B.E. in Artificial Intelligence and Machine Learning
Scheme of Teaching and Examinations - 2025
Outcome-BasedEducation(OBE) and Choice-Based Credit System (CBCS)(Effective from the academic year 2025-26)

III SEMESTER

Sl. No	Course	Course Code	CourseTitle	Teaching Department(TD)and Question Paper Setting Board(PSB)	TeachingHours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Self-Learning	Duration in hours	CIE Marks	SEE Marks	TotalMarks	
					L	T	P	SL					
1	ASC	1BMAT301	Probability, Distributions and Statistics	TD /PSB:Mathematics	3	2	0	0	5	50	50	100	4
2	IPCC	1BCS302	Object Oriented Programming with Java	TD/PSB: CS Allied Depts.	3	0	2	0	5	50	50	100	4
3	PCC	1BCS303	Digital Design and Computer Organization	TD/PSB: CS Allied Depts.	4	0	0	0	4	50	50	100	4
4	PCC	1BCS304	Operating Systems	TD/PSB: CS Allied Depts.	3	0	0	0	3	50	50	100	3
5	PCC	1BCS305	Data Structures and Applications	TD/PSB: CS Allied Depts.	3	0	0	0	3	50	50	100	3
6	PCCL	1BCSL306	Data Structures Laboratory	TD/PSB: CS Allied Depts.	0	0	2	0	2	50	50	100	1
7	AEC	1BCSL307	Project Management (with Git) Laboratory	TD/PSB: CS Allied Depts.	0	0	2	0	2	50	50	100	1
8	SDC	1BCP308	Community Project (Project-Based Learning)	AnyDepartment/ Respective Engineering Dept.	0	0	0	2	2	50	50	100	1
9	NCMC	1BNSS309	NationalServiceScheme(NSS)	Campus: NSScoordinator	0	0	2	0	--	100	---	100	PP
		1BPE309	PhysicalEducation(PE)(Sportsand Athletics)	Campus: PhysicalEducation Director									
		1BYOG309	Yoga	Campus: YogaTeacher									
		1BMUK309	Music	Campus: Music Teacher									

10	NCMC	1BMATDIP310	Mathematics course for Lateral Entry Students	TD -Maths Dept/ VTU Online (COE). CIE by VTU online COE	3	0	0	3	3	100	---	100	PP
Total										**600**	**400**	**1000**	**21**

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Outcome-Based Education(OBE) and Choice-Based Credit System (CBCS) (Effective from the academic year 2025-26)

IV SEMESTER

Sl. No	Course and Course Code		Course Title	Teaching Department(TD) and QuestionPaperSettingBoard (PSB)		TeachingHours/Week				Examination				Credits
						Theory Lecture	Tutorial	Practical/Drawing	Self-Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
						L	T	P	SL					
1	PCC	1BCS401	Graph Theory and Applications	TD/PSB: CS Allied Depts.		3	0	0	0	3	50	50	100	3
2	IPCC	1BAI402	Design and Analysis of Algorithms	TD/PSB: CS Allied Depts.		3	0	2	0	5	50	50	100	4
3	PCC	1BAI403	Database Management Systems	TD/PSB: CS Allied Depts.		3	2	0	0	5	50	50	100	4
4	PCC	1BAI404	Machine Learning	TD/PSB: CS Allied Depts.		3	0	0	0	3	50	50	100	3
5	PCCL	1BAIL405	Machine Learning Laboratory	TD/PSB: CS Allied Depts.		0	0	2	0	2	50	50	100	1
6	AEC	1BXXL406	Ability Enhancement Course	TD/PSB: CS Allied Depts.		0	0	2	0	2	50	50	100	1
7	BSC	1BCS407	Biology for Computer Engineers	TD/PSB: CS Allied Depts.		2	0	0	0	3	50	50	100	2
8	SDC	1BEP408	Environmental Science Project	TD/PSB: CS Allied Depts.		0	0	0	2	3	50	50	100	1
9	NCMC	1BNSK409	NationalServiceScheme(NSS)	Campus	NSScoordinator	0	0	2	0	--	100	---	100	PP
		1BPEK409	PhysicalEducation(PE)(SportsandAthletics)		PhysicalEducation Director									
		1BYOK409	Yoga		YogaTeacher									
		1BMUS409	Music		Music Teacher									
10	NCMC	1BMATDIP41	Mathematics course for Lateral Entry	TD -Maths Dept/ VTU Online						--	100	--	100	PP

		0	Students	(COE). CIE by VTU online COE									
Total										**600**	**400**	**1000**	**19**
Ability Enhancement Course (Laboratory) 1BxxL406x													
1BADL406A	Unix Shell Programming			1BCAL406A	R Programming								
1BCGL406B	UI/UX			1BADL406D	NOSQL Databases								

