

Four Year Degree Course in Bachelor of Engineering Branch: **COMPUTER SCIENCE & ENGINEERING**
Semester Pattern (Choice Based Credit Grade System)

SEMESTER : THIRD

Sr. No.	Subject Code	Subject	TEACHING SCHEME					EXAMINATION SCHEME									
			HOURS / WEEK			Total HOURS/WEEK	CREDITS	THEORY					PRACTICAL				
			Lecture	Tutorial	P/D			Duration Of Paper (Hr.)	Max. Marks Theory Paper	Internal Marks	Total	Min. Passing Marks	Max. Marks		Total	Min. Passing Marks	
													Int.	Ext.			
THEORY																	
01	3KS01	Mathematics-III	3	1	--	4	4	3	80	20	100	40	--	--	--	--	
02	3KS02	Discrete Structure & Graph Theory	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
03	3KS03	Object Oriented Programming	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
04	3KS04	Data Structures	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
05	3KS05	Analog & Digital Electronics	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
06	4ES06	Environmental Studies *	2	--	--	2	0	--	--	--	--	--	-	-	-	-	
PRACTICALS / DRAWING / DESIGN																	
07	3KS06	Object Oriented Programming Jawa-Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
08	3KS07	Data Structures Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
09	3KS08	Analog & Digital Electronics Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
10	3KS09	C Skill-Lab I (#)	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
Total			17	1	8	26	20	--	--	--	500	--	--	--	200	--	
Total															700		

Note: **The Examination of the Subject Environmental Science shall be conducted in IV Semester as per Ordinance No. 42 of 2005.

C Skill Lab I - based on technology like -Python/Django etc. to be decided by Individual Dept. of respective College.

SEMESTER : FOURTH

Sr. No.	Subject Code	Subject	TEACHING SCHEME					EXAMINATION SCHEME									
			HOURS / WEEK			Total HOURS/WEEK	CREDITS	THEORY					PRACTICAL				
			Lecture	Tutorial	P/D			Duration Of Paper (Hr.)	Max. Marks Theory Paper	Internal Marks	Total	Min. Passing Marks	Max. Marks		Total	Min. Passing Marks	
		Int.		Ext.													
THEORY																	
01	4KS01	Artificial Intelligence	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
02	4KS02	Data Communication & Networking	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
03	4KS03	Operating System	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
04	4KS04	Microprocessor & Assembly Lang. Prog.	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
05	4KS05	Theory of Computation	3	1	--	4	4	3	80	20	100	40	--	--	--	--	
06	4ES06	Environmental Studies *	2	--	--	2	2	3	80	20	100	40	-	-	-	-	
PRACTICALS / DRAWING / DESIGN																	
07	4KS06	Data Communication & Networking Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
08	4KS07	Operating System Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
09	4KS08	Microprocessor & Assembly Lang. Prog. Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
10	4KS09	C Skill-Lab II (#)	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
Total			17	1	8	26	22	--	--	--	500	--	--	--	200	--	
															Total	700	

Note: **The Examination of Mandatory Subject Environmental Science shall be conducted in IV Semester.

C Skill Lab II - based on technology like -PHP, Web Technology, Raspberry Pi/Ardino, etc. to be decided by Individual Dept. of respective College.

SEMESTER : FIFTH

Sr. No.	Subject Code	Subject	TEACHING SCHEME					EXAMINATION SCHEME									
			HOURS / WEEK			Total HOURS/WEEK	CREDITS	THEORY					PRACTICAL				
			Lecture	Tutorial	P/D			Duration Of Paper (Hr.)	Max. Marks Theory Paper	Internal Marks	Total	Min. Passing Marks	Max. Marks		Total	Min. Passing Marks	
		Int.	Ext.														
THEORY																	
01	5KS01	Database Management Systems	4	--	--	4	4	3	80	20	100	40	--	--	--	--	
02	5KS02	Compiler Design	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
03	5KS03	Computer Architecture & Organization	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
04	5KS04	Professional Elective –I (PE-I) *	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
05	5KS05	Open Elective – I (OE-I) **	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
PRACTICALS / DRAWING / DESIGN																	
06	5KS06	Database Management Systems - Lab (@)	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
07	5KS07	Compiler Design Lab	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
08	5KS08	Emerging Tech. Lab-I	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
09	5KS09	C Skill Lab III (*)	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
Total			16	0	8	24	20	--	--	--	500	--	--	--	200	--	
													Total		700		

