



**Cambridge Institute of Technology, Bengaluru**  
**An Autonomous Institution**



Approved by UGC & AICTE, New Delhi, Approved with 2(f) status by UGC,  
Affiliated to VTU, Accredited by NAAC with A+ Grade, UG programs, ECE, EEE, ISE and CSE Accredited by NBA, Certified by  
ISO 9001:2015

**Department of Computer Science & Engineering Stream**  
**(CSE, CSE-IOT&CS, ISE)**

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**B.E. 3<sup>rd</sup> to 8<sup>th</sup> Semester**

**Scheme for the**  
**Department of Computer Science & Engineering**  
**Stream (CSE & ISE)**

**Academic year 2023-24**



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3rd Semester											
Sl.No.	Course Type	Course Title	Course Code	Teaching Dept.	L	T	P	Credits	CIE	SEE	Total
1	BSC	Applied Mathematics -III	MC201	BS	3	2	0	4	50	50	100
2	PCC	Digital Design and Computer Organization	CS202	CSE Stream	2	2	0	3	50	50	100
3	PCCL	Digital Design and Computer Organization Laboratory	CS203	CSE Stream	0	0	2	1	50	50	100
4	PCC	Data Structures and Applications	CS204	CSE Stream	3	2	0	4	50	50	100
5	PCCL	Data Structures and Applications Laboratory	CS205	CSE Stream	0	0	2	1	50	50	100
6	IPCC	Object Oriented Programming with Java	CS206	CSE Stream	2	0	2	3	50	50	100
7	ESC	Engineering Science Course	CS22X	CSE Stream	2	1	1	3	50	50	100
8	BSC	Biology for Engineers	BG207	BS	2	0	0	2	50	50	100
9	NCMC	NSS – Phase 1	NS208	NSS	0	2	0	0	50	0	50
		Physical Education (PE) (Sports and Athletics) – Phase 1	PE208	PED							
		Yoga for a Better Life - Phase 1	YG208	Yoga							
10	NCMC	Additional Mathematics/Unix Shell Programming and GIT	DM209 /CS209	BS/ CSE Stream	2	0	0	0	50	50	100
					16	9	7	21	500	450	950

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In **IPCC** courses, practical components shall be included, but not limited to the few experiments. IPCC courses shall have list few

**National Service Scheme /Physical Education/Yoga:** All students have to register for any one of the courses namely National Service Scheme (NSS), Physical Education (PE) (Sports and Athletics), and **Yoga (YG)** with the concerned coordinator of the course during the III semester. Activities shall be carried out between III semesters to the IV semester (for 2 semesters). Successful

ESC		
Sl.No	Course Title	Course Code
1	Operating System	CS221
2	UNIX Programming	CS222



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4th Semester												
Sl.No.	Course Type	Course Title	Course Code	Teaching Dept.	L	T	P	Credits	CIE	SEE	Total	
1	BSC	Applied Mathematics -IV	MC251	BS	2	2	0	3	50	50	100	
2	PCC	Design and Analysis of Algorithms	CS252	CSE Stream	3	0	0	3	50	50	100	
3	PCCL	Design and Analysis of Algorithms Laboratory	CS253	CSE Stream	0	0	2	1	50	50	100	
4	PCC	Microprocessor & Microcontrollers	CS254	CSE Stream	3	0	0	3	50	50	100	
5	PCCL	Microprocessor & Microcontrollers Laboratory	CS255	CSE Stream	0	0	2	1	50	50	100	
6	IPCC	Web Programming	CS256	CSE Stream	2	0	2	3	50	50	100	
7	ESC	Engineering Science Course	CS26X	CSE Stream	3	0	0	3	50	50	100	
8	AEC	Ability Enhancement Course	CS27X	CSE Stream	2	0	0	2	50	50	100	
9	UHV	Universal Human Values	HV257	BS	2	0	0	2	50	50	100	
10	NCMC	NSS – Phase 2	NS258	NSS	0	2	0	0	50	0	50	
		Physical Education (PE) (Sports and Athletics) – Phase 2	PE258	PED								
		Yoga for a Better Life - Phase 2	YG258	Yoga								
11	NCMC	Social Connect and Responsibility	SC259	Any Dept	0	0	2	0	50	0	50	
					<b>17</b>	<b>4</b>	<b>8</b>	<b>21</b>	<b>550</b>	<b>450</b>	<b>1000</b>	

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**National Service Scheme /Physical Education/Yoga:** All students have to register for any one of the courses namely National Service Scheme (NSS), Physical Education (PE) (Sports and Athletics), and **Yoga (YG)** with the concerned coordinator of the course during the III semester. Activities shall be carried out between III semesters to the IV semester (for 2 semesters). Successful completion of the registered course and requisite **CIE score is mandatory for the award of the degree.** The events shall be appropriately scheduled by the colleges and the same shall be reflected in the calendar prepared for the NSS, PE, and Yoga activities. These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the course is mandatory for the award of degree.