B.E. in Artificial Intelligence and Machine Learning

Scheme of Teaching and Examinations- 2025

Outcome-BasedEducation(OBE)andChoice-BasedCreditSystem (CBCS) (Effectivefromtheacademicyear 2025-26)

VSEMESTER

Sl.No	Course and Course Code		Course Title	Teaching Department(TD) and Question Paper Setting Board(PSB)	TeachingHours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical /Drawing	Self – Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	PCC	1BCS501	Software Engineering and Project Management	TD/PSB: CS Allied Depts.	3	0	0	0	3	50	50	100	3
2	IPCC	1BAI502	Artificial Intelligence	TD/PSB: CS Allied Depts.	3	0	2	0	5	50	50	100	4
3	PCC	1BCS503	Theory of Computation	TD/PSB: CS Allied Depts.	3	0	0	0	3	50	50	100	3
4	PCC	1BAI504	Computer Networks	TD/PSB: CS Allied Depts.	3	0	0	0	3	50	50	100	3
5	PEC	1BXX505x	Professional Elective Course-I	TD/PSB: CS Allied Depts.	3	0	0	0	3	50	50	100	3
6	BSC	1BRM506	Research Methodology and IPR (**Online**)	VTU onlineCoE CIE and SEE by COE	2	0	0	0	02	50	50	100	2
7	PCCL	1BAIL507	Data Visualization Lab	TD/PSB	0	0	2	0	02	50	50	100	1
8	SDC	1BXX508	**Hackathon-BasedProject**	CIE: By Departments SEE: Evaluation by industry experts	0	0	0	2	--	50	50	100	2
								Total		**400**	**400**	**800**	**21**

ProfessionalElectiveCourse-I

1BCE505B	Cloud Computing	1BCN505A	Information Retrieval

1BCE505C	Computer Vision	1BCS505B	Distributed Computing

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Outcome-Based Education(OBE) and Choice-Based Credit System (CBCS) (Effective from the academic year 2025-26)

VISEMESTER

Sl. No	Course and Course Code		Course Title	Teaching Department(TD) and Question Paper Setting Board(PSB)	TeachingHours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/Drawing	Self-Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	IPCC	1BCS601	Advanced Java Programming	TD/PSB- CS Allied Depts.	3	0	2	0	5	50	50	100	4
2	PCC	1BIS602	Information and Network Security	TD/PSB- CS Allied Depts.	3	0	0	0	3	50	50	100	3
3	PCC	1BAI603	Deep Learning	TD/PSB- CS Allied Depts.	3	0	0	0	3	50	50	100	3
4	PCC	1BAI604	Natural Language Processing	TD/PSB- CS Allied Depts.	3	0	0	0	3	50	50	100	3
5	PEC	1BXX605x	Professional Elective Courses-II	TD/PSB- CS Allied Depts.	3	0	0	0	3	50	50	100	3
6	PCCL	1BAIL606	Deep Learning Lab	TD/PSB- CS Allied Depts.	0	0	2	0	2	50	50	100	1
7	AEC	1BXXL607x	Ability Enhancement Course Laboratory	TD/PSB- CS Allied Depts.	0	0	2	0	2	50	50	100	1
8	SDC	1BXX608	Capstone Project - Phase I	TD/PSB-	0	0	0	6	3	100	--	100	3
9	NCMC	1Bxx609	**Universal Human Value (VTU ONLINE Course)**	CIE:By VTU online COE	1	0	0	0		100	---	100	PP
				Total						**550**	**350**	**900**	**21**

Professional Elective Course-II

1BCI605D	AI Ethics and Sustainability	1BCD605D	Time Series Analysis
1BIS605A	Explainable Learning	1BAD605C	Internet of Things

Ability Enhancement Course Laboratory**

1BAIL607B	Generative AI	1BADL607B	Object Oriented Modelling using UML
1BCSL607C	Devops	1BADL607C	Front End Web Development using REACT-JS

** The course 1BXXL607x – Ability Enhancement Course Laboratory can be offered either as a single compulsory course. Alternatively, the course 1BXXL307 – Ability Enhancement Course Laboratory shall be offered as multiple elective options under the course codes 1BXXL307x (where *x = A, B, C, D*).

Note to Chairpersons: If only one course is selected, the title of the course may please be entered at serial number 7 of the Scheme of Teaching and Examinations and the

above table, along with this row shall be deleted. In case, multiple courses are selected the above table shall be filled with the course titles, and this row shall be deleted.