Prof. Elect I (*) : i) Cognitive Technologies
 (ii) Data Science and Statistics
 (iii) Internet of Things
 (iv) Introduction to Cyber Security

Open Elect : I ()** (i) Fund. of Fin. & Acctg.
 (ii) Prin. of Marketing for Engg.
 (iii) Entrepreneurship

* C Skill Lab III - based on technology like - **Angular & React, Express, Node.js** etc.
 to be decided by Individual Dept. of respective College

(@) Practicals using Mongo DB, MySQL

Emerging Technology Lab# I : AI : IBM Watson, Microsoft Cognitive Toolkit, TensorFlow, Apache System ML, Caffe, Open NN, Torch, Neuroph

DS : R, Python, Cassandra, Apache Hadoop

IoT : Arduino, DeviceHive, Kaa, Home Assistant

CS : Kali Linux, Open VPN, NMAP, Metasploit Framework

*An Orientation Program of 15 hours duration /MOOC on **Indian Constitution** to be offered to the students during the Vth Semester*

Open Elective I to be opted from the courses offered by other engineering technology boards of the university /Massive Open learning Courses (MOOC) such as SWAYAM pertaining to the profession

SEMESTER : SIXTH																	
Sr. No.	Subject Code	Subject	TEACHING SCHEME					EXAMINATION SCHEME									
			HOURS / WEEK			Total HOURS/WEEK	CREDITS	THEORY					PRACTICAL				
			Lecture	Tutorial	P/D			Duration Of Paper (Hr.)	Max. Marks Theory Paper	Internal Marks	Total	Min. Passing Marks	Max. Marks		Total	Min. Passing Marks	
		Int.		Ext.													
THEORY																	
01	6KS01	Security Policy & Governance	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
02	6KS02	Design & Analysis of Algorithms	4	--	--	4	4	3	80	20	100	40	--	--	--	--	
03	6KS03	Software Engg.	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
04	6KS04	Prof. Elective -II (PE-II)	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
05	6KS05	Open Elective - II (OE-II)	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
PRACTICALS / DRAWING / DESIGN																	
06	6KS06	Design & Analysis of Algorithms- Lab.	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
07	6KS07	Software Engg. – lab.	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
08	6KS08	Emerging Tech. Lab-II	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
09	6KS09	C Skill Lab IV (*)	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
Total			16	0	8	24	20	--	--	--	500	--	--	--	200	--	
															Total	700	

Prof. Elect II (*) : i) Natural Language Processing
 (ii) Big Data Analytics
 (iii)Sensors & Actuators
 iv) Cryptography

Open Elect : II ()** (i) Computational Biology
 (ii) Cyber Law & Ethics
 (iii) Intellectual Property Right

FOSS Tools & Technology for Practicals :

Natural Language Toolkit (NLTK),SpaCy, PyTorch-NLP, Natural, Retext, Text Blob
 KNIME, Spark, Neo4J, MongoDB, Hive, Storm
 Devicehub, Zetta, Node-RED, Flutter, M2MLabs Mainspring
 VeraCrypt, ModSecurity, AdBlocker, CheckShortURL, SPAMfighter, SpamBully

* C Skill Lab IV - based on technology like - **DevOp to be decided by Individual Dept. of respective College**

An Orientation Program of 15 hours duration /MOOC on Indian Constitution to be offered to the students during the Vth Semester .

