$  without any backlog in the subsequent semesters to keep the Micro-Specialization registration active.

### **Provisional list of Micro Specialization courses**

#### **1. Artificial Intelligence and Data Science**

(Shall be offered to all the programs except B. Tech (AI & DS))

- Foundations of Data Science + lab (4 credits)
- Statistical Inference (3 credits)
- Deep Learning (3 credits)

#### **2. Internet of Things**

(Shall be offered to all the programs except B. Tech-CSE (IoT))

- Introduction to Internet of Things and Lab (4 credits)
- Software and Programming in IoT (3 credits)
- IoT architecture and Protocols (3 credits)



### **3. MedTech**

(Shall be offered to all the programs)

- Sensors for healthcare (4 credits)
- Medical Instrumentation (3 credits + lab 1 credit)
- Wearable devices and Mobile health/ IoMT/Big data analytics in Healthcare/  
Neurorehabilitation and Brain Computer Interface (3 credits)

### **4. Applied Robotics**

Shall be offered to all the programs)

- Robotics for Engineers (3 credits)
- Robot System Design (4 credits)

### **5. Cybersecurity**

(Shall be offered to all the programs except B. Tech - CSE (Cybersecurity))

- Cyber Security Essentials(3 credits)
- Modern Cryptography(3 credits)
- Cyber Forensics (3 credits)