B.E. in Artificial Intelligence and Machine Learning

Scheme of Teaching and Examinations- 2025

Outcome-BasedEducation(OBE) and Choice-Based Credit System (CBCS)(Effective from the academic year 2025-26)

VII SEMESTER (Swappable VII and VIII SEMESTER)(SCHEME-A)

Sl. No	Course and Course Code		Course Title	Teaching Department(TD) and Question Paper Setting Board(PSB)	TeachingHours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/Drawing	Self – Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	IPCC	1BAD701	High Performance Computing	TD/PSB- CS Allied Depts.	3	0	2	0	5	50	50	100	4
2	PEC	1BXX702x	Professional Elective Course-III	TD/PSB- CS Allied Depts.	3	0	0	0	3	50	50	100	3
3	PEC	1BXX703x	Professional Elective Course -IV	TD/PSB- CS Allied Depts.	3	0	0	0	3	50	50	100	3
4	OEC	1BXX704x	Open Elective Course-I	TD/PSB- CS Allied Depts.	3	0	0	0	3	50	50	100	3
5	SDC	1BXX705	Capstone Project - Phase-II	TD/PSB- CS Allied Depts.	0	0	0	14	3	100	100	200	7
6	NCMC	1BIKS706	Indian Knowledge System (VTU online Course)	VTU Online CoE, CIE: By COE	1	0	0	0	---	100	--	100	PP
				Total					**15**	**400**	**300**	**700**	**20**

ProfessionalElectiveCourse-III			
1BCO702C	Business Intelligence for IoT	1BCD702B	Business Analytics
1BAD702C	Edge AI & Federated Learning	1BCI702A	Data Engineering & MLOps
ProfessionalElectiveCourse-IV			
1BCS703A	Agentic Artificial Intelligence	1BCD703A	Statistical Machine Learning For Data Science
1BCN703A	Quantum Computing	1BCO703D	IoT Automation
OpenElectiveCourse-I			
1BAI704A	Explainable AI	1BAD704C	Exploratory Data Analysis with Python
1BAI704B	Introduction to Cloud Computing	1BXX704D	Foreign Language (NPTEL/SWAYAM/online VTU)

B.E. in Computer Science and Engineering

SchemeofTeachingandExaminations-2025

Outcome-Based Education (OBE) and Choice-Based Credit System (CBCS) (Effective from the academic year 2025-26)

VIIISEMESTER(SwappableVIIandVIIISEMESTER)(SCHEME-A)

Sl. No	CourseandCourseCode		CourseTitle	TeachingDepartment(TD)andQuestionPaperSettingBoard(PSB)	TeachingHours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/Drawing	Self-Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	PEC	1Bxx801x	Professional Elective-V (NPTEL/VTU Online Course)	Online Evaluation					3	50	50	100	3
2	OEC	1Bxx802x	Open Elective-II (NPTEL/VTU Online Course)	Online Evaluation					3	50	50	100	3
3	SDC	1Bxx803x	Internship (15 weeks or 90 working days)	--	--	--	--	--	3	100	100	200	12
				Total					9	**200**	**200**	**400**	**18**

ProfessionalElectiveCourse(Onlinecourses)-V

1Bxx801A	NPTEL/VTU OnlineCourse	1Bxx801C	NPTEL/VTU OnlineCourse
1Bxx801B	NPTEL/VTU OnlineCourse	1Bxx801D	NPTEL/VTU OnlineCourse

OpenElectiveCourses-II (Online Courses)

1Bxx802A	NPTEL/VTU OnlineCourse	1Bxx802C	NPTEL/VTU OnlineCourse
1Bxx802B	NPTEL/VTU OnlineCourse	1Bxx802D	**Foreign Language** (NPTEL/SWAYAM/online VTU)

Types of Internships (Course Code: 1Bxx803x)

Students shall undertake one of the following internship types during the eighth semester, as per academic guidelines:

1. **1Bxx803A – Industry Internship**: Shall involve practical exposure and training within an industrial or corporate setting.

2. **1Bxx803B – Research Internship**: Shall focus on academic or applied research under the guidance of faculty or research institutions.
3. **1Bxx803C – Post-Placement Internship**: Shall be undertaken by students who have secured placement, aligning with their future employment domain.
4. **1Bxx803D – Societal Internship**: Shall engage students in community-based or social impact projects with NGOs, government bodies, or civic organizations.
5. **1Bxx803E – Online Internship**: Shall be conducted through recognized digital platforms offering structured internship modules.
6. **1Bxx803F – Skill Enhancement Internship:** Shall be opted by students unable to secure internships, offering credit equivalence through curated online courses available at http:// www.online.vtu.ac.in

To ensure uniformity, quality, and transparency in the internship process, **VTU has launched a centralized web portal** that serves as a **single platform** for all internship opportunities. Reputed **industries, Centres of Excellence, Research Laboratories**, and other recognized bodies will be registered on this portal. **Students must choose internships exclusively through this portal**. **No other mode of internship selection will be permitted**

