VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI
B.E. in Computer Science and Engineering(IoT & Cyber Security including Blockchain)
Scheme of Teaching and Examinations 2022
Outcome Based Education (OBE) and Choice Based Credit System (CBCS)
(Effective from the academic year 2023-24)

III SEMESTER

Sl. No	Course	Course Code	Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Theory Lecture L	Tutorial T	Practical / Drawing P	SDA S	Duration in hours	CIE Marks	SEE Marks	Total Marks	Credits
1	PCC/BSC	BCS301	Mathematics for Computer Science	TD- MATHS PSB: MATHS	3	2	0		03	50	50	100	4
2	IPCC	BCS302	Digital Design & Computer Organization	TD:IC PSB:CS	3	0	2		03	50	50	100	4
3	IPCC	BCS303	Operating Systems	TD:IC PSB:CS	3	0	2		03	50	50	100	4
4	PCC	BCS304	Data Structures and Applications	TD:IC PSB:CS	3	0	0		03	50	50	100	3
5	PCCL	BCSL305	Data Structures Lab	TD:IC PSB:CS	0	0	2		03	50	50	100	1
6	ESC	BCS306x	ESC/ETC/PLC	TD:IC PSB:CS	2	0	2		03	50	50	100	3
7	UHV	BSCK307	**Social Connect and Responsibility**	Any Department	0	0	2		01	100	---	100	1
8	AEC/ SEC	BXX358x	Ability Enhancement Course/Skill Enhancement Course – III	TD: IC PSB: CS	If the course is a Theory				01	50	50	100	1
					1	0	0						
					If a course is a laboratory				02				
					0	0	2						
9	MC	BNSK359	National Service Scheme	NSS coordinator	0	0	2			100	---	100	0
		BPEK359	Physical Education	Physical Education Director									
		BYOK359	Yoga	Yoga Teacher									
				Total						550	350	900	21

PCC: Professional Core Course, **PCCL**: Professional Core Course laboratory, **UHV**: Universal Human Value Course, **MC**: Mandatory Course (Non-credit), **AEC**: Ability Enhancement Course, **SEC**: Skill Enhancement Course, **L:** Lecture, **T**: Tutorial, **P**: Practical **S= SDA**: Skill Development Activity, **CIE**: Continuous Internal Evaluation, **SEE**: Semester End Evaluation.K :This letter in the course code indicates common to all the stream of engineering. ESC: Engineering Science Course, ETC: Emerging Technology Course, PLC: Programming Language Course

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Engineering Science Course (ESC/ETC/PLC) (Note- Student should opt for the course which should not be similar to the course opted in 1st Year)			
BCS306A	Object Oriented Programming with Java		
BCS306B	Object Oriented Programming with C++		
Ability Enhancement Course – III			
BCY358A	Cyber Crime & Cyber Laws	BCS358C	Project Management with Git
BCY358B	Incident Management in Cyber Security	BCS358D	Data Visualization with Python

Professional Core Course (IPCC): Refers to Professional Core Course Theory Integrated with practicals of the same course. Credit for IPCC can be 04 and its Teaching–Learning hours (L : T : P) can be considered as (3 : 0 : 2) or (2 : 2 : 2). The theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper. For more details, the regulation governing the Degree of Bachelor of Engineering /Technology (B.E./B.Tech.) 2022-23 may please be refereed.

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(YOG) with the concerned coordinator of the course during the first week of III semesters. Activities shall be carried out between III semester to the VI semester (for 4 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.

			VARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI										

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IV SEMESTER

Sl. No	Course and Course Code		Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination				Credits
					Theory Lecture	Tutorial	Practical / Drawing	Self - Study	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	PCC/BSC	BIC401	Elements of Cyber Security & IoT	TD: IC PSB: CS	3	0	0		03	50	50	100	3
2	IPCC	BCO402	Analysis & Design of Algorithms	TD: IC PSB: CS	3	0	2		03	50	50	100	4
3	IPCC	BCS403	Database Management Systems	TD: IC PSB: CS	3	0	2		03	50	50	100	4
4	PCCL	BICL404	Cyber Security Lab	TD: IC PSB: CS	0	0	2		03	50	50	100	1
5	ESC	BXX405x	ESC/ETC/PLC	TD: IC/Maths PSB: CS/Maths	2	2	0		03	50	50	100	3
6	AEC/ SEC	BXX456x	Ability Enhancement Course/Skill Enhancement Course- IV	TD : Concerned department PSB: CS	If the course is Theory				01	50	50	100	1
					1	0	0						
					If the course is a lab				02				
					0	0	2						
4	BSC	BBOC407	Biology For Computer Engineers	TD / PSB: BT, CHE,	2	0	0		03	50	50	100	2
7	UHV	BUHK408	Universal human values course	Any Department	1	0	0		01	50	50	100	1
9	MC	BNSK459	National Service Scheme	NSS coordinator	0	0	2			100	---	100	0
		BPEK459	Physical Education	Physical Education Director									
		BYOK459	Yoga	Yoga Teacher									
								Total		500	400	900	19

PCC: Professional Core Course, **PCCL**: Professional Core Course laboratory, **UHV**: Universal Human Value Course, **MC**: Mandatory Course (Non-credit), **AEC**: Ability Enhancement Course, **SEC**: Skill Enhancement Course, **L:** Lecture, **T**: Tutorial, **P**: Practical **S= SDA**: Skill Development Activity, **CIE**: Continuous Internal Evaluation, **SEE**: Semester End Evaluation. K :This letter in the course code indicates common to all the stream of engineering.

Ability Enhancement Course / Skill Enhancement Course – IV			
BCO456A	Data Analytics for IOT	BCY456C	Problem Management in Cyber Security
BICL456B	Embedded C (0:0:2)	BCSL456D	Technical writing using LATEX (Lab) (0:0:2)
Engineering Science Course (ESC/ETC/PLC)			
BCS405A	Discrete Mathematical Structures	BCS405C	Optimization Technique
BCS405B	Graph Theory	BCY405D	Number Theory

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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(YOG) with the concerned coordinator of the course during the first week of III semesters. Activities shall be carried out between III semester to the VI semester (for 4 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 courses is mandatory for the award of degree.

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V SEMESTER

Sl. No	Course and Course Code		Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Theory Lecture	Tutorial	Practical / Drawing	SDA	Duration in hours	CIE Marks	SEE Marks	Total Marks	Credits
					L	T	P	S					
1	PCC	BCS501	Software Engineering & Project Management	TD: IC PSB : CS	4	0	0		03	50	50	100	4
2	IPCC	BCS502	Computer Networks	TD: IC PSB: CS	3	0	2		03	50	50	100	4
3	PCC	BCS503	Theory of Computation	TD: IC PSB: CS	3	2	0		03	50	50	100	4
4	PCCL	BICL504	IoT Lab	TD: IC PSB: CS	0	0	2		03	50	50	100	1
5	PEC	BXX515x	Professional Elective Course	TD: IC PSB: CS	3	0	0		03	50	50	100	3
6	PROJ	BIC586	Mini Project	TD: IC PSB: CS	0	0	4		03	100		100	2
7	AEC	BRMK557	Research Methodology and IPR	TD: HSM PSB : HSM	2	2	0		02	50	50	100	3
8	HSMS	BCS508	Environmental Studies and E-waste Management	TD: HSM PSB : HSM	1	0	0		01	50	50	100	1
9	MC	BNSK559	National Service Scheme	NSS coordinator	0	0	2			100		100	0
		BPEK559	Physical Education	Physical Education Director									
		BYOK559	Yoga	Yoga Teacher									
							Total			500	300	800	22

Professional Elective Course

BIC515A	IOT system architecture	BIC515C	Full Stack Development

BCS515B	Artificial Intelligence	BCS515D	Distributed Systems

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Professional Core Course (IPCC): Refers to Professional Core Course Theory Integrated with practicals of the same course. Credit for IPCC can be 04 and its Teaching– Learning hours (L : T : P) can be considered as (3 : 0 : 2) or (2 : 2 : 2). The theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper. For more details, the regulation governing the Degree of Bachelor of Engineering /Technology (B.E./B.Tech.) 2022-23

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(YOG) with the concerned coordinator of the course during the first week of III semesters. Activities shall be carried out between III semester to the VI semester (for 4 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.