ESC		
Sl.No	Course Title	Course Code
1	Finite Automata and Formal Languages	CS261
2	Optimization Techniques	CS262

AEC		
Sl.NO	Course Title	Course Code
1	Special Topic	CS271
2	Unix Shell Programming with GIT	CS272
3	Indian Knowledge System	CS273
4	Arduino - Programming and Interfacing	CS274

5th Semester											
Sl. No.	Course Type	Course Title	Course Code	Teaching Dept.	L	T	P	Credits	CIE	SEE	Total
1	PCC	Database Management Systems	CS301	CSE Stream	2	2	0	3	50	50	100
2	PCCL	Database Management Systems Laboratory	CS302	CSE Stream	0	0	2	1	50	50	100
3	PCC	Computer Networks	CS303	CSE Stream	2	2	0	3	50	50	100
4	PCCL	Computer Networks Laboratory	CS304	CSE Stream	0	0	2	1	50	50	100
5	IPCC	Full Stack Development/ Architecture of IOT	CS305/IC305	CSE Stream	2	0	2	3	50	50	100
6	HSMC	Research Methodology and IPR/Project Management	CS306	CSE Stream	2	0	0	2	50	50	100
7	HSMC	Environmental studies	CV307	CIVIL	0	2	0	1	50	50	100
8	AEC	BOS recommended ONLINE Courses	CS308					2			100
9	PEC-1	Professional Elective Course	CS32X/IS32X/IC32X	CSE Stream	3	0	0	3	50	50	100
10	OEC-1	Open Elective Course	CS33X/IS33X	CSE Stream	3	0	0	3	50	50	100
11	NCMC	NSS – Phase 3	NS309	NSS	0	2	0	0	50	0	50
		Physical Education (PE) (Sports and Athletics) – Phase 3	PE309	PED							
		Yoga for a Better Life - Phase 3	YG309	Yoga							
					14	8	6	22	500	450	1050

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**Professional Elective Courses (PEC):** A professional elective (PEC) course is intended to enhance the depth and breadth of educational experience in the Engineering and Technology curriculum. Multidisciplinary courses that are added supplement the latest trend and advanced technology in the selected stream of engineering.

**Open Elective Course (OEC):** These Courses will be offered by each department on the emerging technologies and Centre of Excellence to students of other branches. These courses may be online courses approved by the respective Board of Studies (BOS). These courses shall not offered to the students of offering department.

**Note:**

- 1 In place of Open Elective Course (OEC) students may carry out any industrial internship or societal internship or societal project leading to startups.
- 2 The eligible students (**having CGPA  $\geq 7.5$  without any backlogs**) may register for **Research work** leading a publication in reputed journal at the 5th semester in lieu of an Open elective. **The Credit for the same shall be reflected in the 8th Semester grade card.**

**Certification course:** The students shall take up the relevant certification courses from NPTEL/Swayam, Coursera, Infosys Springboard, **Courses offered by Premier Institute like IISC, IITs, MIT** etc. having a final score reflecting in the certificate. Students shall take up these courses from 1st semester and submit the certificate prior to last working of the 5th semester. **There will be no SEE. The score reflected in certificate shall be directly used for grade processing.**

PEC-1		
Sl.No	Course Title	Course Code
1	JavaScript Based Frameworks/Computer Vision	CS321/ IS321
2	Data Science with Visualization/Natural Language Processing	CS322/IS322
3	IOT & Embedded Systems/IOT with Raspberry Pi/Computer Vision and Image Processing	CS323/IS323/IC323
4	Artificial Intelligence	CS324
5	Application Development using Python	CS325
6	Computer Graphics	CS326

OEC-1		
Sl.No.	Course Title	Course Code
1	Web Technology/ Introduction to Python	CS331/IS331
2	OOPS with Java	CS332
3	Data Structure and Algorithms	CS333

6th Semester												
Sl. No.	Course Type	Course Title	Course Code	Teaching Dept.	L	T	P	Credits	CIE	SEE	Total	
1	PCC	Software Engineering/ Crptography & Cybersecurity	CS351/ IC351	CSE Stream	2	2	0	3	50	50	100	
2	PCCL	Agile Software Laboratory/Cyber Security Lab	CS352/ IC352	CSE Stream	0	0	2	1	50	50	100	
3	PCC	Machine Learning	CS353	CSE Stream	2	2	0	3	50	50	100	
4	PCCL	Machine Learning Laboratory	CS354	CSE Stream	0	0	2	1	50	50	100	
5	IPCC	Compiler Design/Software Design Patterns/IOT Communication Protocols	CS355/ IS355/ IC355	CSE Stream	2	0	2	3	50	50	100	
6	HSMC	Research Methodology and IPR/Project Management	CS356	CSE Stream	2	0	0	2	50	50	100	
7	AEC	Ability Enhancement Course	CS36X/ IC36X	CSE Stream	0	2	2	2	50	50	100	
8	PROJ	Mini Project	CS357	CSE Stream	0	0	2	1	50	50	100	
9	PEC-2	Professional Elective Course	CS37X /IS37X/I C37X	CSE Stream	3	0	0	3	50	50	100	
10	OEC-2	Open Elective Course	CS38X/I S38X	CSE Stream	3	0	0	3	50	50	100	
11	NCMC	NSS – Phase 4	NS358	NSS	0	2	0	0	50	0	50	
		Physical Education (PE) (Sports and Athletics) – Phase 4	PE358	PED								
		Yoga for a Better Life - Phase 4	YG358	Yoga								
					14	8	10	22	500	500	1000	