B.E. in Computer Science and Engineering

SchemeofTeachingandExaminations- 2025

Outcome-Based Education (OBE) and Choice-Based Credit System (CBCS) (Effective from the academic year 2025-26)

VIIandVIIIsemestersforthecandidateswhoopt for a two-semesters internship along with Capstone Project(SchemeB)

Sl. No	CourseandCourseCode		CourseTitle	TeachingDepartment(TD)andQuestionPaperSettingBoard(PSB)	TeachingHours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/Drawing	Self-Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	IPCC	1BXX701	To be completed in the **Summer Semester after 6th semester**						3	50	50	100	4
2	PEC	1BXX702x	ProfessionalElectiveCourse-III (NPTEL/VTU Online Course)	Online Evaluation					--	50	50	100	3
3	PEC	1BXX703x	ProfessionalElectiveCourse-IV (NPTEL/VTU Online Course)	Online Evaluation					--	50	50	100	3
4	OEC	1BXX704x	OpenElectiveCourse(NPTEL/VTU Online course)-I	Online Evaluation					---	50	50	100	3
5	SDC	1BXX705	Capstone Project - Phase-II***	TD:					3	100	100	200	7

				PSB:									
6	NCMC	1BIKS706	IndianKnowledgeSystem (VTU online)		1	0	0	0	--	100	--	100	PP
								Total	**6**	**400**	**300**	**700**	**20**
1	PEC	1Bxx801x	ProfessionalElective-V (NPTEL/VTU Online Course)	Online Evaluation					---	50	50	100	3
2	OEC	1Bxx802x	OpenElective-II (NPTEL/VTU Online Course)	Online Evaluation					---	50	50	100	3
3	SDC	1Bxx803x	Internship(Two-semester internship for a minimum Period of 180 working days or -30 weeks)						3	50	50	100	12
								Total	**3**	**150**	**150**	**300**	**18**
												7th semester and 8th semester Credits Total	**38**

NPTEL/VTU OnlineProfessionalElectiveCourse - III			
1Bxx703A	**NPTEL/VTU Online Courses**	1Bxx703C	**NPTEL/VTU Online Courses**
1Bxx703B	**NPTEL/VTU Online Courses**	1Bxx704D	**NPTEL/VTU Online Courses**
NPTEL/VTU Online Open Elective Courses - I			
1Bxx704A	NPTEL/VTU Online Courses	1Bxx704C	NPTEL/VTU Online Courses
1Bxx704B	NPTEL/VTU Online Courses	1Bxx704D	NPTEL/VTU Online Courses
NPTEL/VTU OnlineProfessionalElectiveCourse (Online Courses)-IV			
1Bxx801A	NPTEL/VTU Online Courses	1Bxx801C	NPTEL/VTU Online Courses
1Bxx801B	NPTEL/VTU Online Courses	1Bxx801D	NPTEL/VTU Online Courses
NPTEL/VTU OnlineOpenElectiveCourses(Online Courses)-III			
1Bxx802A	NPTEL/VTU Online Courses	1Bxx802C	NPTEL/VTU Online Courses
1Bxx802B	NPTEL/VTU Online Courses	1Bxx802D	Foreign Language (NPTEL/MOOC/online VTU)

Types of Internships (Course Code: 1Bxx803)

Students shall undertake one of the following internship types during the eighth semester, as per academic guidelines:

1. **1Bxx803A – Industry Internship**: Shall involve practical exposure and training within an industrial or corporate setting.
2. **1Bxx803B – Research Internship**: Shall focus on academic or applied research under the guidance of faculty or research institutions.
3. **1Bxx803C – Post-Placement Internship**: Shall be undertaken by students who have secured placement, aligning with their future employment domain.
4. **1Bxx803D – Societal Internship**: Shall engage students in community-based or social impact projects with NGOs, government bodies, or civic organizations.
5. **1Bxx803E – Online Internship**: Shall be conducted through recognized digital platforms offering structured internship modules.

6. **1Bxx803F – Skill Enhancement Courses (SEC):** Shall be opted by students unable to secure internships, offering credit equivalence through curated online courses available at http:// www.online.vtu.ac.in

To ensure uniformity, quality, and transparency in the internship process, **VTU has launched a centralized web portal** that serves as a **single platform** for all internship opportunities. Reputed **industries, Centres of Excellence, Research Laboratories**, and other recognized bodies will be registered on this portal. **Students must choose internships exclusively through this portal**. **No other mode of internship selection will be permitted**.