Mini-project work: Mini Project is a laboratory-oriented/hands on course that will provide a platform to students to enhance their practical knowledge and skills by the development of small systems/applications etc. Based on the ability/abilities of the student/s and recommendations of the mentor, a single discipline or a multidisciplinary Mini- project can be assigned to an individual student or to a group having not more than 4 students.

CIE procedure for Mini-project:

(i) Single discipline: The CIE marks shall be awarded by a committee consisting of the Head of the concerned Department and two faculty members of the Department, one of them being the Guide. The CIE marks awarded for the Mini-project work shall be based on the evaluation of the project report, project presentation skill, and question and answer session in the ratio of 50:25:25. The marks awarded for the project report shall be the same for all the batches mates.

(ii) Interdisciplinary: Continuous Internal Evaluation shall be group-wise at the college level with the participation of all the guides of the project.

The CIE marks awarded for the Mini-project, shall be based on the evaluation of the project report, project presentation skill, and question and answer session in the ratio 50:25:25. The marks awarded for the project report shall be the same for all the batch mates.

No SEE component for Mini-Project.

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. Each group will provide an option to select one course. The minimum number of students' strengths for offering a professional elective is 10. However, this conditional shall not be applicable to cases where the admission to the program is less than 10.

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VI SEMESTER

Sl. No	Course and Course Code		Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination				Credits
					Theory Lecture	Tutorial	Practical / Drawing	SDA	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	IPCC	BCO601	Microcontrollers & Embedded Systems	TD: IC PSB: CS	3	0	2		03	50	50	100	4
2	PCC	BCY602	Cryptography & Network Security	TD: IC PSB: CS	4	0	0		03	50	50	100	4
3	PEC	BXX613x	Professional Elective Course	TD: IC PSB: CS	3	0	0		03	50	50	100	3
4	OEC	BXX654x	Open Elective Course	TD: IC PSB: CS	3	0	0		03	50	50	100	3
5	PROJ	BIC685	Project Phase I	TD: IC PSB: CS	0	0	4		03	100	--	100	2
6	PCCL	BICL606	Vulnerability Assessment and Penetration Testing Laboratory	TD: IC PSB: CS	0	0	2		03	50	50	100	1
7	AEC/SDC	BXX657x	Ability Enhancement Course/Skill Development Course V	TD and PSB: Concerned department	If the course is offered as a Theory				01	50	50	100	1
					1	0	0						
					If course is offered as a practical								
					0	0	2						
8	MC	BNSK658	National Service Scheme	NSS coordinator	0	0	2			100	---	100	0
		BPEK658	Physical Education	Physical Education Director									
		BYOK658	Yoga	Yoga Teacher									
9	MC	BIKS609	Indian Knowledge System		1	0	0		01	100	---	100	0
								Total		**500**	**300**	**800**	**18**

Professional Elective Course			
BCS613B	**Computer Vision**	BCO613D	Fog and Edge Computing
BIS613D	Cloud Computing & Security	BCY613D	Wireless and Mobile Device Security

Open Elective Course			
BCS654A	Introduction to Data Structures	BIS654C	Mobile Application Development
BCS654B	Fundamentals of Operating Systems	BAI654D	Introduction to Artificial Intelligence

Ability Enhancement Course / Skill Enhancement Course-V			
BCYL657A	Industrial Cyber Security	BAIL657C	Generative AI
BCSL657B	React	BCSL657D	Devops

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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(YOG) with the concerned coordinator of the course during the first week of III semesters. Activities shall be carried out between III semester to the VI semester (for 4 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.

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. Each group will provide an option to select one course. The minimum number of students' strengths for offering professional electives is 10. However, this conditional shall not be applicable to cases where the admission to the program is less than 10.

Open Elective Courses:

Students belonging to a particular stream of Engineering and Technology are not entitled to the open electives offered by their parent Department. However, they can opt for an elective offered by other Departments, provided they satisfy the prerequisite condition if any. Registration to open electives shall be documented under the guidance of the Program Coordinator/ Advisor/Mentor. The minimum numbers of students' strength for offering Open Elective Course is 10. However, this condition shall not be applicable to class where the admission to the program is less than 10.

Project Phase-I : Students have to discuss with the mentor /guide and with their helphe/she has to complete the literature survey and prepare the report and finally define the problem statement for the project work.

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VII SEMESTER (Swappable VII and VIII SEMESTER)

Sl. No	Course and Course Code		Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination				Credits
					Theory Lecture	Tutorial	Practical / Drawing	SDA	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	IPCC	BCO701	IOT communication Protocols	TD: IC PSB: CS	3	0	2		03	50	50	100	4
2	IPCC	BIC702	Blockchain Technology	TD: IC PSB: CS	3	0	2		03	50	50	100	4
3	PCC	BIC703	Machine Learning	TD: IC PSB: CS	4	0	0		03	50	50	100	4
4	PEC	BIC714x	**Professional Elective Course**	TD: IC PSB: CS	3	0	0		03	50	50	100	3
5	OEC	BIC755x	**Open Elective Course**	TD: IC PSB: CS	3	0	0		01	50	50	100	3
6	PROJ	BIC786	**Major Project Phase-II**	TD: IC PSB: CS	0	0	12		03	100	100	200	6
										400	300	700	24

Professional Elective Course			
BCY714D	Cyber Security Management, Compliance and Governance	BCO714C	IoT Automation
BCS714A	Deep Learning	BCS714D	Big Data Analytics
Open Elective Course			
BIC755A	Introduction to DBMS	BIC755C	Software Engineering
BIC755B	Introduction to Algorithms	BIC755D	Introduction to Embedded Systems

PCC: Professional Core Course, **PCCL**: Professional Core Course laboratory, **PEC**: Professional Elective Course, **OEC**: Open Elective Course PR: Project Work, **L**: Lecture, **T**: Tutorial, **P**: Practical **S= SDA**: Skill Development Activity, **CIE**: Continuous Internal Evaluation, **SEE**: Semester End Evaluation. **TD-** Teaching Department, **PSB**: Paper Setting department, **OEC**: Open Elective Course, **PEC**: Professional Elective Course. **PROJ**: Project work

Note: VII and VIII semesters of IV years of the program

(1) Institutions can swap the VII and VIII Semester Schemes of Teaching and Examinations to accommodate research internships/ industry internships after the VI semester**.**

(2) Credits earned for the courses of VII and VIII Semester Scheme of Teaching and Examinations shall be counted against the corresponding semesters whether the VII or VIII semesters is completed during the beginning of the IV year or the later part of IV years of the program.

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PROJECT WORK (21XXP75): The objective of the Project work is
   (i) To encourage independent learning and the innovative attitude of the students.
   (ii) To develop interactive attitude, communication skills, organization, time management, and presentation skills.
   (iii) To impart flexibility and adaptability.
   (iv) To inspire team working.
   (v) To expand intellectual capacity, credibility, judgment and intuition.
   (vi) To adhere to punctuality, setting and meeting deadlines.
   (vii) To install responsibilities to oneself and others.
   (viii) To train students to present the topic of project work in a seminar without any fear, face the audience confidently, enhance communication skills, involve in group discussion to present and exchange ideas.

CIE procedure for Project Work:

(1) Single discipline: The CIE marks shall be awarded by a committee consisting of the Head of the concerned Department and two senior faculty members of the Department, one of whom shall be the Guide.

The CIE marks awarded for the project work, shall be based on the evaluation of the project work Report, project presentation skill, and question and answer session in the ratio 50:25:25. The marks awarded for the project report shall be the same for all the batch mates.