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AEC		
Sl.No.	Course Title	Course Code
1	Innovation & Entrepreneurship/Vulnerability Assessment and Penetration Testing Laboratory	CS361/IC361
2	Latex/IoT Data Analytics using Python	CS362/IC362
3	Active Learning/Problem Management in Cyber Security	CS363/IC363
4	Mobile Application Development Lab	CS364

OEC-2		
Sl. No.	Course Title	Course Code
1	Cyber Security/Web 2.0	CS381/IS381
2	Cloud Computing/Introduction to AI & ML	CS382/IS382
3	Advanced Java	CS383

PEC-2		
Sl.No.	Course Title	Course Code
1	Image Processing/IOT & Embedded Systems/Software Engineering	CS371/IS371/IC371
2	Cryptography/Business Analytics/Artificial Intelligence in IOT & Cyber Security	CS372/IS372/IC372
3	Social Network Analysis	CS373
4	Natural Language Processing/Wireless and Mobile Device Security	CS374/IC374
5	Computational Science	CS375
6	Advanced Java	CS376



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7th Semester											
Sl. No.	Course Type	Course Title	Course Code	Teaching Dept.	L	T	P	Credits	CIE	SEE	Total
1	PCC	Cloud Computing/ Block Chain Technology	CS401/IC401	CSE Stream	2	2	0	3	50	50	100
2	PCCL	Cloud Computing Laboratory/Block Chain Technology Lab	CS402/IC402	CSE Stream	0	0	2	1	50	50	100
3	IPCC	Advanced Databases & Analytics/ Integration of Cloud Computing with Internet of Things	CS403/IC403	CSE Stream	2	0	2	3	50	50	100
4	PROJ-1	Project Phase-1 with Seminar	CS404	CSE Stream	0	0	4	1	50	0	50
5	PEC-3	Professional Elective Course	CS42X/IS42X/IC42X	CSE Stream	3	0	0	3	50	50	100
6	PEC-4	Professional Elective Course	CS43X/IS43X/IC43X	CSE Stream	3	0	0	3	50	50	100
7	OEC-3	Open Elective Course	CS44X/IS44X	CSE Stream	3	0	0	3	50	50	100
					13	2	8	17	350	300	650

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**Note:**

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- 2 **Project Phase-1:** Includes Problem statement and Literature survey on the project to be submitted in 8th semester.

PEC-3		
Sl.No.	Course Title	Course Code
1	Deep Learning/Industrial IOT/Neural Networks	CS421/IS421/IC421
2	Computer Vision with Robotics/Big Data Analytics/IOT Automation & Analytics	CS422/IS422/IC422
3	Fuzzy Logic/Information Security	CS423/IS423
4	Virtual Reality/DevOps	CS424/IS424
5	Distributed Computing & Blockchain	CS425

OEC-3		
Sl.No.	Course Title	Course Code
1	Software Architecture/Angular JS & Node JS	CS441/IS441
2	Software Testing/Data Science	CS442/IS442
3	Blockchain	CS443

PEC-4		
Sl. No.	Course Title	Course Code
1	DevOps/Software Architecture/Ethical Hacking	CS431/IS431/IC431
2	Cyber Security/NOSQL/Hacker Techniques, Tools, and Incident Handling	CS432/IS432/IC432
3	User Experience Design/ Cyber Security Management, Compliance and Governance/ Virtual Reality	CS433/IS433/IC433
4	Software Product Management /Introduction to Cyber Forensics	CS434/IC434
5	Open-Source Software Engineering	CS435
6	Advances in Software Architecture	CS436



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8th Semester										
Sl.No.	Course Type	Course Title	Course Code	L	T	P	Credits	CIE	SEE	Total
1	INT	Research Internship	CS451				5	50	50	100
2	PROJ-2	Project Phase-2	CS452				10	50	50	100
3	AEC	BOS recommended ONLINE Courses/ Certification	CS453				2			100
							<b>17</b>	<b>100</b>	<b>100</b>	<b>300</b>

**NOTE:**

- 1 **INT** : Research Internship shall be carried out in the premier institutes or in the Research Institute for minimum period of 14 to 18 weeks.
- 2 **Project Phase-2:** Includes demonstration and presentation on the project and the final viva. A Technical paper submitted/published is desirable.
- 3 **Research work:** The credit for Research work opted during 5th semester shall be reflected in the 8th semester grade card upon submission of **proof for publishing in the research paper in reputed journal.**
- 4 **Certification course:** The students shall take up the relevant certification courses from NPTEL/Swayam, Coursera, Infosys Springboard, **Courses offered by Premier Institute like IISC, IITs, MIT** etc. having a final score reflecting in the certificate. Students shall take up these courses from 1st semester and submit the certificate prior to last working of the 8th semester. **There will no SEE. The score reflected in certificate shall be directly used for grade processing.**