Overview of Courses, Credits, Projects, and Internships under VTU Curriculum

I. Abbreviations used in Scheme of Teaching and Exanimations

Abbreviations	Expanded Form of the Abbreviations
AEC	Ability Enhancement Course
ASC	Applied Science Course
BSC	Basic Science Course
CIE	Continuous Internal Evaluation
COE	Centre for Online Education
HSMC	Humanities Studies and Management Course
IPCC	Integrated Professional Core Course
NCMC	Non-Credit Mandatory Course
OEC	Open Elective (Interdepartmental or interdisciplinary) Course
PCC	Professional Core Course
PCCL	Professional Core Course Laboratory
PEC	Professional Elective Courses
SEC	Skill Enhancement Courses
SEE	Semester End Evaluation
SL	Self-Learning
VTU online Course	VTU online courses offered by Centre for Online Education, Mysuru

II. Credit Representation

1-hour Lecture (L) per week=1Credit
2-hoursTutorial(T) per week=1Credit
2-hours Practical / Drawing (P) per week=1Credit
04-Credit courses are designed for 50 hours of Teaching-Learning sessions
04-Credit (IPCC)courses are designed for 40 hours theory and 10-12 hours of practical sessions
03-Credit courses are designed for 40 hours of Teaching-Learning Session
02- Credit courses are designed for 25 hours of Teaching-Learning Session

01-Credit courses are designed for 12 hours of Teaching-Learning sessions

III. Details of Courses

(1) Integrated Professional Core Course (IPCC): The Integrated Professional Core Course (IPCC) refers to a core theory course that is integrated with a laboratory of the same subject. Each IPCC carries 4 credits, with Teaching–Learning hours structured (L :T : P) as either (3:0:2). The theory component of the IPCC shall be evaluated through both Continuous Internal Evaluation (CIE) and Semester End Examination (SEE). The laboratory part shall be assessed exclusively through CIE, with no SEE. However, questions derived from the laboratory part may be included in the SEE question paper to ensure comprehensive evaluation

(2) Non-Credit Mandatory Courses (NCMC): are aimed at enhancing students' knowledge, skills, and awareness beyond the core curriculum.Successful completion of the NCMC is compulsory for fulfilling the requirements of the academic program. It shall not be considered for the computation of SGPA, CGPA and vertical progression. Each student shall register for the prescribed NCMC(s) in the prescribed semester. A student who fails to qualify in the prescribed NCMC shall not be eligible for the conferment of the degree.

(3) Professional Elective Courses (PEC):A professional elective course (PEC) is intended to enhance the depth and breadth of educational experience in the Engineering and Technology curriculum of the same discipline.

(4) Open Elective Courses (OEC): A open elective course (OEC) is a course offered by departments other than a student's parent department. These interdepartmental /interdisciplinary courses allow students to explore disciplines beyond their core area of study. Thesecourses are intended to promote interdisciplinary learning, broad-based education, thereby enhancing a student's overall knowledge, creativity, and employability. Registration to open electives shall be documented under the guidance of the Program Coordinator/ Advisor/Mentor/Proctor.

(5) Ability Enhancement Course Laboratory (AEC): An Ability Enhancement Course Laboratory is a practical, skill-oriented lab course designed to strengthen students' practical abilities, professional competencies that support communication, environmental awareness, computational thinking, interdisciplinary learning, and application skills through hands-on learning experiences.

The laboratory may pertain to disciplinary or interdisciplinary involving experiments, design tasks, and mini-projects aligned with current industry practices.

(6) Skill Enhancement Courses (SEC): These courses are intended to develop specific practical skills and competencies that improve students' employability, technical proficiency, and professional readiness to bridge the gap between academic and industry requirements. These courses emphasize hands-on training, application of theoretical knowledge, and development of discipline-relevant and transferable skills required in industry and society, and develop entrepreneurship and start-up skills.

(7) Online Courses: Online courses are educational programs delivered over the Internet through a digital platform, allowing students to access lessons, assignments, and discussions from anywhere at any time. Most online courses offer flexibility, allowing students to access materials and complete assignments on their own schedule. However, students have to pass the course within a stipulated period as per the norms of the university.

(8) VTU Online Courses:VTU Online courses are online courses offered by Centre of Online Education (COE) Mysuru. A wide range of multidisciplinary courses are available to learners anywhere, anytime to earn university-prescribed credits through proctored examination for the award of a degree.

(9) NPTEL/SWAYAM Online Courses: The National Programme on Technology Enhanced Learning (NPTEL)/SWAYAM (Study Webs of Active Learning for Young Aspiring Minds) are the specific Indian platforms to host national Massive Open Online Courses (MOOCs). It offers online courses on a wide range of disciplines to learners anywhere, anytime, to earn university-prescribed credits through proctored examination for the award of a degree. All NPTEL/SWAYAM courses are MOOCs, but not all MOOCs are offered on these specific Indian platforms.

IV. National Service Scheme / Physical Education / Yoga (NSS / PE / YOG):

All students are required to register for any one of the following courses; National Service Scheme (NSS), Physical Education (PE) (Sports and Athletics), or Yoga (YOG)—with the respective course coordinator during the first week of the third semester.