Open Elective II to be opted from the courses offered by other engineering technology boards of the university /Massive Open learning Courses (MOOC) such as SWAYAM pertaining to the profession

SEMESTER : SEVENTH																	
Sr. No.	Subject Code	Subject	TEACHING SCHEME					EXAMINATION SCHEME									
			HOURS / WEEK			Total HOURS/WEEK	CREDITS	THEORY					PRACTICAL				
			Lecture	Tutorial	P/D			Duration Of Paper (Hr.)	Max. Marks Theory Paper	Internal Marks	Total	Min. Passing Marks	Max. Marks		Total	Min. Passing Marks	
THEORY																	
														Int.	Ext.		
01	7KS01	Social Science & Engineering Economics	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
02	7KS02	Computer Graphics	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
03	7KS03	Cloud Computing	4	--	--	4	4	3	80	20	100	40	--	--	--	--	
04	7KS04	Prof. Elective - III (PE-III) (*)	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
05	7KS05	Prof. Elect.- IV (PE-IV) (**)	3	--	--	3	3	3	80	20	100	40	--	--	--	--	
PRACTICALS / DRAWING / DESIGN																	
06	7KS06	Computer Graphics- Lab.	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
07	7KS07	Emerging Tech. Lab-III	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
08	7KS08	Emerging Tech. Lab-IV	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
09	7KS09	** Project & Seminar	--	--	8	8	4	--	--	--	--	--	--	50	50	25	
Total			16	0	14	30	23	--	--	--	500	--	--	--	200	--	
Total															700		

Prof. Elect III (*) : (i) Robotics
(ii) Data Warehousing & Mining
(iii) Embedded Systems
iv) Digital Forensic

Prof. Elect : IV ()** (i) Block Chain Fundamentals
(ii) Image Processing
(iii) Optimization Techniques

Emerging Technology Lab# V : Ethereum, Bigchain DB, Corda
OpenCV, Simple CV, Keras, Caffe
Open Eaagles, Repast, Open Simulator

SEMESTER : EIGHT																	
Sr. No.	Subject Code	Subject	TEACHING SCHEME					EXAMINATION SCHEME									
			HOURS / WEEK			Total HOURS/WEEK	CREDITS	THEORY					PRACTICAL				
			Lecture	Tutorial	P/D			Duration Of Paper (Hr.)	Max. Marks Theory Paper	Internal Marks	Total	Min. Passing Marks	Max. Marks		Total	Min. Passing Marks	
													Int.	Ext.			
THEORY																	
01	8KS01	Object Oriented Analysis & Design	3	--		3	3	3	80	20	100	40	--	--	--	--	
02	8KS02	Professional Ethics & Management	3	--		3	3	3	80	20	100	40	--	--	--	--	
03	8KS03	Prof. Elective-V (PE-V)	3	--		3	3	3	80	20	100	40	--	--	--	--	
04	8KS04	Prof. Elective-VI (PE-VI)	3	--		3	3	3	80	20	100	40	--	--	--	--	
PRACTICALS / DRAWING / DESIGN																	
05	8KS05	Emerging Tech. Lab-V	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
06	8KS02	Emerging Tech. Lab-VI	--	--	2	2	1	--	--	--	--	--	25	25	50	25	
07	8KS03	Project & Seminar	--	--	12	12	6	--	--	--	--	--	75	75	150	75	
Total			12	--	16	28	20	--	--	--	400	--	--	--	250	--	
Total															650		

Prof. Elect V (*) : (i) Virtual & Augmented Reality
(ii) Machine Learning and AI
(iii) Wireless Sensor Networks
(iv) System & Software Security

Prof. Elect : VI ()** (i) Distributed Ledger Technology
(ii) Multimedia Computing
(iii) Modeling & Simulation

Emerging Tech. Lab# V : i) Google's ARCore, AR.js, ARToolKit, , **Emerging Tech. Lab# VI :** i) Hyperledger, HydraChain, MultiChain, Elements
DroidAR Brio, Adobe Aero
ii) R Studio, Orange, D3.js, Ggplot2, Jupyter Notebooks
iii) Wireshark, Burp Suit, Nessus

ii) Google Colab, GPUImage, Cuda, Aforge/Accord.NET
iii) OR-Tools, Locust.io, httpperf, Apache JMeter, Siege