- Colleges shall submit Continuous Internal Evaluation (CIE) marks for each semester based on the activities completed by students under the selected course.
- Students may opt for different activities/options across semesters. For instance, a student participating in PE during 3rd semester may choose NSS in the 4th semester or Yoga.
- Activities shall be conducted over two semesters (III & IV), and successful completion of the registered course / or courses along with the required CIE score is mandatory for the award of the degree.
- Institutions must ensure that events are appropriately scheduled and reflected in the semester-wise calendar for NSS, PE, Music, and Yoga activities.

These courses shall not be considered for the calculation of SGPA or CGPA and for vertical progression. However, completion of course(s) is compulsory for degree eligibility.

V. Projects

1. **Community Project**

A community is a social unit or group of people sharing socially-significant characteristics, such as place, set of norms, culture, religion, values, customs or identity. A community project involves addressing issues or needs within such a community or a network of entities working toward a common purpose. These projects may cover a wide range of areas, including welfare, sustainability, technology integration, and social development. Examples include establishing and maintaining an orphanage, implementing solar power generation and its maintenance, or developing environmental improvement solutions, etc. A community project is an experiential learning activity that encourages students to identify, analyse, and address real-life problems of the community using engineering knowledge. It aims to promote social responsibility and civic engagement, interdisciplinary thinking and collaboration and practical application of theoretical concepts, thereby enabling students to contribute meaningfully to community welfare and sustainable development. Students can take up project individually or in a group not exceeding 4 students.

The evaluation shall be done as per the following;

CIE: 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 rubrics.

SEE: SEE will be conducted by the two examiners appointed by the University. The SEE marks awarded for the project work shall be based on the rubrics.

2. **Environmental Science Project**

The Environmental Science Project is an applied learning component designed to develop students' awareness, understanding, and responsibility toward the environment. It provides an opportunity to study real-world environmental issues and apply scientific and engineering principles to design feasible and sustainable solutions.

The topics under environment include, but not limited to, climate change, biodiversity, air and water pollution, land use, excess use of natural resources, earthquakes, rise in the earth's temperature, power generation, soil erosion, environment issues related programmme, etc.

The project involves problem identification, field surveys, case studies, data collection, environmental audits, analysis, and proposal of remedial or preventive measures aimed at improving biodiversity, air quality, and thermal comfort, etc. Students can take up project individually or in a group not exceeding 4 students. Students can opt for Interdisciplinary Project based on their interest.

The evaluation shall be done as per the following;

CIE: 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 rubrics.

SEE: SEE will be conducted by the two examiners appointed by the University. The SEE marks awarded for the project work shall be based on the rubrics.

3. Hackathon Based Project (Academic)

The term hackathon is derived from the combination of hack (referring to clever problem-solving, not illegal activity) and marathon, which denotes an arduous (i.e., difficult) intellectual task requiring sustained effort, endurance, and mental resilience. The meaning of a hackathon varies depending on the specific context and intent. In an academic context, a hackathon can be considered to involve several concepts, ranging from resourceful, unconventional approaches to problem-solving.

Though a hackathon is an event, typically lasting for a few days to address a specific challenge, for academic purposes, it is conducted as a noncompetitive semester-long activity. The evaluation is done as and when the project is completed, by a panel of industry experts.

The hackathons not only help participants develop skills like problem-solving, critical thinking, creativity, teamwork, communication and time management, but also foster indigenous technology development, promote innovation and entrepreneurship, and contribute to non-formal learning and skill enhancement.

Students can take up a hackathon project individually or in a group of not exceeding 4 students.

The respective **BoS will announce** the problem statements in the beginning of the 5th semester. The topic selected can be discipline specific, interdepartmental, industrial, social (refers to immediate human relations, interactions, and individual behaviour within a community), societal (describes larger, general issues, institutions, and structures that define society as a whole), environmental, health, financial, or innovative in nature, leading to development of a working prototype, application, or product.

Hackathon projects are aligned with the principles of Outcome-Based Education (OBE) and support the objectives of innovation, skill development, and experiential learning in engineering education.

Projects shall be evaluated by industry experts, based on creativity, problem-solving approach, teamwork, and possible implementation, as far as possible, as and when the project is completed.

The evaluation shall be done as per the following;

CIE: 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 rubrics.

SEE: SEE will be conducted by the industry experts appointed by the Head of the Institute/University. The SEE marks awarded for the project work shall be based on the rubrics.

4. Capstone Project

The Capstone project is a comprehensive, year-long project carried out in two phases during 6th and 7th semesters of the undergraduate engineering/technology program. It integrates knowledge and skills acquired from multiple courses and disciplines to address a complex, real-world problem.

This project provides students with an opportunity to apply scientific principles, engineering methodologies, and technological tools to conceive, design, implement and evaluate an engineering solution. It serves as a culminating academic experience to demonstrate program outcomes, including problem-solving ability, teamwork, communication skills, and practical application of engineering principles. Students can take up project individually or in a group not exceeding 4 students. The group may have students from the same discipline and drawn from different disciplines.

Types of Capstone Projects:

Capstone projects undertaken for one year may fall into one or more of the following categories:

a) **Research-Oriented Projects :**

- Focus on investigating new concepts, theories, or technologies.

- Aim to generate new knowledge or contribute to academic research.

b) **Experimental/Analytical Projects**

- Based on laboratory or field experiments to validate a hypothesis or study a phenomenon.
- Including detailed data collection, analysis, and interpretation.

c) **Simulation/Modelling Projects**

- Use computational tools to model, simulate, and predict system behaviour.
- Reduce the need for physical prototyping in the initial stages.

d) **Industrial/Industry-Sponsored Projects**

- Carried out in collaboration with an industry partner.
- Address real-world engineering problems faced by the organization.

e) **Interdisciplinary/Multidisciplinary Projects**

- Combine knowledge and techniques from multiple engineering domains or other fields such as management, medicine, or environmental sciences.

f) **Entrepreneurial/Innovation Projects**

- Focus on product or service innovation with potential for commercialization.
- Include aspects of market analysis, cost estimation, and business planning.

Phase I Evaluation: Capstone Project Phase-I shall have only Continuous Internal Evaluation (CIE). In case disciplinary capstone project, the CIE shall be conducted by the **DepartmentalProject Review Committee**, which consists of a Senior Professor, the Project Guide, and one additional faculty member appointed by the principal for projects within the **parent discipline**.

For **Interdisciplinary Projects**, the Project Review Committee will consist of one Senior Professor, the department and interdepartmental Project Guides and one faculty member from a department related to the interdisciplinary project. The committee members are appointed by the principal of the college. Phase-I evaluation shall be based on **rubrics** designed to measure graduate attributes defined by NBA. Successful completion of Phase-I allows the student to proceed to **Phase-II**.

Phase II Evaluation:

CIE ofPhase shall be evaluated as indicated with phase -I evaluation. The **SEE** shall be conducted by university-appointed examiners**.** The assessmentshall be based on **rubrics** designed to measure graduate attributes defined by NBA.

VI. Internship

Internship refers to the position of a student as trainee or a temporary (or unconfirmed) employee, who works in an organization, with or without pay, in order to gain work experience or satisfy requirements for a qualification. It is a structured, supervised professional experience in an industry, research organization, or community setting. Students taking up internship may be with or without stipend.

Internships play a vital role in bridging the gap between theoretical education and professional practice. In general, engineering internships serve as a crucial component of professional education by providing experiential learning, industry readiness, and holistic skill development, ultimately producing competent engineers or entrepreneurs. Apart from these, it develops professional ethics, work culture awareness and communication skills.

Some of the common types of internships are as follows:

i. **Industry Internship:** Carried outin the engineering industry, companies, manufacturing units, startups, business, IT industry. The topic involved may be technical, managerial, production-related tasks, live projects, or innovative activities.

ii. **Research Internship:** Carried out at universities, research labs, or R and D departments or organisations. The internship may involve literature review, data analysis, and experimental work leading to publications, prototypes, technical reports or innovations. The research internship may induce students to plan for higher studies or academic careers.

iii. **Academic or Teaching Internship:** Carried out at educational institutions. The students assist in academic activities, laboratory sessions or content development, and prepare or present report, presentation and student evaluation. The internship encourages interest in academia and pedagogy, develops new skills, helps to gain a competitive edge on the job market or for post-baccalaureate studies.

iv. **Community or Societal Internship:** Carried out with government schemes, or rural development projects, Non-Governmental Organisations (NGOs). The internship focused on social and community development activities promotes social responsibility, sustainable development awareness, encourages civic responsibility and ethical engagement.

v. **Entrepreneurship Internship:** Undertaken in association with start-ups, or entrepreneurship cells or launching own idea in Pre-Incubation/Incubation centres. The internship offers exposure to business planning, prototype product development, and promotes innovation, risk-taking, and entrepreneurial mindset.

vi. **Virtual or Remote or Online Internship:** Undertaken usingonline tools and digital collaboration platforms. Such internships are common in content writing, data science, marketing, and software development. It offers flexible learning environments and access to global opportunities, and allows participation in real projects without being physically present, from anywhere and anytime.

vii. **Government Internship:** Ministries, public sector units, or civic bodies offer such internships in policy research, administrative tasks, or public service projects. This internship is for students interested in governance or public administration.

viii. **Post-Placement Internship:** Refers to the internship offered to students after they receive a confirmed job offer (placement) from a company, but before formally joining as full-time employees. This internship (on-site, virtual, or hybrid) ensures that students are groomed to be professionally ready, technically competent, and culturally aligned with the organization even before official induction.

ix. **Skill Enhancement Internship:** Carried out at reputed organisations in offline or online mode. The aim of the internship is to expose to real-world tools, technologies, and professional environments to improve a student's employability by offering hands-on experience, application of theoretical concepts, and skill development aligned with current industry and technical trends. Skill Enhancement Internships, depending on focus area and scope, can be carried out at various organisations such as, Academic and Research Institutions, Industry and Corporate Settings, Government and Public Sector, NGOs and Social Enterprises.

For Skill Enhancement Internship topics refer to
https://online.vtu.ac.in/category/courses/Skill-Enhancement-Course.

Note on Internship for the Attention of Students and Colleges

- Placement training conducted at the college level, whether by third-party agencies, training institutes, or internal faculty, shall not be considered as internship for either a 15 week or a 30-week period.
- The official engagement period of 15-week or 30-week for students selected/recruited by the company/ organization only at their premises under the supervision of the company, shall only be considered as an internship.

- The period of training and working of students who have been recruited as employees by organisations at the beginning of the 4th year of the programme, shall also be treated as an internship.
- Students and colleges/institutions shall follow all the guidelines and procedures of the organization and the University's Internship Guidelines, and complete the internship within a period that matches with the VTU Calander and examination timetable.
- The assigned institution faculty mentor/ coordinator/guide should monitor the student's progress, and document offer letters, training reports, attendance, and evaluations for awarding academic credits.
- All students undergoing an internship, should adhere to all the guidelines, reporting protocols, and evaluation procedures prescribed by the University.
- Students must submit the certificate of completion of an internship with the period of internship clearly mentioned, from the respective company/organization.
- Colleges must submit details of students opting for internship during the odd and even semesters, along with a copy of the company selection letter, to the VTU when notified by the University.

Attention: In addition to the internship support provided by the college, students have the option to select internships through the AICTE and VTU Internship Portals. To ensure uniformity, quality, and transparency in the internship process, VTU has developed a dedicated web portal that serves as a single platform where colleges can also register companies offering internships. Every student is required to register on the portal before the commencement of their internship, and their progress will be monitored through the same platform.

As per VTU norms, the CIE shall be conducted based on the students' performance during the training program, assessed through **rubrics** from the company supervisor. The SEE evaluation shall be conducted by the college as per the examination timetable published by the VTU.

VII. Bridge Courses on Mathematics for Lateral Entry Students:

This courses can be taught in the **offline** mode by the faculty of the mathematics department of the college as per the normal procedure to the students. The students can attend the class at their college or the can choose the VTU **online mode,** conducted by Centre for Online Education (COE) of VTU. Only CIE is only prescribed for this course and the CIE assessment is only by VTU online COE, and not at the institution level.

All lateral entry students are required to **register** compulsorily for this course in the 3rd semester & 4th Semester and must appear for **CIE.** Passing in this course is **mandatory** for the award of the degree. Those who fail to secure the passing CIE marks, have to appear for the summer semester of the academic year or during subsequent odd semester. However, this course will not be considered forvertical progression, SGPA, and CGPA calculation.

VIII. AICTE Activity Points Requirement for BE/B.Tech. Programmes

As per AICTE guidelines (refer to Chapter 6 – *AICTE Activity Point Program, Model Internship Guidelines*), in addition to academic requirements, students must earn a specified number of **Activity Points** to be eligible for the award of the degree. The points to be earned are as follows:

1. **Regular students** admitted to a 4-year degree program must earn **100 Activity Points**.
2. **Lateral entry students** (joining from the second year) must earn **75 Activity Points**.
3. **Students transferred** from other universities directly into the fifth semester must earn **50 Activity Points** from the date of entry into VTU.

These Activity Points do not carry any credits, and therefore, the points are not considered for **the SGPA/CGPA** or for **vertical progression**. However, earning Activity Points is mandatory for the **award of the degree**, and the points earned will be reflected on the **eighth semester Grade Card**.
The hours spent earning the activity points will not be counted for regular attendance requirements. Students can accumulate these points at any time during their program period, including weekends, holidays, and vacations, starting from the year of admission, provided they meet the minimum hours of engagement prescribed for each activity by AICTE.

If a student completes all the semesters (eight/six) successfully, but fails to earn the required Activity Points, the eighth-semester Grade Card will be withheld until the Activity points requirement is fulfilled. Also, the degree will be awarded only after the Grade Card has been released.

IX. Option -1: Swappable Semester Scheme - A

To ensure equitable access to internship opportunities, provision has been made to swap seventh and eighth semesters under Scheme A. The details of the Scheme – A are as follows: