ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ
ವಿಟಿಯು ಅಧಿನಿಯಮ ೧೯೯೪ರ ಅಡಿಯಲ್ಲಿ ಕರ್ನಾಟಕ ಸರ್ಕಾರದಿಂದ ಸ್ಥಾಪಿತವಾದ ರಾಜ್ಯವಿಶ್ವವಿದ್ಯಾಲಯ
VISVESVARAYA TECHNOLOGICAL UNIVERSITY
State University of Government of Karnataka Established as per the VTU Act, 1994"JnanaSangama" Belagavi-590018, Karnataka, India

Dr. Prasad B. Rampure , M.E., Ph.D
REGISTRAR

Phone: (0831) 2498100
Fax: (0831) 2405467

REF: VTU/BGM/893/MD-Feedback/2025-26/ 5310 DATE: 06 JAN 2026

CIRCULAR

To

The Principals / Heads of Department,
Electronics and Communication Engineering
Electronics and Instrumentation Engineering
Mechanical Engineering,
All Affiliated Colleges of VTU.

Subject: Request for Feedback on Draft scheme of 3-8 semester Multidisciplinary Engineering programs coming under ECE/EIE/ME departments

Reference: Chairperson's email dated: 05.01.2026

Dear Sir/Madam,

The Board of Studies in the undergraduate Multidisciplinary Engineering Programme of Visvesvaraya Technological University (VTU), Belagavi, has prepared the draft Scheme (3-8 semesters) of Teaching and Examination for the undergraduate Multidisciplinary Engineering programs.

The University seeks constructive feedback from faculty members of all affiliated colleges. Your insights and suggestions will be invaluable in refining the schemes to ensure they meet contemporary academic standards, industry requirements, and the evolving needs of students.

You are kindly requested to:

- Review the draft schemes thoroughly.
- Provide specific comments, suggestions, or recommendations regarding the structure, content, and examination framework.
- Submit consolidated feedback from your institution to the University by 15.01.2026

Feedback may be sent electronically to **[sbhvtuso2022@gmail.com]** or in hard copy to the undersigned.

We sincerely appreciate your cooperation and contribution in this academic exercise. Your active participation will help us strengthen the teaching-learning process and uphold the quality benchmarks of VTU.

Thank you for your support.

Sd/-
Registrar

To,

1. The Principals of all Affiliated Autonomous/Non-Autonomous/Constituent Engineering Colleges under the ambit of the university
2. The Chairpersons/ Programme Coordinator, University Departments at Kalaburagi, Mysuru, and Bengaluru (Muddenhalli)

Copy to:

- The Hon'ble Vice-Chancellor, through the Secretary to the VC, for information
- The Dean, Faculty of Engineering, VTU, & Chairperson BoS in EEE VTU, Belagavi, for information
- The Registrar (Evaluation) for information
- The Director ITI SMU, VTU Belagavi, for information and request to make the arrangement to upload the circular on VTU's web portal
- Office file

Paul/06/01/26
REGISTRAR
ಕ್ರ 6/1/26

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

Jnana Sangam, Machhe, Belagavi-590018

Scheme of Teaching and Examinations 2025

Outcome-Based Education (OBE) and Choice-Based Credit System (CBCS)

(Effective from the academic year 2025-26)

B.E. in Electronics & Computer Science,
Scheme of Teaching and Examinations 2025
Outcome-Based Education (OBE) and Choice-Based Credit System (CBCS) (Effective from the academic year 2025-26)

III SEMESTER

Sl. No	Course	Course Code	Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Self-Learning	Duration in	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	ASC/PCC	1BMAT301	Discrete Mathematics & Probability Theory	TD /PSB: Mathematics	3	0	0		3	50	50	100	4
2	IPCC	1BUE302	Data Structures & Algorithms	TD/PSB: ECS	3	0	2		5	50	50	100	4
3	PCC	1BUE303	Analog Electronic Circuits	TD/PSB: ECS	3	2	0		5	50	50	100	4
4	PCC	1BUE304	Digital Logic & Computer Organization	TD/PSB: ECS	3	0	0		3	50	50	100	3
5	PCC	1BUE305	Network Analysis & Control Engineering	TD/PSB: ECS	3	0	0		3	50	50	100	3
6	PCCL	1BUE306	Professional Core Course Lab Analog circuits lab	TD/PSB: ECS	0	0	2		2	50	50	100	1
7	AEC	1BUEL307	Ability Enhancement Course Laboratory Digital Electronics Lab	TD/PSB: ECS	0	0	2		2	50	50	100	1
8	SDC	1BCP308	Community Project (Project-Based Learning)	Any Department/ Respective Engineering Dept.	0	0	0	2	2	50	50	100	1
9	NCMC	1BNSS309	National Service Scheme (NSS)	Campus: NSS coordinator	0	0	2		--	100	---	100	PP
		1BPE309	Physical Education (PE) (Sports and Athletics)	Campus: Physical Education Director									
		1BYOG309	Yoga	Campus: Yoga Teacher									
		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**

Overview of Courses, Credits, Projects, and Internships under VTU Curriculum-Details are listed on page number 11(onwards)

B.E. in Electronics & Computer Science,
Scheme of Teaching and Examinations-2025
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 Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Self -Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	ASC/PCC	1BUE401	Automata Theory	TD/PSB: ECS	3	0	0		3	50	50	100	3
2	IPCC	1BUE402	Machine Learning	TD/PSB: ECS	3	0	2		5	50	50	100	4
3	PCC	1BUE403	Signal Analysis & Processing	TD/PSB: ECS	3	2	0		5	50	50	100	4
4	PCC	1BUE404	Database Management Systems	TD/PSB: ECS	3	0	0		3	50	50	100	3
5	PCCL	1BUEL405	PCC Lab Signal Processing Lab	TD/PSB: ECS	0	0	2	0	2	50	50	100	1
6	AEC	1BUEL406	Ability Enhancement Course Laboratory Database Management Systems Lab	TD/PSB: ECS	0	0	2	0	2	50	50	100	1
7	BSC	1BUE407	Programme Specific Biology	TD/PSB: ECS	2	0	0	0	3	50	50	100	2
8	SDC	1BEP408	Environmental Science Project	TD/PSB: ECS	0	0	0	2	3	50	50	100	1
9	NCMC	1BNSK409	National Service Scheme (NSS)	Campus: NSS coordinator	0	0	2		--	100	---	100	PP
		1BPEK409	Physical Education (PE) (Sports and Athletics)	Campus: Physical Education Director									
		1BYOK409	Yoga	Campus: Yoga Teacher									
		1BMUS409	Music	Campus: Music Teacher									
10	NCMC	1BMATDIP410	Mathematics course for Lateral Entry Students	TD -Maths Dept/ VTU Online (COE). CIE by VTU online COE					--	100	--	100	PP
				Total						**600**	**400**	**1000**	**19**

B.E. in Electronics & Computer Science,
Scheme of Teaching and Examinations 2025
Outcome-Based Education (OBE) and Choice-Based Credit System (CBCS) (Effective from the academic year 2025-26)

V 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 – Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	HSMC	1BXX501	This course must be pertaining to economics and management of the concerned degree program. The course syllabus should have both economics and management topics and the course title should bear the word Management.	TD/PSB:					3	50	50	100	3
2	IPCC	1BUE502	Microcontrollers & Embedded Systems	TD/PSB: ECS	3	0	2		5	50	50	100	4
3	PCC	1BUE503	Analog & Digital Communication	TD/PSB: ECS	3	0	0		3	50	50	100	3
4	PCC	1BUE504	Operating Systems	TD/PSB: ECS	3	0	0		3	50	50	100	3
5	PEC	1BUE505x	**Professional Elective Course-I**	TD/PSB: ECS	3	0	0		3	50	50	100	3
6	BSC	1BRM506	Research Methodology and IPR (**Online**)	VTU online CoE CIE and SEE by COE	2	0	0	0	02	50	50	100	2
7	PCCL	1BUEL507	Operating Systems Lab	TD/PSB	0	0	2	0	02	50	50	100	1
8	SDC	1BECS508	**Hackathon-Based Project**	CIE: By Departments SEE: Evaluation by industry experts	0	0	0	2	--	50	50	100	2
								Total		**400**	**400**	**800**	**21**

Professional Elective Course-I

1BUE505A	Sensors & Instrumentation	1BUE505C	Cybersecurity
1BUE505B	VLSI Design & FPGA Fundamentals	1BUE505D	Deep Learning

B.E. in Electronics & Computer Science,
Scheme of Teaching and Examinations-2025
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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	Self -Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	IPCC	1BUE601	Computer Networks	TD/PSB: ECS	3	0	2		5	50	50	100	4
2	PCC	1BUE602	Wireless & Mobile Communication	TD/PSB: ECS	3	0	0		3	50	50	100	3
3	PCC	1BUE603	Software Engineering	TD/PSB: ECS	3	0	0		3	50	50	100	3
4	PCC	1BUE604	Parallel and Distributed Computing	TD/PSB: ECS	3	0	0		3	50	50	100	3
5	PEC	1BUE605x	Professional Elective Courses-II	TD/PSB: ECS	3	0	0		3	50	50	100	3
6	PCCL	1BUEL606	PCC Lab Mobile Application Development	TD/PSB: ECS	0	0	2	0	2	50	50	100	1
7	AEC	1BUEL607	Ability Enhancement Course Laboratory Visual Data Analytics	TD/PSB: ECS	0	0	2	0	2	50	50	100	1
8	SDC	1BUE608	Capstone Project - Phase I	TD/PSB: ECS	0	0	0	6	3	100	--	100	3
9	NCMC	1BUE609	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

1BUE605A	Robotics & Automation	1BUE605C	Cryptography and Network Security
1BUE605B	VLSI Design and Verification	1BUE605D	Generative AI

Overview of Courses, Credits, Projects, and Internships under VTU Curriculum-Details are listed on page number 11(onwards)

B.E. in Electronics & Computer Science,
Scheme of Teaching and Examinations 2025
Outcome-Based Education (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)	Teaching Hours /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	1BUE701	Embedded Linux & Device Drivers	TD/PSB: ECS	3	0	2		5	50	50	100	4
2	PEC	1BUE702x	Professional Elective Course-III	TD/PSB: ECS	3	0	0		3	50	50	100	3
3	PEC	1BUE703x	Professional Elective Course -IV	TD/PSB: ECS	3	0	0		3	50	50	100	3
4	OEC	1BUE704x	Open Elective Course-I	TD/PSB: ECS	3	0	0		3	50	50	100	3
5	SDC	1BUE705	Capstone Project - Phase-II	TD/PSB: ECS	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**

Professional Elective Course-III			
1BUE702A	Physical Design & EDA tools	1BUE702C	Quantum Computing
1BUE702B	Automotive Embedded Systems/Software-Defined vehicles	1BUE702D	Semiconductor Manufacturing
Professional Elective Course-IV			
1BUE703A	Augmented Reality and Virtual Reality	1BUE703C	Natural Language Processing
1BUE703B	Soft computing	1BUE703D	Edge & Cloud Computing
Open Elective Course-I			
1BUE704A	PCB Design and Manufacturing	1BUE704C	Introduction to VLSI
1BUE704B	Data Structures	1BUE704D	**Foreign Language** (NPTEL/SWAYAM/online VTU)

 Overview of Courses, Credits, Projects, and Internships under VTU Curriculum-Details are listed on page number 11(onwards)

B.E. in the title of the program
Scheme of Teaching and Examinations 2025
Outcome-Based Education (OBE) and Choice-Based Credit System (CBCS) (Effective from the academic year 2025-26)

VIII 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)	Teaching Hours /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	1BUE801x	Professional Elective-V (NPTEL/VTU Online Course)	Online Evaluation	--	--	--		3	50	50	100	3
2	OEC	1BUE802x	Open Elective-II (NPTEL/VTU Online Course)	Online Evaluation	--	--	--		3	50	50	100	3
3	SDC	1BUE803x	Internship (15 weeks or 90 working days)	--	--	--	--	--	3	100	100	200	12
			Total						9	**200**	**200**	**400**	**18**

Professional Elective Course (Online courses)-V			
1BUE801A	NPTEL/VTU Online Course	1BUE801C	NPTEL/VTU Online Course
1BUE801B	NPTEL/VTU Online Course	1BUE801D	NPTEL/VTU Online Course
Open Elective Courses -II (Online Courses)			
1BUE802A	NPTEL/VTU Online Course	1BUE802C	NPTEL/VTU Online Course
1BUE802B	NPTEL/VTU Online Course	1BUE802D	**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 the title of the program

Scheme of Teaching and Examinations 2025

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

VII and VIII semesters for the candidates who opt for a two-semesters internship along with Capstone Project (Scheme B)

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-Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	IPCC	1BUE701	To be completed in the **Summer Semester after 6th semester**						3	50	50	100	4
2	PEC	1BUE702x	Professional Elective Course-III (NPTEL/VTU Online Course)	Online Evaluation	--	--	--		--	50	50	100	3
3	PEC	1BUE703x	Professional Elective Course-IV (NPTEL/VTU Online Course)	Online Evaluation	--	--	--		--	50	50	100	3
4	OEC	1BUE704x	Open Elective Course (NPTEL/VTU Online course)-I	Online Evaluation	--	--	--		---	50	50	100	3
5	SDC	1BUE705	Capstone Project - Phase-II***	TD/PSB: ECS					3	100	100	200	7
6	NCMC	1BIKS706	Indian Knowledge System (VTU online)		1	0	0	0	--	100	--	100	PP
								Total	**6**	**400**	**300**	**700**	**20**
1	PEC	1BUE801x	Professional Elective-V (NPTEL/VTU Online Course)	Online Evaluation					---	50	50	100	3
2	OEC	1BUE802x	Open Elective-II (NPTEL/VTU Online Course)	Online Evaluation					---	50	50	100	3
3	SDC	1BUE803x	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**

Overview of Courses, Credits, Projects, and Internships under VTU Curriculum-Details are listed on page number 11(onwards)

												7th semester and 8th semester Credits Total	**38**

NPTEL/VTU Online Professional Elective Course - III			
1BUE703A	**NPTEL/VTU Online Courses**	1BUE703C	**NPTEL/VTU Online Courses**
1BUE703B	**NPTEL/VTU Online Courses**	1BUE704D	**NPTEL/VTU Online Courses**
NPTEL/VTU Online Open Elective Courses - I			
1BUE704A	NPTEL/VTU Online Courses	1BUE704C	NPTEL/VTU Online Courses
1BUE704B	NPTEL/VTU Online Courses	1BUE704D	NPTEL/VTU Online Courses
NPTEL/VTU Online Professional Elective Course (Online Courses)-IV			
1BUE801A	NPTEL/VTU Online Courses	1BUE801C	NPTEL/VTU Online Courses
1BUE801B	NPTEL/VTU Online Courses	1BUE801D	NPTEL/VTU Online Courses
NPTEL/VTU Online Open Elective Courses (Online Courses)-III			
1BUE802A	NPTEL/VTU Online Courses	1BUE802C	NPTEL/VTU Online Courses
1BUE802B	NPTEL/VTU Online Courses	1BUE802D	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-Details are listed on page number 11(onwards)

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

Jnana Sangam, Machhe, Belagavi-590018

Scheme of Teaching and Examinations 2025

Outcome-Based Education (OBE) and Choice-Based Credit System (CBCS)

(Effective from the academic year 2025-26)

B.E. in Biomedical Engineering
Scheme of Teaching and Examinations 2025
Outcome-Based Education (OBE) and Choice-Based Credit System (CBCS) (Effective from the academic year 2025-26)

III SEMESTER

Sl. No	Course	Course Code	Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)		Teaching Hours /Week				Examination				Credits
						Theory Lecture	Tutorial	Practical/ Drawing	Self-Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
						L	T	P	SL					
1	ASC/PCC	1BBE301	Transform Techniques and Fourier Series	TD /PSB: Mathematics / Specific department		3	2	0		3	50	50	100	4
2	IPCC	1BBE302	Digital Design and HDL	TD/PSB		2	2	2		3	50	50	100	4
3	PCC	1BBE303	Analog Electronic Circuits	TD/PSB		3	0	2		3	50	50	100	4
4	PCC	1BBE304	Anatomy and Physiology	TD/PSB						3	50	50	100	3
5	PCC	1BBE305	Instrumentation, Measurements and Biomedical Transducers	TD/PSB		3	0	0		3	50	50	100	3
6	PCCL	1BBEL306	Analog Electronic Circuits Lab	TD/PSB		0	0	2		2	50	50	100	1
7	AEC	1BBEL307	Instrumentation, Measurements and Biomedical Transducers Lab	TD/PSB		0	0	2		2	50	50	100	1
8	SDC	1BCP308	Community Project (Project-Based Learning)	Any Department/ Respective Engineering Dept.		0	0	0	2	2	50	50	100	1
9	NCMC	1BNSS309	National Service Scheme (NSS)	Campus	NSS coordinator	0	0	2		--	100	---	100	PP
		1BPE309	Physical Education (PE) (Sports and Athletics)		Physical Education Director									
		1BYOG309	Yoga		Yoga Teacher									
		1BMUK309	Music		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**

Ability Enhancement Course (Laboratory)			

** The course 1BXXL307 – 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 Biomedical Engineering
Scheme of Teaching and Examinations 2025
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 Question Paper Setting Board (PSB)	Teaching Hours /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	1BBE401	Biomechanics	TD/PSB:					3	50	50	100	3
2	IPCC	1BBE402	Data Structures and Algorithms	TD/PSB					3	50	50	100	4
3	PCC	1BBE403	Data Acquisition Circuits	TD/PSB					3	50	50	100	4
4	PCC	1BBE404	Embedded Controllers	TD/PSB					3	50	50	100	3
5	PCCL	1BBEL405	Data Acquisition Circuits Lab	TD/PSB	0	0	2	0	2	50	50	100	1
6	AEC	1BBEL406	Embedded Controllers Lab	TD/PSB	0	0	2	0	2	50	50	100	1
7	BSC	1BBE407	Programme Specific Biology	TD / PSB	2	0	0	0	3	50	50	100	2
8	SDC	1BEP408	Environmental Science Project	TD/PSB	0	0	0	2	3	50	50	100	1
9	NCMC	1BNSK409	National Service Scheme (NSS)	Campus: NSS coordinator	0	0	2		--	100	---	100	PP
		1BPEK409	Physical Education (PE) (Sports and Athletics)	Campus: Physical Education Director									
		1BYOK409	Yoga	Campus: Yoga Teacher									
		1BMUS409	Music	Campus: Music Teacher									
10	NCMC	1BMATDIP410	Mathematics course for Lateral Entry Students	TD -Maths Dept/ VTU Online (COE). CIE by VTU online COE					--	100	--	100	PP
				Total						**600**	**400**	**1000**	**19**

Ability Enhancement Course (Laboratory)

** The course 1BXXL406x – Ability Enhancement Course Laboratory can be offered either as a single compulsory course. Alternatively, the Ability Enhancement Course Laboratory course can be offered with multiple elective options under the course codes 1BXXL406x (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 6 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.**

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V SEMESTER

Sl. No	Course Type 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 – Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	HSMC	1BXX501	Engineering Management and Economics	TD/PSB:					3	50	50	100	3
2	IPCC	1BBE502	Signals and Systems	TD/PSB					3	50	50	100	4
3	PCC	1BBE503	Clinical Instrumentation	TD/PSB					3	50	50	100	3
4	PCC	1BBE504	Biomedical Equipment	TD/PSB					3	50	50	100	3
5	PEC	1BBE505X	**Professional Elective I**	TD/PSB					3	50	50	100	3
6	BSC	1BRM506	Research Methodology and IPR (**Online**)	VTU online CoE CIE and SEE by COE	2	0	0	0	02	50	50	100	2
7	PCCL	1BBEL507	Clinical Instrumentation Lab	TD/PSB	0	0	2	0	02	50	50	100	1
8	SDC	1BXX508	**Hackathon-Based Project**	CIE: By Departments SEE: Evaluation by industry experts	0	0	0	2	--	50	50	100	2
								Total		**400**	**400**	**800**	**21**

Professional Elective Course-I

1BBE505A	Hospital Management	1BBE505C	Medical Device Regulations and Safety
1BBE505B	Prosthetics	1BBE505D	Bio-Fabrication

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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	Self-Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	IPCC	1BBE601	Healthcare IoT	TD/PSB-					3	50	50	100	4
2	PCC	1BBE602	Biomedical DSP	TD/PSB-					3	50	50	100	3
3	PCC	1BBE603	Biomedical Image Processing	TD/PSB-					3	50	50	100	3
4	PCC	1BBE604	Thermodynamics	TD/PSB-					3	50	50	100	3
5	PEC	1BBE605X	Professional Elective Courses-II	TD/PSB-					3	50	50	100	3
6	PCCL	1BBEL606	Biomedical DSP Lab	TD/PSB-	0	0	2	0	2	50	50	100	1
7	AEC	1BBEL607X	Ability Enhancement Course	TD/PSB-	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

1BBE605A	Medical Device Design and Development	1BBE605C	Physiological System Modeling
1BBE605B	Biosensors & Smart Sensors	1BBE605D	Machine Learning and Deep Learning

Ability Enhancement Course Laboratory**

1BBEL607A	Healthcare Data Analytics Lab	1BBEL607C	Machine Learning with Python Lab
1BBEL607B	Biomedical Image Processing Lab	1BBEL607D	Arduino and Raspberry-Pi Lab

** 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.

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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)	Teaching Hours /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	1BBE701	Biomaterials and Artificial Organs	TD/PSB-					3	50	50	100	4
2	PEC	1BBE702X	Professional Elective Course-III	TD/PSB-					3	50	50	100	3
3	PEC	1BBE703X	Professional Elective Course -IV	TD/PSB-					3	50	50	100	3
4	OEC	1BBE704X	Open Elective Course-I	TD/PSB-					3	50	50	100	3
5	SDC	1BBE705	Capstone Project - Phase-II	TD/PSB-	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**

Professional Elective Course-III			
1BBE702A	Healthcare DBMS	1BBE702C	Bioinformatics
1BBE702B	Lasers and Optical Fibers in Medicine	1BBE702D	BioMEMS
Professional Elective Course-IV			
1BBE703A	Ergonomics	1BBE703C	Advanced Clinical Instrumentation
1BBE703B	Biomechanics	1BBE703D	Biostatistics
Open Elective Course-I			
1BBE704A	Biomedical Image Processing	1BBE704C	Medical Informatics
1BBE704B	Biomedical Signal Processing	1BBE704D	

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VIII 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)	Teaching Hours /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	1BBE801X	Professional Elective-V (NPTEL/VTU Online Course)	Online Evaluation					3	50	50	100	3
2	OEC	1BBE802X	Open Elective-II (NPTEL/VTU Online Course)	Online Evaluation					3	50	50	100	3
3	SDC	1BBE803X	Internship (15 weeks or 90 working days)	--	--	--	--	--	3	100	100	200	12
				Total					9	**200**	**200**	**400**	**18**

Professional Elective Course (Online courses)-V

1BXX801A	NPTEL/VTU Online Course	1BXX801C	NPTEL/VTU Online Course
1BXX801B	NPTEL/VTU Online Course	1BXX801D	NPTEL/VTU Online Course

Open Elective Courses -II (Online Courses)

1BXX802A	NPTEL/VTU Online Course	1BXX802C	NPTEL/VTU Online Course
1BXX802B	NPTEL/VTU Online Course	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**

 Overview of Courses, Credits, Projects, and Internships under VTU Curriculum-Details are listed on page number 11(onwards)

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VII and VIII semesters for the candidates who opt for a two-semesters internship along with Capstone Project (Scheme B)

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 - 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	Professional Elective Course-III (NPTEL/VTU Online Course)	Online Evaluation					--	50	50	100	3
3	PEC	1BXX703x	Professional Elective Course-IV (NPTEL/VTU Online Course)	Online Evaluation					--	50	50	100	3
4	OEC	1BXX704x	Open Elective Course (NPTEL/VTU Online course)-I	Online Evaluation					---	50	50	100	3
5	SDC	1BXX705	Capstone Project - Phase-II***	TD: PSB:					3	100	100	200	7
6	NCMC	1BIKS706	Indian Knowledge System (VTU online)		1	0	0	0	--	100	--	100	PP
								Total	**6**	**400**	**300**	**700**	**20**
1	PEC	1Bxx801x	Professional Elective-V (NPTEL/VTU Online Course)	Online Evaluation					---	50	50	100	3
2	OEC	1Bxx802x	Open Elective-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 Online Professional Elective Course - 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 Online Professional Elective Course (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 Online Open Elective Courses (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. These courses 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 and 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 **Departmental Project 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 of Phase shall be evaluated as indicated with phase -I evaluation. The **SEE** shall be conducted by university-appointed examiners**.** The assessment shall 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 out in 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 using online 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 and 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 for vertical 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:

- Students who have an offer to enrol for a 15-week internship, before the start of 4th year, shall register for VIII semester courses instead of VII semester courses and take up respective semester examination.
- Those who have no offer to enrol to a 15-week internship, before the start of 4th year, shall register VII and VIII semesters courses in the chronological manner and complete the programme. In this case the internship shall be carried out during VIII semester.

X. Option -2: Two-Semester Internship Scheme – B

- Students who have cleared all the courses up to VI semester in first attempt only (i.e., students having no backlogs) and have an internship offer for a period of 180 working days or 30 working weeks, are only eligible for Scheme – B. The internship commence date should coincide with the 4th year academic calendar of VTU. Such students, shall produce the confirmed internship letter, to the Principal/Academic Authority to get permission to register for the summer semester to opt for Scheme - B.
- Such eligibles students shall register for the course 1Bxx701 in the summer semester of the same academic year (i.e., after their VI semester) and complete the said course in first attempt only.
- In case, they absent for the examination or fails in the course 1Bxx701, they shall not be considered eligible for the Scheme – B. However, they shall register for Scheme – A.
- After completing the course 1Bxx701, students with confirmed internship letter to carry out the internship for a minimum 180 working days or 30 working weeks, shall register for the Scheme – B.
- In case students cannot commence the internship for various reasons, they not be considered for Scheme – B. In such cases, they shall register for Scheme – A. However, they will be exempted from studying the course 1Bxx701 again.
- A request letter with internship permission letter must be submitted to Registrar, VTU through concerned authorities of the institution. Only after receiving the approval from the Registrar, students proceed with the internship as mentioned in Option Scheme B.

Capstone Project Evaluation Guidelines for Students Opting for Internship for two semesters duration:

a) **Industry Internship Leading to Capstone Project:** For students opting for a two-semester Industry Internship that leads to the completion of the Capstone Project, the Phase-I evaluation will be conducted at the end of the VII semester, and the Phase-II evaluation will be conducted at the end of the VIII semester.

b) **Industry Internships Not Leading to Capstone Project:** For students opting for a Industry Internship that does **not** lead to the completion of the Capstone Project, they are required to undertake the Capstone Project separately. Both Phase-I and Phase-II of the Project Work must be completed as per the prescribed guidelines, under the guidance of a college-level guide or mentor.

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

Jnana Sangam, Machhe, Belagavi-590018

Scheme of Teaching and Examinations 2025

Outcome-Based Education (OBE) and Choice-Based Credit System (CBCS)

(Effective from the academic year 2025-26)

B.E. in Mechatronics Engineering
Scheme of Teaching and Examinations 2025
Outcome-Based Education (OBE) and Choice-Based Credit System (CBCS) (Effective from the academic year 2025-26)

III SEMESTER

Sl. No	Course	Course Code	Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)		Teaching Hours /Week				Examination				Credits
						Theory Lecture	Tutorial	Practical/ Drawing	Self-Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
						L	T	P	SL					
1	ASC/PCC	1BMT301	Discrete Mathematics and Probability Theory	TD /PSB: Mathematics / Specific Department		3	2	0	3	3	50	50	100	4
2	IPCC	1BMT302	Data Structures and Algorithms	TD/PSB-MT/MT		2	2	2	2	3	50	50	100	4
3	PCC	1BMT303	Mechanics and Design	TD/PSB-MT/MT		3	0	2	3	3	50	50	100	4
4	PCC	1BMT304	Analog and Digital Electronics	TD/PSB-MT/MT		3	2	0	3	3	50	50	100	3
5	PCC	1BMT305	Fundamental of Manufacturing Technology	TD/PSB-MT/MT		3	0	0	3	3	50	50	100	3
6	PCCL	1BMTL306	Computer Aided Machine Drawing Lab	TD/PSB-MT/MT		0	0	2	0	3	50	50	100	1
7	AEC	1BMTL307	Analog and Digital Electronics Lab	TD/PSB-MT/MT		0	0	2	0	3	50	50	100	1
8	SDC	1BCP308	Community Project (Project-Based Learning)	Any Department/ Respective Engineering Dept.		0	0	2	2	3	50	50	100	1
9	NCMC	1BNSS309	National Service Scheme (NSS)	Campus	NSS coordinator	0	0	2	0	--	100	---	100	PP
		1BPE309	Physical Education (PE) (Sports and Athletics)		Physical Education Director									
		1BYOG309	Yoga		Yoga Teacher									
		1BMUK309	Music		Music Teacher									
10	NCMC	1BMATDIP310	Diploma Mathematics 1	TD -Maths Dept/ VTU Online (COE). CIE by VTU online COE		3	0	0	3	--	100	---	100	PP
					Total					**24**	**600**	**400**	**1000**	**21**

Ability Enhancement Course (Laboratory)			

** The course 1BXXL307 – 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.

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Scheme of Teaching and Examinations 2025
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 Question Paper Setting Board (PSB)		Teaching Hours /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	1BMT401	Theory of Machines	TD/PSB-MT/MT		2	2	0	2	3	50	50	100	3
2	IPCC	1BMT402	Object Oriented Programming	TD/PSB-MT/MT		3	0	2	3	3	50	50	100	4
3	PCC	1BMT403	Thermofluids	TD/PSB-MT/MT		2	2	0	2	3	50	50	100	4
4	PCC	1BMT404	Sensors and Actuators	TD/PSB-MT/MT		3	0	0	3	3	50	50	100	3
5	PCCL	1BMTL405	Sensors and Actuators Lab	TD/PSB-MT/MT		0	0	2	0	3	50	50	100	1
6	AEC	1BMTL406	Mechanisms and Machines Lab	TD/PSB-MT/MT		0	0	2	0	3	50	50	100	1
7	BSC	1BMT407	Programme Specific Biology	TD/PSB-MT/MT		2	0	0	0	3	50	50	100	2
8	SDC	1BEP408	Environmental Science Project	TD/PSB-MT/MT		0	0	0	2	3	50	50	100	1
9	NCMC	1BNSK409	National Service Scheme (NSS)	Campus	NSS coordinator	0	0	2	0	--	100	---	100	PP
		1BPEK409	Physical Education (PE) (Sports and Athletics)		Physical Education Director									
		1BYOK409	Yoga		Yoga Teacher									
		1BMUS409	Music		Music Teacher									
10	NCMC	1BMATDIP410	Diploma Mathematics 2	TD -Maths Dept/ VTU Online (COE) CIE by VTU online COE						--	100	--	100	PP
					Total					**24**	**600**	**400**	**1000**	**19**

Ability Enhancement Course (Laboratory)

** The course 1BXXL406x – Ability Enhancement Course Laboratory can be offered either as a single compulsory course. Alternatively, the Ability Enhancement Course Laboratory course can be offered with multiple elective options under the course codes 1BXXL406x (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 6 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 Mechatronics Engineering
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V SEMESTER

Sl. No	Course Type 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 – Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	HSMC	1BMT501	Engineering Management and Economics	TD/PSB-MT/MT	2	2	0	2	3	50	50	100	3
2	IPCC	1BMT502	Artificial Intelligence and Machine Learning	TD/PSB-MT/MT	3	0	2	3	3	50	50	100	4
3	PCC	1BMT503	Robotics for Engineers	TD/PSB-MT/MT	2	2	0	2	3	50	50	100	3
4	PCC	1BMT504	Microcontroller and Applications	TD/PSB-MT/MT	3	0	0	3	3	50	50	100	3
5	PEC	1BMT505X	**Professional Elective I**	TD/PSB-MT/MT	3	0	0	3	3	50	50	100	3
6	BSC	1BRM506	Research Methodology and IPR (**Online**)	VTU online CoE CIE and SEE by COE	2	0	0	0	2	50	50	100	2
7	PCCL	1BMTL507	CNC and 3D Printing Lab	TD/PSB-MT/MT	0	0	2	0	3	50	50	100	1
8	SDC	1BMT508	**Hackathon-Based Project**	CIE: By Departments SEE: Evaluation by industry experts	0	0	0	2	--	50	50	100	2
								Total	**20**	**400**	**400**	**800**	**21**

Professional Elective Course-I

1BMT505A	Natural Language Processing	1BMT505C	Computer Vision
1BMT505B	Robot Operating System	1BMT505D	Automotive Electronics Systems

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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	Self-Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	IPCC	1BMT601	Industrial IoT and Smart Manufacturing	TD/PSB-MT/MT	3	0	2	3	3	50	50	100	4
2	PCC	1BMT602	Industrial Automation	TD/PSB-MT/MT	2	2	0	2	3	50	50	100	3
3	PCC	1BMT603	Signal Processing	TD/PSB-MT/MT	3	0	0	3	3	50	50	100	3
4	PCC	1BMT604	Control Engineering	TD/PSB-MT/MT	2	2	0	2	3	50	50	100	3
5	PEC	1BMT605X	Professional Elective Courses-II	TD/PSB-MT/MT	3	0	0	3	3	50	50	100	3
6	PCCL	1BMTL606	Mechatronics and Signal Processing Lab	TD/PSB-MT/MT	0	0	2	0	3	50	50	100	1
7	AEC	1BMTL607X	Ability Enhancement Course	TD/PSB-MT/MT	0	0	2	0	3	50	50	100	1
8	SDC	1BMT608	Capstone Project - Phase I	TD/PSB-MT/MT	0	0	6	6	3	100	--	100	3
9	NCMC	1BMT609	**Universal Human Value (VTU ONLINE Course)**	CIE: By VTU online COE	1	0	0	0	--	100	---	100	PP
			Total						**24**	**550**	**350**	**900**	**21**

Professional Elective Course-II

1BMT605A	Industrial AI	1BMT605C	Unmanned Aerial Vehicles
1BMT605B	Mobile Robots	1BMT605D	Autonomous Vehicles

Ability Enhancement Course Laboratory**

1BMTL607A	Finite Element Analysis Lab	1BMTL607C	Data Cleaning and Visualization
1BMTL607B	ROS Lab	1BMTL607D	Instrumentation and Control System Lab

** 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.

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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)	Teaching Hours /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	1BMT701	Advanced Manufacturing	TD/PSB-MT/MT	3	0	2	3	3	50	50	100	4
2	PEC	1BMT702X	Professional Elective Course-III	TD/PSB-MT/MT	3	0	0	3	3	50	50	100	3
3	PEC	1BMT703X	Professional Elective Course -IV	TD/PSB-MT/MT	3	0	0	3	3	50	50	100	3
4	OEC	1BMT704X	Open Elective Course-I	TD/PSB-MT/MT	3	0	0	3	3	50	50	100	3
5	SDC	1BMT705	Capstone Project - Phase-II	TD/PSB-MT/MT	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**

Professional Elective Course-III			
1BMT702A	Data Analytics	1BMT702C	Micro Electro-Mechanical Systems
1BMT702B	Medical Robots	1BMT702D	Energy Storage Systems
Professional Elective Course-IV			
1BMT703A	Cyber Security	1BMT703C	Statistical Quality Control
1BMT703B	Collaborative Robots	1BMT703D	Quality Control and Reliability
Open Elective Course-I			
1BMT704A	Automotive Electronics	1BMT704C	Mechatronics Systems
1BMT704B	Fluid Power Systems	1BXX704D	Foreign Language (NPTEL/SWAYAM/online VTU)

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VIII 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)	Teaching Hours /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	1BMT801X	Professional Elective-V (NPTEL/VTU Online Course)	Online Evaluation					3	50	50	100	3
2	OEC	1BMT802X	Open Elective-II (NPTEL/VTU Online Course)	Online Evaluation					3	50	50	100	3
3	SDC	1BMT803X	Internship (15 weeks or 90 working days)	--	--	--	--	--	3	100	100	200	12
				Total					9	**200**	**200**	**400**	**18**

Professional Elective Course (Online courses)-V

1BMT801A	NPTEL/VTU Online Course	1BMT801C	NPTEL/VTU Online Course
1BMT801B	NPTEL/VTU Online Course	1BMT801D	NPTEL/VTU Online Course

Open Elective Courses -II (Online Courses)

1BMT802A	NPTEL/VTU Online Course	1BMT802C	NPTEL/VTU Online Course
1BMT802B	NPTEL/VTU Online Course	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. **1BMT803A – Industry Internship**: Shall involve practical exposure and training within an industrial or corporate setting.
2. **1BMT803B – Research Internship**: Shall focus on academic or applied research under the guidance of faculty or research institutions.
3. **1BMT803C – Post-Placement Internship**: Shall be undertaken by students who have secured placement, aligning with their future employment domain.
4. **1BMT803D – Societal Internship**: Shall engage students in community-based or social impact projects with NGOs, government bodies, or civic organizations.
5. **1BMT803E – Online Internship**: Shall be conducted through recognized digital platforms offering structured internship modules.
6. **1BMT803F – 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**

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VII and VIII semesters for the candidates who opt for a two-semesters internship along with Capstone Project (Scheme B)

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-Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	PCC	1BMT701	Advanced Manufacturing (To be completed in the **Summer Semester after 6th Semester)**	TD/PSB-MT/MT	3				3	50	50	100	4
2	PEC	1BMT702X	Professional Elective Course-III (NPTEL/VTU Online Course)	Online Evaluation					--	50	50	100	3
3	PEC	1BMT703X	Professional Elective Course-IV (NPTEL/VTU Online Course)	Online Evaluation					--	50	50	100	3
4	OEC	1BMT704X	Open Elective Course (NPTEL/VTU Online course)-I	Online Evaluation					---	50	50	100	3
5	SDC	1BMT705	Capstone Project - Phase-II***	TD/PSB-MT/MT					3	100	100	200	7
6	NCMC	1BIKS706	Indian Knowledge System (VTU online)		1	0	0	0	--	100	--	100	PP
	Total								**6**	**400**	**300**	**700**	**20**
1	PEC	1BMT801X	Professional Elective-V (NPTEL/VTU Online Course)	Online Evaluation					---	50	50	100	3
2	OEC	1BMT802X	Open Elective-II (NPTEL/VTU Online Course)	Online Evaluation					---	50	50	100	3
3	SDC	1BMT803X	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 Online Professional Elective Course - III			
1BMT703A	NPTEL/VTU Online Courses	1BMT703C	NPTEL/VTU Online Courses
1BMT703B	NPTEL/VTU Online Courses	1BMT704D	NPTEL/VTU Online Courses
NPTEL/VTU Online Open Elective Courses - I			
1BMT704A	NPTEL/VTU Online Courses	1BMT704C	NPTEL/VTU Online Courses
1BMT704B	NPTEL/VTU Online Courses	1BMT704D	NPTEL/VTU Online Courses
NPTEL/VTU Online Professional Elective Course (Online Courses)-IV			
1BMT801A	NPTEL/VTU Online Courses	1BMT801C	NPTEL/VTU Online Courses
1BMT801B	NPTEL/VTU Online Courses	1BMT801D	NPTEL/VTU Online Courses
NPTEL/VTU Online Open Elective Courses (Online Courses)-III			
1BMT802A	NPTEL/VTU Online Courses	1BMT802C	NPTEL/VTU Online Courses
1BMT802B	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. These courses 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 **Departmental Project 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 of Phase shall be evaluated as indicated with phase -I evaluation. The **SEE** shall be conducted by university-appointed examiners**.** The assessment shall 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 out in 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 using online 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 for vertical 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:

- Students who have an offer to enrol for a 15-week internship, before the start of 4th year, shall register for VIII semester courses instead of VII semester courses and take up respective semester examination.
- Those who have no offer to enrol to a 15-week internship, before the start of 4th year, shall register VII and VIII semesters courses in the chronological manner and complete the programme. In this case the internship shall be carried out during VIII semester.

X. Option -2: Two-Semester Internship Scheme – B

- Students who have cleared all the courses up to VI semester in first attempt only (i.e., students having no backlogs) and have an internship offer for a period of 180 working days or 30 working weeks, are only eligible for Scheme – B. The internship commence date should coincide with the 4th year academic calendar of VTU. Such students, shall produce the confirmed internship letter, to the Principal/Academic Authority to get permission to register for the summer semester to opt for Scheme - B.
- Such eligibles students shall register for the course 1Bxx701 in the summer semester of the same academic year (i.e., after their VI semester) and complete the said course in first attempt only.
- In case, they absent for the examination or fails in the course 1Bxx701, they shall not be considered eligible for the Scheme – B. However, they shall register for Scheme – A.
- After completing the course 1Bxx701, students with confirmed internship letter to carry out the internship for a minimum 180 working days or 30 working weeks, shall register for the Scheme – B.
- In case students cannot commence the internship for various reasons, they not be considered for Scheme – B. In such cases, they shall register for Scheme – A. However, they will be exempted from studying the course 1Bxx701 again.
- A request letter with internship permission letter must be submitted to Registrar, VTU through concerned authorities of the institution. Only after receiving the approval from the Registrar, students proceed with the internship as mentioned in Option Scheme B.

Capstone Project Evaluation Guidelines for Students Opting for Internship for two semesters duration:

a) **Industry Internship Leading to Capstone Project:** For students opting for a two-semester Industry Internship that leads to the completion of the Capstone Project, the Phase-I evaluation will be conducted at the end of the VII semester, and the Phase-II evaluation will be conducted at the end of the VIII semester.

b) **Industry Internships Not Leading to Capstone Project:** For students opting for a Industry Internship that does **not** lead to the completion of the Capstone Project, they are required to undertake the Capstone Project separately. Both Phase-I and Phase-II of the Project Work must be completed as per the prescribed guidelines, under the guidance of a college-level guide or mentor.

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

Jnana Sangam, Machhe, Belagavi-590018

Scheme of Teaching and Examinations 2025

Outcome-Based Education (OBE) and Choice-Based Credit System (CBCS)

(Effective from the academic year 2025-26)

B.E. in Medical Electronics
Scheme of Teaching and Examinations 2025
Outcome-Based Education (OBE) and Choice-Based Credit System (CBCS) (Effective from the academic year 2025-26)

III SEMESTER

Sl. No	Course	Course Code	Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)		Teaching Hours /Week				Examination				Credits
						Theory Lecture	Tutorial	Practical/ Drawing	Self-Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
						L	T	P	SL					
1	ASC/PCC	1BMD301	Transform Techniques and Fourier Series	TD /PSB: Mathematics / Specific department		3	2	0		3	50	50	100	4
2	IPCC	1BMD302	Digital Design and HDL	TD/PSB		2	2	2		3	50	50	100	4
3	PCC	1BMD303	Analog Electronic Circuits	TD/PSB		3	0	2		3	50	50	100	4
4	PCC	1BMD304	Anatomy and Physiology	TD/PSB						3	50	50	100	3
5	PCC	1BMD305	Electronic Instrumentation	TD/PSB		3	0	0		3	50	50	100	3
6	PCCL	1BMDL306	Analog Electronic Circuits Lab	TD/PSB		0	0	2		2	50	50	100	1
7	AEC	1BMDL307	Electronics Instrumentation and Measurements Lab	TD/PSB		0	0	2		2	50	50	100	1
8	SDC	1BCP308	Community Project (Project-Based Learning)	Any Department/ Respective Engineering Dept.		0	0	0	2	2	50	50	100	1
9	NCMC	1BNSS309	National Service Scheme (NSS)	Campus	NSS coordinator	0	0	2		--	100	---	100	PP
		1BPE309	Physical Education (PE) (Sports and Athletics)		Physical Education Director									
		1BYOG309	Yoga		Yoga Teacher									
		1BMUK309	Music		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**

Ability Enhancement Course (Laboratory)			

** The course 1BXXL307 – 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 Medical Electronics
Scheme of Teaching and Examinations 2025
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 Question Paper Setting Board (PSB)	Teaching Hours /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	1BMD401	Sensors & Actuators in Healthcare	TD/PSB:					3	50	50	100	3
2	IPCC	1BMD402	Data Structures and Algorithms	TD/PSB					3	50	50	100	4
3	PCC	1BMD403	Data Acquisition Circuits	TD/PSB					3	50	50	100	4
4	PCC	1BMD404	Embedded Controllers	TD/PSB					3	50	50	100	3
5	PCCL	1BMDL405	Data Acquisition Circuits Lab	TD/PSB	0	0	2	0	2	50	50	100	1
6	AEC	1BMDL406	Embedded Controllers Lab	TD/PSB	0	0	2	0	2	50	50	100	1
7	BSC	1BMD407	Programme Specific Biology	TD / PSB	2	0	0	0	3	50	50	100	2
8	SDC	1BEP408	Environmental Science Project	TD/PSB	0	0	0	2	3	50	50	100	1
9	NCMC	1BNSK409	National Service Scheme (NSS)	Campus: NSS coordinator	0	0	2		--	100	---	100	PP
		1BPEK409	Physical Education (PE) (Sports and Athletics)	Physical Education Director									
		1BYOK409	Yoga	Yoga Teacher									
		1BMUS409	Music	Music Teacher									
10	NCMC	1BMATDIP410	Mathematics course for Lateral Entry Students	TD -Maths Dept/ VTU Online (COE). CIE by VTU online COE					--	100	--	100	PP
				Total						**600**	**400**	**1000**	**19**

Ability Enhancement Course (Laboratory)

** The course 1BXXL406x – Ability Enhancement Course Laboratory can be offered either as a single compulsory course. Alternatively, the Ability Enhancement Course Laboratory course can be offered with multiple elective options under the course codes 1BXXL406x (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 6 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 Medical Electronics
Scheme of Teaching and Examinations 2025
Outcome-Based Education (OBE) and Choice-Based Credit System (CBCS) (Effective from the academic year 2025-26)

V SEMESTER

Sl. No	Course Type 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 – Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	HSMC	1BMD501	Engineering Management and Economics	TD/PSB:					3	50	50	100	3
2	IPCC	1BMD502	Signals and Systems	TD/PSB					3	50	50	100	4
3	PCC	1BMD503	Clinical Instrumentation	TD/PSB					3	50	50	100	3
4	PCC	1BMD504	Diagnostic and Therapeutic Equipment	TD/PSB					3	50	50	100	3
5	PEC	1BMD505X	**Professional Elective I**	TD/PSB					3	50	50	100	3
6	BSC	1BRM506	Research Methodology and IPR (**Online**)	VTU online CoE CIE and SEE by COE	2	0	0	0	02	50	50	100	2
7	PCCL	1BMDL507	Clinical Instrumentation Lab	TD/PSB	0	0	2	0	02	50	50	100	1
8	SDC	1BXX508	**Hackathon-Based Project**	CIE: By Departments SEE: Evaluation by industry experts	0	0	0	2	--	50	50	100	2
								Total		**400**	**400**	**800**	**21**

Professional Elective Course-I

1BMD505A	Hospital Management	1BMD505C	Medical Device Regulations and Safety
1BMD505B	CMOS VLSI Design	1BMD505D	Biomedical Nanotechnology

B.E. in Medical Electronics
Scheme of Teaching and Examinations 2025
Outcome-Based Education (OBE) and Choice-Based Credit System (CBCS) (Effective from the academic year 2025-26)

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	Self-Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	IPCC	1BMD601	Healthcare IoT	TD/PSB-					3	50	50	100	4
2	PCC	1BMD602	Medical Physics	TD/PSB-					3	50	50	100	3
3	PCC	1BMD603	Biomedical Image Processing	TD/PSB-					3	50	50	100	3
4	PCC	1BMD604	Mechatronics in Medicine	TD/PSB-					3	50	50	100	3
5	PEC	1BMD605X	Professional Elective Courses-II	TD/PSB-					3	50	50	100	3
6	PCCL	1BL606	Biomedical Image Processing Lab	TD/PSB-	0	0	2	0	2	50	50	100	1
7	AEC	1BxxL607X	Ability Enhancement Course	TD/PSB-	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

1BMD605A	Medical Device Design and Development	1BMD605C	Scientific and Analytical Instrumentation
1BMD605B	Biosensors & Smart Sensors	1BMD605D	Machine Learning and Deep Learning

Ability Enhancement Course Laboratory**

1BMDL607A	Healthcare Data Analytics Lab	1BMDL607C	Machine Learning with Python Lab
1BMDL607B	Biomedical Image Processing Lab	1BMDL607D	Arduino and Raspberry-Pi Lab

** 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.

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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)	Teaching Hours /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	1BMD701	Biomaterials Digital Signal Processing	TD/PSB-					3	50	50	100	4
2	PEC	1BMD702X	Professional Elective Course-III	TD/PSB-					3	50	50	100	3
3	PEC	1BMD703X	Professional Elective Course -IV	TD/PSB-					3	50	50	100	3
4	OEC	1BMD704X	Open Elective Course-I	TD/PSB-					3	50	50	100	3
5	SDC	1BMD705	Capstone Project - Phase-II	TD/PSB-	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**

Professional Elective Course-III			
1BMD702A	Healthcare DBMS	1BMD702C	Bioinformatics
1BMD702B	Biometric Systems	1BMD702D	BioMEMS
Professional Elective Course-IV			
1BMD703A	Ergonomics	1BMD703C	Advanced Clinical Instrumentation
1BMD703B	Biomechanics	1BMD703D	Biostatistics
Open Elective Course-I			
1BMD704A	Biomedical Image Processing	1BMD704C	Biomedical Instrumentation
1BMD704B	Biomedical Signal Processing	1BMD704D	

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VIII 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)	Teaching Hours /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	1BMD801X	Professional Elective-V (NPTEL/VTU Online Course)	Online Evaluation					3	50	50	100	3
2	OEC	1BMD802X	Open Elective-II (NPTEL/VTU Online Course)	Online Evaluation					3	50	50	100	3
3	SDC	1BMD803X	Internship (15 weeks or 90 working days)	--	--	--	--	--	3	100	100	200	12
				Total					9	**200**	**200**	**400**	**18**

Professional Elective Course (Online courses)-V

1BXX801A	NPTEL/VTU Online Course	1BXX801C	NPTEL/VTU Online Course
1BXX801B	NPTEL/VTU Online Course	1BXX801D	NPTEL/VTU Online Course

Open Elective Courses -II (Online Courses)

1BXX802A	NPTEL/VTU Online Course	1BXX802C	NPTEL/VTU Online Course
1BXX802B	NPTEL/VTU Online Course	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**

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VII and VIII semesters for the candidates who opt for a two-semesters internship along with Capstone Project (Scheme B)

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 - 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	Professional Elective Course-III (NPTEL/VTU Online Course)	Online Evaluation					--	50	50	100	3
3	PEC	1BXX703x	Professional Elective Course-IV (NPTEL/VTU Online Course)	Online Evaluation					--	50	50	100	3
4	OEC	1BXX704x	Open Elective Course (NPTEL/VTU Online course)-I	Online Evaluation					---	50	50	100	3
5	SDC	1BXX705	Capstone Project - Phase-II***	TD: PSB:					3	100	100	200	7
6	NCMC	1BIKS706	Indian Knowledge System (VTU online)		1	0	0	0	--	100	--	100	PP
								Total	**6**	**400**	**300**	**700**	**20**
1	PEC	1Bxx801x	Professional Elective-V (NPTEL/VTU Online Course)	Online Evaluation					---	50	50	100	3
2	OEC	1Bxx802x	Open Elective-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 Online Professional Elective Course - 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 Online Professional Elective Course (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 Online Open Elective Courses (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. These courses 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 and 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 **Departmental Project 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 of Phase shall be evaluated as indicated with phase -I evaluation. The **SEE** shall be conducted by university-appointed examiners**.** The assessment shall 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 out in 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 using online 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 and 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 for vertical 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:

- Students who have an offer to enrol for a 15-week internship, before the start of 4th year, shall register for VIII semester courses instead of VII semester courses and take up respective semester examination.
- Those who have no offer to enrol to a 15-week internship, before the start of 4th year, shall register VII and VIII semesters courses in the chronological manner and complete the programme. In this case the internship shall be carried out during VIII semester.

X. Option -2: Two-Semester Internship Scheme – B

- Students who have cleared all the courses up to VI semester in first attempt only (i.e., students having no backlogs) and have an internship offer for a period of 180 working days or 30 working weeks, are only eligible for Scheme – B. The internship commence date should coincide with the 4th year academic calendar of VTU. Such students, shall produce the confirmed internship letter, to the Principal/Academic Authority to get permission to register for the summer semester to opt for Scheme - B.
- Such eligibles students shall register for the course 1Bxx701 in the summer semester of the same academic year (i.e., after their VI semester) and complete the said course in first attempt only.
- In case, they absent for the examination or fails in the course 1Bxx701, they shall not be considered eligible for the Scheme – B. However, they shall register for Scheme – A.
- After completing the course 1Bxx701, students with confirmed internship letter to carry out the internship for a minimum 180 working days or 30 working weeks, shall register for the Scheme – B.
- In case students cannot commence the internship for various reasons, they not be considered for Scheme – B. In such cases, they shall register for Scheme – A. However, they will be exempted from studying the course 1Bxx701 again.
- A request letter with internship permission letter must be submitted to Registrar, VTU through concerned authorities of the institution. Only after receiving the approval from the Registrar, students proceed with the internship as mentioned in Option Scheme B.

Capstone Project Evaluation Guidelines for Students Opting for Internship for two semesters duration:

a) **Industry Internship Leading to Capstone Project:** For students opting for a two-semester Industry Internship that leads to the completion of the Capstone Project, the Phase-I evaluation will be conducted at the end of the VII semester, and the Phase-II evaluation will be conducted at the end of the VIII semester.

b) **Industry Internships Not Leading to Capstone Project:** For students opting for a Industry Internship that does **not** lead to the completion of the Capstone Project, they are required to undertake the Capstone Project separately. Both Phase-I and Phase-II of the Project Work must be completed as per the prescribed guidelines, under the guidance of a college-level guide or mentor.

B.E. in the title Robotics and Artificial Intelligence

Scheme of Teaching and Examinations-2025

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

III SEMESTER

Sl. No	Course	Course Code	Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Self Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	ASC/PCC	1BMAT301	Discrete Mathematics and Probability Theory	TD /PSB: Mathematics/ Respective Engineering Dept.	3	2	0	0	3	50	50	100	4
2	IPCC	1BRI302	Data Structures and Algorithms	TD/PSB: CSE/ RAI	3	0	2	0	3	50	50	100	4
3	PCC	1BRI303	Mechanics and Design	TD/PSB: ME/ RAI	3	2	0	0	3	50	50	100	4
4	PCC	1BRI304	Analog and Digital Electronic Circuits (ADEC)	TD/PSB: ECE/RAI	3	0	0	0	3	50	50	100	3
5	PCC	1BRI305	Fundamentals of Industrial Robots	TD/PSB: ME/RAI	3	0	0	0	3	50	50	100	3
6	PCCL	1BRIL306	Computer Aided Modelling Lab	TD/PSB: ME/RAI	0	0	2	0	3	50	50	100	1
7	AEC	1BRIL307A	Ability Enhancement Course Laboratory- Analog and Digital Electronic Circuits Lab	TD/PSB: ECE/RAI	0	0	2	0	3	50	50	100	1
8	SDC	1BSC308	Societal Project (Project-Based Learning)	Any Department/ Respective Engineering Dept.	0	0	0	2	3	50	50	100	1
9	NCMC	1BNSS309	National Service Scheme (NSS)	NSS coordinator	0	0	2			100	---	100	PP
		1BPE309	Physical Education (PE) (Sports and Athletics)	Physical Education Director									
		1BYOG309	Yoga	Yoga Teacher									
		1BMUK309	Music	Music Teacher									
				Total						**100**	**--**	**100**	**21**
10	NCMC	1BMATDIP310	Maths course for Lateral Entry Students	TD/PSB-Maths Dept	3	0	0	3	03	100	---	100	PP

ASC- Applied Science Course, PCC- Professional Core Course, IPCC-Integrated Professional Core Course, PCCL- Professional Core Course Laboratory, AEC-Ability Enhancement Course, SDC- Skill Development Course, NCMC- Non-Credit Mandatory Course, SL-Term-work and Self Study hours, CIE-Continuous Internal Evaluation, SEE- Semester End

Evaluation.			
Ability Enhancement Course Laboratory (May be one course or			
1BRIL307A	**Analog and Digital Electronic Circuits lab**		

The course **1BRIL307 – Ability Enhancement Course Laboratory** shall be offered either as a single compulsory course or as multiple options under the course codes **1BRIL307x** (where *x = A, B, C, D*). Each student shall choose **one course** from the available options for study. Since this is a laboratory course, the **minimum strength required** for each course shall be **20 students**. If the number of students opting for a particular course is **less than 20**, the college shall seek permission from the **Registrar, VTU Belagavi**, to offer that course.
Professional Core Course (IPCC): The Integrated Professional Core Course (IPCC) refers to a core theory course that is integrated with practical components of the same subject. Each IPCC carries 4 credits, with Teaching–Learning hours structured as either (3:0:2) or (2:2:2). The theory component of the IPCC shall be evaluated through both Continuous Internal Evaluation (CIE) and Semester End Examination (SEE). The practical component shall be assessed exclusively through CIE, with no separate SEE. However, questions derived from the practical component may be included in the SEE question paper to ensure comprehensive evaluation.
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, semesters. • Colleges shall submit Continuous Internal Evaluation (CIE) marks each semester based on the activities completed by students under the selected course. • Students may opt for different activities/courses across semesters. For instance, a student participating in PE during the 3rd semester may choose NSS in the 4th semester or Yoga. • This flexible approach aligns with the student-centric vision of the National Education Policy (NEP) 2022, and facilitates equitable distribution of NSS/PE/Yoga-related responsibilities across departments. • Activities shall be conducted over two semesters (III & IV), and successful completion of the registered course 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, and Yoga activities. These courses shall not be considered for vertical progression, nor shall they be included in the calculation of SGPA or CGPA. However, completion is compulsory for degree eligibility.
Societal project work: Students shall undertake Societal Project Work to address real-world social challenges and contribute meaningfully to community well-being. They shall engage with domains such as health, education, sustainability, digital inclusion, and rural development through experiential learning. Students shall apply their domain-specific knowledge to design and implement solutions that respond effectively to identified societal needs. By interacting directly with communities and stakeholders, they shall develop practical skills, empathy, and ethical awareness.
A **Non-Credit Mandatory Course (NCMC)** shall constitute an integral component of the academic framework, aimed at enhancing students' knowledge, skills, and awareness beyond the core curriculum. These courses shall not carry academic credits nor be considered in the computation of CGPA; however, successful completion of the NCMC shall be compulsory for fulfilling the requirements of the academic program. Each student shall register for the designated NCMC in the prescribed semester as notified by the University/Institution. NCMCs shall not be considered for vertical progression. However, qualifying in the NCMC is mandatory for the award of the degree. A student who fails to qualify in the prescribed NCMC shall not be eligible for the conferment of the degree.

Credit Definition:	04-Credit courses are designed for 50 hours of Teaching-Learning sessions

1-hour Lecture **(L)** per week=**1Credit** 2-hoursTutorial**(T)** per week=**1Credit** 2-hours Practical / Drawing (**P**) per week=**1Credit**	04-Credit (IC) 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

AICTE Activity Points Requirement for BE/B.Tech. Programmes (Lateral Entry Students)

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 is:

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 are **non-credit** and will not be considered for **the SGPA/CGPA** or be used 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**. If a student completes all the semesters (eight or six) at the end Robotics and Artificial Intelligenceme but fails to earn the required Activity Points, the eighth-semester Grade Card will be withheld until the requirement is fulfilled. Also, the degree will be awarded only after the Grade Card has been released. 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.

B.E. in the title Robotics and Artificial Intelligence

Scheme of Teaching and Examinations-2025

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 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	SL					
1	ASC/PCC	1BRI401	Robot Kinematics and Dynamics	TD/PSB: ME/RAI	3	0	0	0	3	50	50	100	3
2	IPCC	1BRI402	Object-oriented programming	TD/PSB: CSE/RAI	3	0	2	0	3	50	50	100	4
3	PCC	1BRI403	Control systems	TD/PSB: ECE/ME/EEE/RAI	4	0	0	0	3	50	50	100	4
4	PCC	1BRI404	Sensors and Actuators	TD/PSB: ECE/EEE/ME/RAI	3	0	0	0	3	50	50	100	3
5	PCCL	1BRIL405	Sensors and Actuators Laboratory	TD/PSB: ECE/EEE/ME/RAI	0	0	2	0	02	50	50	100	1
6	AEC	1BRIL406A	**Ability Enhancement Course Laboratory:** Industrial Robot Laboratory	TD/PSB: ME/RAI	0	0	2	0	02	50	50	100	1
7	HSMC	1BRMI407	Research Methodology and IPR (VTU **Online**)	TD / PSB:	2	0	0	0	03	50	50	100	2
8	SDC	1BEP408	**Environmental Science Project** **(Interdisciplinary Project Based Learning)**	TD/PSB	0	0	0	2	03	50	50	100	1
9	NCMC	1BNSK409	National Service Scheme (NSS)	NSS coordinator	0	0	2	-	-	100	---	100	PP
		1BPEK409	Physical Education (PE) (Sports and Athletics)	Physical Education Director									
		1BYOK409	Yoga	Yoga Teacher									
		1BMUS409	Music	Music Teacher									
				Total									**19**
10	NCMC	1BMATDIP410	Maths for Lateral Entry Students	Maths Dept	4	0	0	0	-	100	--	100	PP

ASC- Applied Science Course, PCC- Professional Core Course, IPCC-Integrated Professional Core Course, PCCL- Professional Core Course Laboratory, AEC-Ability Enhancement Course, SDC- Skill Development Course, NCMC- Non-Credit Mandatory Course, SL-Term-work and Self Study hours, CIE-Continuous Internal Evaluation, SEE- Semester End Evaluation.

Professional Core Course (IPCC): The Integrated Professional Core Course (IPCC) refers to a core theory course that is integrated with practical components of the same

subject. Each IPCC carries 4 credits, with Teaching–Learning hours structured as either (3:0:2) or (2:2:2). The theory component of the IPCC shall be evaluated through both Continuous Internal Evaluation (CIE) and Semester End Examination (SEE). The practical component shall be assessed exclusively through CIE, with no separate SEE. However, questions derived from the practical component may be included in the SEE question paper to ensure comprehensive evaluation.

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, semesters.

- Colleges shall submit Continuous Internal Evaluation (CIE) marks each semester based on the activities completed by students under the selected course.
- Students may opt for different activities/courses across semesters. For instance, a student participating in PE during the 3rd semester may choose NSS in the 4th semester or Yoga.
- This flexible approach aligns with the student-centric vision of the National Education Policy (NEP) 2022, and facilitates equitable distribution of NSS/PE/Yoga-related responsibilities across departments.
- Activities shall be conducted over two semesters (III & IV), and successful completion of the registered course 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, and Yoga activities.

These courses shall not be considered for vertical progression, nor shall they be included in the calculation of SGPA or CGPA. However, completion is compulsory for degree eligibility.

A **Non-Credit Mandatory Course (NCMC)** shall constitute an integral component of the academic framework, aimed at enhancing students' knowledge, skills, and awareness beyond the core curriculum. These courses shall not carry academic credits nor be considered in the computation of CGPA; however, successful completion of the NCMC shall be compulsory for fulfilling the requirements of the academic program. Each student shall register for the designated NCMC in the prescribed semester as notified by the University/Institution. NCMCs shall not be considered for vertical progression. However, qualifying in the NCMC is mandatory for the award of the degree. A student who fails to qualify in the prescribed NCMC shall not be eligible for the conferment of the degree.

An **Environmental Science project** for engineering students shall aim to integrate ecological awareness with technical innovation. The project shall be either interdisciplinary—drawing from multiple branches of engineering—or domain-specific, focusing on a particular field. It shall encourage students to apply sustainable practices, analyze environmental impact, and propose viable solutions. The chosen topic shall reflect current environmental challenges and align with academic objectives. Students shall document their findings systematically and present actionable outcomes. The project shall foster responsible engineering aligned with environmental stewardship.

The course **1BRIL406 – Ability Enhancement Course Laboratory** shall be offered either as a single compulsory course or as multiple options under the course codes **1BRIL406x** (where *x = A, B, C, D*). Each student shall choose **one course** from the available options for study. Since this is a laboratory course, the **minimum strength required** for each course shall be **20 students**. If the number of students opting for a particular course is **less than 20**, the college shall seek permission from the **Registrar, VTU Belagavi**, to offer that course.

Ability Enhancement Course Laboratory			
1BRIL406A	Industrial Robot Lab		-
	-		-

B.E. in the title Robotics and Artificial Intelligence

Scheme of Teaching and Examinations-2025

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

V 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	Selp Study	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	HSMC	1BRI501	Management and Economics	TD/PSB: Relevant Engineering Department	3	0	0	0	3	50	50	100	3
2	IPCC	1BRI502	Artificial Intelligence and Machine Learning	TD/PSB: CSE/RAI	3	0	2	0	3	50	50	100	4
3	PCC	1BRI503	Robot Operating System	TD/PSB: CSE/RAI/ECE/ME	3	0	0	0	3	50	50	100	3
4	PCC	1BRI504	Microcontroller and applications	TD/PSB: ECE/RAI	3	0	0	0	3	50	50	100	3
5	PEC	1BRI505X	**Professional Elective Course-I**	TD/PSB: Relevant Engineering Department	3	0	0	0	3	50	50	100	3
6	BSC	1BRI506	**Program Specific Biology**	TD/PSB	2	0	0	0	2	50	50	100	2
7	PCCL	1BRIL507	Robot Operating system Lab	TD/PSB	0	0	2	0	2	50	50	100	1
8	SDC	1BRI508	**Minor Project**	TD/PSB	0	0	0	2	-	50	50	100	2
				Total	17	0	4	2		400	400	800	**21**

HSMC- Humanities Studies and Management Course, IPCC-Integrated Professional Core Course, PCC- Professional Core Course, BSC-Basic Science Course, PCCL- Professional Core Course Laboratory, AEC-Ability Enhancement Course, SDC- Skill Development Course, SL-Term-work and Self Study hours, CIE-Continuous Internal Evaluation, SEE- Semester End Evaluation.

Professional Elective Course-I			
1BRI505A	Finite Element Methods	1BRI505C	Digital Twin
1BRI505B	Computer vision	1BRI505D	Cyber security

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 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. If the number of students opting for a particular course is **less than 10**, the college shall seek permission from the **Registrar, VTU Belagavi**, to offer that course.

Mini-project work: The Mini-Project shall be a laboratory-based, hands-on course intended to enhance students' practical skills and technical proficiency through the development of small-scale systems or applications. Projects may be assigned individually or in groups of up to four students, depending on the students' capabilities and the mentor's recommendations. The assignments may belong to a single discipline or span multiple disciplines.

CIE procedure for Mini-project: (out of 50 Marks)

(i) Single-Discipline Projects: The CIE marks shall be awarded by a departmental committee comprising the Head of the Department and two faculty members, one of whom shall be the project guide. The evaluation shall be based on the following components: Project Report – 50%, Presentation Skills – 25%, Question & Answer Session – 25%

The marks awarded for the project report shall be uniform for all members of the group. If the CIE is conducted for 100 marks, then the total score shall be scaled to a maximum of 50 marks.

(ii) Interdisciplinary: The CIE for interdisciplinary projects shall be conducted at the college level. The evaluation shall be carried out group-wise by a panel comprising all the project guides involved. The assessment criteria and weightage shall remain the same as for single-discipline projects. The SEE shall be conducted as per the Examination/University guidelines. (SEE will be as per Examination/University guidelines).

B.E. in the title Robotics and Artificial Intelligence

Scheme of Teaching and Examinations-2025

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

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	Self Study	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	IPCC	1BRI601	Deep and Reinforcement Learning	TD/PSB-CSE/RAI	3	0	2	0	3	50	50	100	4
2	PCC	1BRI602	Natural Language Processing	TD/PSB-CSE/RAI	3	0	0	0	3	50	50	100	3
3	PCC	1BRI603	Autonomous robots	TD/PSB-ME/ECE/CSE/RAI	3	0	0	0	3	50	50	100	3
4	PCC	1BRI604	Cognitive intelligence	TD/PSB-ME/CSE/ECE/RAI	3	0	0	0	3	50	50	100	3
5	PEC	1BRI605x	Professional Elective Courses-II	TD/PSB-Relevant Engineering Department	3	0	0	0	3	50	50	100	3
6	PCCL	1BRIL606	Natural Language processing Lab	TD/PSB-	0	0	2	0	3	50	50	100	1
7	AEC	1BRIL607X	**Ability Enhancement Course Laboratory**	TD/PSB-	0	0	2	0	3	50	50	100	1
8	SDC	1BRI608	Project Phase I	TD/PSB-	0	0	0	6		50	50	100	3
9	NCMC	1BRI609	**Universal Human Value (VTU ONLINE Course)**	TD/PSB-	1	0	0	0		100	---	100	PP
				Total	16	0	6	6		500	400	900	**21**

IPCC-Integrated Professional Core Course, PCC- Professional Core Course, BSC-Basic Science Course, PEC-Professional Elective Course, PCCL- Professional Core Course Laboratory, AEC-Ability Enhancement Course, SDC- Skill Development Course, NCMC- Non-Credit Mandatory Course, SL-Term-work and Self Study hours, CIE-Continuous Internal Evaluation, SEE- Semester End Evaluation.

Professional Elective Course-II

1BRI605A	Data Analytics	1BRI605C	Robot Integrated Manufacturing
1BRI605B	Cloud Computing	1BRI605D	Virtual Instrumentation

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 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. If the number of students opting for a particular course is **less than 10**, the college shall seek permission from the **Registrar, VTU Belagavi**, to offer that course.

The course **1BRIL607 – Ability Enhancement Course Laboratory** shall be offered either as a single compulsory course or as multiple options under the course codes **1BRIL607x** (where *x = A, B, C, D*). Each student shall choose **one course** from the available options for study. Since this is a laboratory course, the **minimum strength required** for each course shall be **20 students**. If the number of students opting for a particular course is **less than 20**, the college shall seek permission from the **Registrar, VTU Belagavi**, to offer that course.			
Ability Enhancement Course Laboratory			
1BRIL607A	Mobile Robot Lab		
1BRIL607B	Finite Element Analysis Lab		

B.E. in the title Robotics and Artificial Intelligence

Scheme of Teaching and Examinations-2025

Outcome-Based Education (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)	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	IPCC	1BRI701	Industrial Internet of Things	TD/PSB-ME/ECE/RAI	3	0	2	0	3	50	50	100	4
2	PCC	1BRI702x	Professional Elective Course -III	TD/PSB-Relevant Engineering department	3	0	0	0	3	50	50	100	3
3	PEC	1BRI703x	Professional Elective Course -IV	TD/PSB-Relevant Engineering department	3	0	0	0	3	50	50	100	3
4	OEC	1BRI704x	Open Elective Course-I	TD/PSB-RAI	3	0	0	0	3	50	50	100	3
5	SDC	1BRI705	Major Project Phase-II	TD/PSB-RAI	0	0	0	14		100	100	200	7
6	**NCMC**	**1BIKS706**	**Indian Knowledge System (VTU online Course)**	TD/PSB-	**1**	**0**	**0**	0		**100**	**--**	**100**	**PP**
				Total	**13**	**0**	**2**	14		**400**	**300**	**700**	**20**

IPCC-Integrated Professional Core Course, PCC- Professional Core Course, PEC-Professional Elective Course, OEC-Open Elective Course, SDC- Skill Development Course, NCMC-Non-Credit Mandatory Course, SL-Term-work and Self Study hours, CIE-Continuous Internal Evaluation, SEE- Semester End Evaluation.

Professional Elective Course-III

1BRI702A	Robot Process Automation	1BRI702C	Mobile Application Development for robots
1BRI702B	Operation Research	1BRI702D	Trustworthy and Explainable AI for Robotics

Professional Elective Course-IV

1BRI703A	Business Analytics	1BRI703C	Agentic AI
1BRI703B	Micro-Electro_Mechanical Systems	1BRI703D	Wireless Communication

Open Elective Course-I

1BRI704A	Autonomous Mobile Robots	1BRI704C	Introduction to robotics
1BRI704B	Industrial Automation	1BRI704D	Foreign language

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 Robotics and Artificial Intelligence 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

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 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. If the number of students opting for a particular course is **less than 10**, the college shall seek permission from the **Registrar, VTU Belagavi**, to offer that course.

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.

(2) Interdisciplinary: Continuous Internal Evaluation shall be group-wise at the college level with the participation of all guides of the college. Participation of external guide/s, if any, is desirable. The CIE marks awarded for the project work, shall be based on the evaluation of 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.

SEE procedure for Project Work: SEE for project work will be conducted by the two examiners appointed by the University. The SEE marks awarded for the project work shall be based on the evaluation of project work Report, project presentation skill, and question and answer session in the ratio 50:25:25.

Swappable Semester Provision – Scheme A

To ensure equitable access to internship opportunities, the seventh and eighth semesters shall be swappable under Scheme A, as detailed below;

Standard Implementation: All students shall, by default, undertake seventh-semester courses during the ODD semester, and eighth-semester courses during the EVEN semester.

Alternative Implementation: Alternatively, in the ODD semester, a defined percentage of final-year students shall be permitted to take up eighth-semester courses, The remaining students shall pursue seventh-semester courses, in the EVEN semester, the student groups shall exchange roles. Those who completed seventh-semester courses in the ODD semester shall now undertake eighth-semester components, and vice versa.

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

B.E. in the title Robotics and Artificial Intelligence

Scheme of Teaching and Examinations-2025

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

VIII 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)	Teaching Hours /Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Self Study	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	PEC	1BRI801x	**Professional Elective-V (NPTEL/VTU Online Courses)**	TD/PSB-	3	0	0	0					3
2	OEC	1BRI802x	**Open Elective (NPTEL/VTU Online Courses)-II**	TD/PSB-	3	0	0	0					3
3	SDC	1BRI803x	**Internship (Types) (15 weeks) (90 working days)**	TD/PSB-	0	0	0	24		100	100	200	12
				Total									**18**

PEC-Professional Elective Course, OEC-Open Elective Course, SDC- Skill Development Course, SL-Term-work and Self Study hours, CIE-Continuous Internal Evaluation, SEE-Semester End Evaluation.

Professional Elective Course (Online courses)-V

1BRI801A	**NPTEL/VTU Online Courses**	1BRI801C	**NPTEL/VTU Online Courses**
1BRI801B	**NPTEL/VTU Online Courses**	1BRI801D	**NPTEL/VTU Online Courses**

Open Elective Courses (Online Courses)-II

1BRI802A	**NPTEL/VTU Online Courses**	1BRI802C	**NPTEL/VTU Online Courses**
1BRI802B	**NPTEL/VTU Online Courses**	1BRI802D	**NPTEL/VTU Online Courses**

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 Robotics and Artificial Intelligence Coordinator/ Advisor/Mentor. The minimum number 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

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 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. If the number of students opting for a particular course is **less than 10**, the college shall seek permission from the **Registrar, VTU Belagavi**, to offer that course.

Swappable Semester Provision – Scheme A

To ensure equitable access to internship opportunities, the seventh and eighth semesters shall be swappable under Scheme A, as detailed below;

Standard Implementation: All students shall, by default, undertake seventh-semester courses during the ODD semester, and eighth-semester courses during the EVEN semester.

Alternative Implementation: Alternatively, in the ODD semester, a defined percentage of final-year students shall be permitted to take up eighth-semester courses, The remaining students shall pursue seventh-semester courses, in the EVEN semester, the student groups shall exchange roles. Those who completed seventh-semester courses in the ODD semester shall now undertake eighth-semester components, and vice versa.

Types of Internships (Course Code: 1BRI803)

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

1. **1BRI803A – Industry Internship**: Shall involve practical exposure and training within an industrial or corporate setting.
2. **1BRI803B – Research Internship**: Shall focus on academic or applied research under the guidance of faculty or research institutions.
3. **1BRI803C – Post-Placement Internship**: Shall be undertaken by students who have secured placement, aligning with their future employment domain.
4. **1BRI803D – Societal Internship**: Shall engage students in community-based or social impact projects with NGOs, government bodies, or civic organizations.
5. **1BRI803E – Online Internship**: Shall be conducted through recognized digital platforms offering structured internship modules.
6. **1BRI803F – 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

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

B.E. in the title Robotics and Artificial Intelligence Scheme of Teaching and Examinations 2022

Outcome-Based - Education (OBE) and Choice-Based Credit System (CBCS)

(Effective from the academic year 2023-24)

VII and VIII semesters for the candidates who seek an internship for two semesters along with project work (Scheme B)

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	SL					
1	IPCC	1BRI701	To be completed in the Summer Semester after 6th semester	3	0	2	0	3	50	50	100	4	4
2	PEC	1BRI702x	Professional Elective Course (NPTEL/VTU Online Courses)-III										3
3	PEC	1BRI703x	Professional Elective Course (NPTEL/VTU Online Courses)-IV										3
4	OEC	1BRI704x	Open Elective Courses (NPTEL/VTU Online courses)-I										3
6	**NCMC**	**1BIKS706**	**Indian Knowledge System (VTU online)**		**1**	**0**	**0**	0		**100**	**--**	**100**	**PP**
			Total										**13**
1	PEC	1BRI801x	Professional Elective (Online Courses)-IV										3
2	OEC	1BRI802x	Open Elective (Online Courses)-II										3
3	SDC	1BRI803x	Internship (Industry/Research) (02 semesters) (min-180 working days)(min-30 weeks)										12
4	SDC	1BRI805	Project Phase-II -										**07**
			Total										**25**

IPCC- Integrated Professional Core Course, PEC-Professional Elective Course, OEC-Open Elective Course, NCMC-Non-Credit Mandatory Course, SDC- Skill Development Course, SL-Term-work and Self Study hours, CIE-Continuous Internal Evaluation, SEE- Semester End Evaluation.

Professional Elective Course (Online Courses)-III			
1BRI702A	NPTEL/VTU Online Courses	1BRI702C	NPTEL/VTU Online Courses
1BRI702B	NPTEL/VTU Online Courses	1BRI702D	NPTEL/VTU Online Courses
Professional Elective Course (Online Courses)-IV			

1BRI703A	NPTEL/VTU Online Courses	1BRI703C	NPTEL/VTU Online Courses
1BRI703B	NPTEL/VTU Online Courses	1BRI704D	NPTEL/VTU Online Courses
Open Elective Courses (Online Course)-I			
1BRI704A	NPTEL/VTU Online Courses	1BRI704C	NPTEL/VTU Online Courses
1BRI704B	NPTEL/VTU Online Courses	1BRI704D	NPTEL/VTU Online Courses
Professional Elective Course (Online Courses)-IV			
1BRI801A	NPTEL/VTU Online Courses	1BRI801C	NPTEL/VTU Online Courses
1BRI801B	NPTEL/VTU Online Courses	1BRI801D	NPTEL/VTU Online Courses
Open Elective Courses (Online Courses)-III			
1BRI802A	NPTEL/VTU Online Courses	1BRI802C	NPTEL/VTU Online Courses
1BRI802B	NPTEL/VTU Online Courses	1BRI802D	NPTEL/VTU Online Courses

Instructions for Two-Semester Internship:

1. Students who wish to take up the two-semester internship (minimum **180 working days** or **30 working weeks**) must plan in advance.
2. **Eligibility:**
    a. Students must clear all courses up to the **6th semester in the first attempt** (no backlogs). They must also clear all the remaining semester courses in the **first attempt only**.
3. If a student fails in **any 6th-semester course**, they will be shifted to **Scheme A** and cannot continue with the two-semester internship.
4. **Registration:**
    a. Students must register for **1BRI701** in the **SUMMER SEMESTER** only, study and pass the course. If not qualified, he/she shall continue with scheme A.
    b. A request/approval letter must be submitted to the **Registrar (Evaluation)**. Only after receiving confirmation can the student proceed with the internship.

Types of Internships (Course Code: 1BRI803)

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

1. **1BRI803A – Industry Internship**: Shall involve practical exposure and training within an industrial or corporate setting.
2. **1BRI803B – Research Internship**: Shall focus on academic or applied research under the guidance of faculty or research institutions.
3. **1BRI803C – Post-Placement Internship**: Shall be undertaken by students who have secured placement, aligning with their future employment domain.
4. **1BRI803D – Societal Internship**: Shall engage students in community-based or social impact projects with NGOs, government bodies, or civic organizations.
5. **1BRI803E – Online Internship**: Shall be conducted through recognized digital platforms offering structured internship modules.
6. **1BRI803F – 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

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

Jnana Sangam, Machhe, Belagavi-590018

Scheme of Teaching and Examinations 2025

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

B.E. in Agricultural Engineering,
Scheme of Teaching and Examinations 2025
Outcome-Based Education (OBE)and Choice-Based Credit System (CBCS) (Effective from the academic year2025-26)

III SEMESTER

Sl. No	Course	Course Code	CourseTitle	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/Drawing	Self-Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	ASC/PCC	1BMAT301	Numerical Methods, Probability and Statistics	TD /PSB: Mathematics / Specific department					3	50	50	100	4
2	IPCC	1BAG302	Soil and Fluid Mechanics	TD/PSB	3	0	2	0	3	50	50	100	4
3	PCC	1BAG303	Engineering properties of Agricultural Produce and Food Science	TD/PSB	3	0	2	0	3	50	50	100	4
4	PCC	1BAG304	Mechanics of Materials and Machines	TD/PSB	3	0	0	0	3	50	50	100	3
5	PCC	1BAG305	Agrochemicals and Their Applications	TD/PSB	3	0	0	0	3	50	50	100	3
6	PCCL	1BAGL306	Machine Drawing and GD&T Lab	TD/PSB	0	0	2	0	2	50	50	100	1
7	AEC	1BAGL307x	Ability Enhancement Course Laboratory**	TD/PSB	0	0	2	0	2	50	50	100	1
8	SDC	1BCP308	Community Project (Project-Based Learning)	Any Department/ Respective Engineering Dept.	0	0	0	2	2	50	50	100	1
9	NCMC	1BNSS309	National Service Scheme(NSS)	Campus: NSS coordinator	0	0	2		--	100	---	100	PP
		1BPE309	Physical Education(PE) (Sports and Athletics)	Campus: Physical Education Director									
		1BYOG309	Yoga	Campus: Yoga Teacher									
		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**

Ability Enhancement Course (Laboratory) 1BxxL307x			
1BxxL307A	**Advanced Python Program**	**1BxxL307C**	**Spreadsheet for engineers**
1BxxL307B	**Crop Production Technology Lab-Field Crops**	**1Bxx307D**	**Surveying and Levelling Lab**

B.E. in Agricultural Engineering,
Scheme of Teaching and Examinations-2025
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 Question Paper Setting Board (PSB)		Teaching Hours/Week				Examination				Credits
						Theory Lecture	Tutorial	Practical/Drawing	Self-Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
						L	T	P	SL					
1	ASC/PCC	1BAG401	Watershed Hydrology	TD/PSB:		3	0	0	0	3	50	50	100	3
2	IPCC	1BAG402	Farm Power and Tractor systems	TD/PSB		3	0	2	0	3	50	50	100	4
3	PCC	1BAG403	Post-harvest engineering of cereals, pulses and oil seeds	TD/PSB		3	0	2	0	3	50	50	100	4
4	PCC	1BAG404	Thermodynamics, Refrigeration and Air Conditioning	TD/PSB		3	0	0	0	3	50	50	100	3
5	PCCL	1BAGL405	Workshop Technology Lab	TD/PSB		0	0	2	0	2	50	50	100	1
6	AEC	1BAG4L06	**Ability Enhancement Course (Laboratory)**	TD/PSB		2	0	0	0	2	50	50	100	1
7	BSC	1BAG407	**Programme Specific Biology**	TD/PSB		2	0	0	0	3	50	50	100	2
8	SDC	1BEP408	Environmental Science Project	TD/PSB		0	0	0	2	3	50	50	100	1
9	NCMC	1BNSK409	National Service Scheme(NSS)	Campus	NSS coordinator	0	0	2		--	100	---	100	PP
		1BPEK409	Physical Education(PE) (Sports and Athletics)		Physical Education Director									
		1BYOK409	Yoga		Yoga Teacher									
		1BMUS409	Music		Music Teacher									
10	NCMC	1BMATDIP410	Mathematics course for Lateral Entry Students	TD -Maths Dept/ VTU Online (COE). CIE by VTU online COE						--	100	--	100	PP
					Total						**600**	**400**	**1000**	**19**

Ability Enhancement Course (Laboratory) 1BxxL406x

1BxxL406A	Crop Production Technology Lab-Horticultural Crops	1BxxL406C	AI and Image Processing Lab
1BxxL406B	Sensors and Actuators Lab for Agriculture	1BxxL406D	Manufacturing Process Lab

B.E. in Agricultural Engineering,
Scheme of Teaching and Examinations
2025
Outcome-Based Education (OBE) and Choice-Based Credit System (CBCS) (Effective from the academic year 2025-26)

VSEMESTER

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–Learning	Durationin hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	HSMC	1BAG501	Entrepreneurship Development and Business Management	TD/PSB:	3	0	0	0	3	50	50	100	3
2	IPCC	1BAG502	Farm Machinery and Equipment -I	TD/PSB	3	0	2	0	3	50	50	100	4
3	PCC	1BAG503	Soil and Water Conservation Engineering	TD/PSB	3	0	0	0	3	50	50	100	3
4	PCC	1BAG504	Heat and Mass Transfer	TD/PSB	3	0	2	0	3	50	50	100	3
5	PEC	1BAG505x	**Professional Elective Course-I**	TD/PSB					3	50	50	100	3
6	BSC	1BRM506	Research Methodology and IPR (**Online**)	VTU online CoE CIE and SEE by COE	2	0	0	0	02	50	50	100	2
7	PCCL	1BAGL507	Food Engineering Lab	TD/PSB	0	0	2	0	02	50	50	100	1
8	SDC	1BAG508	**Hackathon-Based Project**	CIE: By Departments SEE: Evaluation by industry experts	0	0	0	2	--	50	50	100	2
								Total		**400**	**400**	**800**	**21**

Professional Elective Course-I

1BAG505A	Remote Sensing & GIS Applications in Agriculture	1BAG505C	Renewable Energy Source
1BAG505B	AI and Robotics in Agriculture	1BAG505D	Precision Agriculture and System Management

B.E. in Agricultural Engineering
SchemeofTeachingandExaminations-2025
Outcome-Based Education(OBE)and Choice-Based Credit System (CBCS) (Effective from the academic year2025-26)

VISEMESTER

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-Learning	Durationin hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	PCC	1BAG601	Irrigation and Drainage Engineering	TD/PSB-	3	0	0	0	3	50	50	100	3
2	IPCC	1BAG602	Farm Machinery and Equipment - II	TD/PSB-	3	0	2	0	3	50	50	100	4
3	PCC	1BAG603	Agricultural Structures and Environmental Control	TD/PSB-	3	0	0	0	3	50	50	100	3
4	PCC	1BAG604	Post-Harvest Engineering of Horticultural Crops	TD/PSB-	3	0	0	0	3	50	50	100	3
5	PEC	1BAG605x	Professional Elective Courses-II	TD/PSB-	3	0	0	0	3	50	50	100	3
6	PCCL	1BAGL606	Field Operation and Maintenance of Tractors and Farm Machinery Lab	TD/PSB-	0	0	2	0	2	50	50	100	1
7	AEC	1BAGL607x	**Ability Enhancement Course Laboratory**	TD/PSB-	0	0	2	0	2	50	50	100	1
8	SDC	1BAG608	Capstone Project - Phase I	TD/PSB-	0	0	0	6	3	100	--	100	3
9	NCMC	1BAG609	**Universal Human Value (VTU ONLINE Course)**	CIE:By VTU online COE	1	0	0	0		100	---	100	PP
	Total									**550**	**350**	**900**	**21**

ProfessionalElective Course-II

1BAG605A	Food Packaging Technology	1BAG605C	Watershed Planning and Management
1BAG605B	Food Quality and Control	1BAG605D	Production Technology of Agricultural Machinery

Ability Enhancement Course Laboratory**

1BAGL607A	Geoinformatics for Agriculture Resource Management Lab	1BAGL607C	Agricultural IoT Lab
1BAGL607B	Reservoir and Farm Pond Design	1BAGL607D	Analysis/Simulation using MATLAB

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B.E. in Agricultural Engineering,
Scheme of Teaching and Examinations 2025
Outcome-Based Education(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)	Teaching Hours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/Drawing	Self–Learning	Durationin hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	IPCC	1BAG701	Dairy and Food Engineering	TD/PSB-	3	0	2	0	3	50	50	100	4
2	PEC	1BAG702x	Professional Elective Course-III	TD/PSB-	3	0	0	0	3	50	50	100	3
3	PEC	1BAG703x	Professional Elective Course -IV	TD/PSB-	3	0	0	0	3	50	50	100	3
4	OEC	1BAG704x	Open Elective Course-I	TD/PSB-	3	0	0	0	3	50	50	100	3
5	SDC	1BAG705	Capstone Project - Phase-II	TD/PSB-	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**

Professional Elective Course-III			
1BAG702A	Tractor systems and controls	1BAG702C	Ergonomics and Safety in Agriculture
1BAG702B	Sprinkler and Micro Irrigation Systems	1BAG702D	Water harvesting and soil conservation structures
Professional Elective Course-IV			
1BAG703A	Drone Technology in Agriculture	1BAG703C	Waste and Byproducts Utilization
1BAG703B	Hi-Tech Greenhouse Farming	1BAG703D	Tractor Design and Testing
Open Elective Course-I			
1BAG704A	Principles of Soil Science and Agronomy	1BAG704C	Agricultural Process Engineering
1BAG704B	Storage and Packaging technology	1BAG704D	Foreign Language (NPTEL/SWAYAM/online VTU)

B.E. in the Agricultural Engineering
Scheme of Teaching and Examinations 2025
Outcome-Based Education (OBE) and Choice-Based Credit System (CBCS) (Effective from the academic year 2025-26)

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

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-Learning	Durationin hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	PEC	1BAG801x	Professional Elective-V (NPTEL/VTU Online Course)	Online Evaluation	3	0	0	0	3	50	50	100	3
2	OEC	1BAG802x	Open Elective-II (NPTEL/VTU Online Course)	Online Evaluation	3	0	0	0	3	50	50	100	3
3	SDC	1BAG803x	Internship (15 weeks or 90 working days)	--	--	--	--	--	3	100	100	200	12
			Total						9	**200**	**200**	**400**	**18**

Professional Elective Course (Online courses)-V

1BAG801A	Design of Farm Machinery	1BAG801C	Novel Technologies for Food Processing and Shelf Life Extension
1BAG801B	Machine Learning for Soil and Crop Management	1BAG801D	Renewable Energy Engineering: Solar, Wind and Biomass Energy Systems

Open Elective Courses-II (Online Courses)

1BAG802A	Farm Machinery	1BAG802C	Watershed Hydrology
1BAG802B	Fundamentals of Food Process Engineering	1BAG802D	**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 the Agricultural Engineering

Scheme of Teaching and Examinations2025

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

VII and VIII semesters for the candidates who opt for a two-semesters internship along with Capstone Project (Scheme B)

Sl. No	Course and CourseCode		Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/Drawing	Self-Learning	Durationin 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	Professional Elective Course-III (NPTEL/VTU Online Course)	Online Evaluation					--	50	50	100	3
3	PEC	1BXX703x	Professional Elective Course-IV (NPTEL/VTU Online Course)	Online Evaluation					--	50	50	100	3
4	OEC	1BXX704x	Open Elective Course(NPTEL/VTU Online course)-I	Online Evaluation					---	50	50	100	3
5	SDC	1BXX705	Capstone Project -Phase-II***	TD: PSB:					3	100	100	200	7
6	NCMC	1BIKS706	Indian Knowledge System (VTU online)		1	0	0	0	--	100	--	100	PP
								Total	**6**	**400**	**300**	**700**	**20**
1	PEC	1Bxx801x	Professional Elective-V (NPTEL/VTU Online Course)	Online Evaluation					---	50	50	100	3
2	OEC	1Bxx802x	Open Elective-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 Online Professional Elective Course - 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 Online Professional Elective Course (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 Online Open Elective Courses (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:

- Students who have an offer to enrol for a 15-week internship, before the start of 4th year, shall register for VIII semester courses instead of VII semester courses and take up respective semester examination.
- Those who have no offer to enrol to a 15-week internship, before the start of 4th year, shall register VII and VIII semesters courses in the chronological manner and complete the programme. In this case the internship shall be carried out during VIII semester.

X. Option -2: Two-Semester Internship Scheme – B

- Students who have cleared all the courses up to VI semester in first attempt only (i.e., students having no backlogs) and have an internship offer for a period of 180 working days or 30 working weeks, are only eligible for Scheme – B. The internship commence date should coincide with the 4th year academic calendar of VTU. Such students, shall produce the confirmed internship letter, to the Principal/Academic Authority to get permission to register for the summer semester to opt for Scheme - B.
- Such eligibles students shall register for the course 1Bxx701 in the summer semester of the same academic year (i.e., after their VI semester) and complete the said course in first attempt only.
- In case, they absent for the examination or fails in the course 1Bxx701, they shall not be considered eligible for the Scheme – B. However, they shall register for Scheme – A.
- After completing the course 1Bxx701, students with confirmed internship letter to carry out the internship for a minimum 180 working days or 30 working weeks, shall register for the Scheme – B.
- In case students cannot commence the internship for various reasons, they not be considered for Scheme – B. In such cases, they shall register for Scheme – A. However, they will be exempted from studying the course 1Bxx701 again.

- A request letter with internship permission letter must be submitted to Registrar, VTU through concerned authorities of the institution. Only after receiving the approval from the Registrar, students proceed with the internship as mentioned in Option Scheme B.

Capstone Project Evaluation Guidelines for Students Opting for Internship for two semesters duration:

a) **Industry Internship Leading to Capstone Project:** For students opting for a two-semester Industry Internship that leads to the completion of the Capstone Project, the Phase-I evaluation will be conducted at the end of the VII semester, and the Phase-II evaluation will be conducted at the end of the VIII semester.

b) **Industry Internships Not Leading to Capstone Project:** For students opting for aIndustry Internship that does **not** lead to the completion of the Capstone Project, they are required to undertake the Capstone Project separately. Both Phase-I and Phase-II of the Project Work must be completed as per the prescribed guidelines, under the guidance of a college-level guide or mentor.

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

Jnana Sangam, Machhe, Belagavi-590018

Scheme of Teaching and Examinations 2025

Outcome-Based Education (OBE) and Choice-Based Credit System (CBCS)

(Effective from the academic year 2025-26)

B.E. in Industrial IoT,
Scheme of Teaching and Examinations 2025
Outcome-Based Education (OBE) and Choice-Based Credit System (CBCS) (Effective from the academic year 2025-26)

III SEMESTER

Sl. No	Course	Course Code	Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Self -Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	ASC/PCC	1BMAT301	Program Specific Mathematics (Transforms, Differential Equations & Linear Algebra for IoT Systems)	TD /PSB: Mathematics / Specific department	2	2	0	0	4	50	50	100	4
2	IPCC	1BXX302	Data Structures & Algorithms	TD/PSB	3	0	2	0	5	50	50	100	4
3	PCC	1BXX303	Digital Electronics and Logic Design	TD/PSB	3	0	2	0	5	50	50	100	4
4	PCC	1BXX304	Sensors & Transducers	TD/PSB	3	0	0	0	3	50	50	100	3
5	PCC	1BXX305	Fundamentals of Industrial IoT	TD/PSB	3	0	0	0	3	50	50	100	3
6	PCCL	1BXXL306	Sensors & IoT Devices Lab	TD/PSB	0	0	2	0	2	50	50	100	1
7	AEC	1BXXL307x	Ability Enhancement Course Laboratory**	TD/PSB	0	0	2		2	50	50	100	1
8	SDC	1BCP308	Community Project (Project-Based Learning)	Any Department/ Respective Engineering Dept.	0	0	0	2	2	50	50	100	1
9	NCMC	1BNSS309	National Service Scheme (NSS)	Campus: NSS coordinator	0	0	2		--	100	---	100	PP
		1BPE309	Physical Education (PE) (Sports and Athletics)	Campus: Physical Education Director									
		1BYOG309	Yoga	Campus: Yoga Teacher									
		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**

Ability Enhancement Course (Laboratory) 1BxxL307x			
1BxxL307A	Python Programming for IoT	**1BxxL307C**	Fundamentals of Linux & Shell Scripting (IoT-Focused)
1BxxL307B	PCB Design & Soldering Skills	**1Bxx307D**	MATLAB / Simulink for IoT

** The course 1BXXL307 – 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 Industrial IoT,

Scheme of Teaching and Examinations-2025

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 Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Self -Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	ASC/PCC	1BXX401	Signals & Systems	TD/PSB:	2	2	0	0	4	50	50	100	3
2	IPCC	1BXX402	Industrial Automation & PLC Basics	TD/PSB	3	0	2	0	5	50	50	100	4
3	PCC	1BXX403	Database Management Systems	TD/PSB	3	0	2	0	5	50	50	100	4
4	PCC	1BXX404	Microcontrollers & Embedded Systems	TD/PSB	3	0	0	0	3	50	50	100	3
5	PCCL	1BXXL405	Embedded Systems Lab	TD/PSB	0	0	2	0	2	50	50	100	1
6	AEC	1BxxL406	Ability Enhancement Course Laboratory**	TD/PSB	0	0	2	0	2	50	50	100	1
7	BSC	1Bxx407	Programme Specific Biology	TD / PSB	2	0	0	0	2	50	50	100	2
8	SDC	1BEP408	Environmental Science Project	TD/PSB	0	0	0	2	2	50	50	100	1
9	NCMC	1BNSK409	National Service Scheme (NSS)	Campus: NSS coordinator	0	0	2		--	100	---	100	PP
		1BPEK409	Physical Education (PE) (Sports and Athletics)	Campus: Physical Education Director									
		1BYOK409	Yoga	Campus: Yoga Teacher									
		1BMUS409	Music	Campus: Music Teacher									
10	NCMC	1BMATDIP410	Mathematics course for Lateral Entry Students	TD -Maths Dept/ VTU Online (COE). CIE by VTU online COE					--	100	--	100	PP
				Total						**600**	**400**	**1000**	**19**

Ability Enhancement Course (Laboratory) 1BxxL406x

1BxxL406A	IoT Device Programming with Arduino & ESP32	1BxxL406C	Dashboard & Data Visualization Lab
1BxxL406B	Signal processing using Matlab	1BxxL406D	Industrial Safety & IoT Standards

** The course 1BXXL406x – Ability Enhancement Course Laboratory can be offered either as a single compulsory course. Alternatively, the Ability Enhancement Course Laboratory course can be offered with multiple elective options under the course codes 1BXXL406x (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 6 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 Industrial IoT,

Scheme of Teaching and Examinations 2025

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

V 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 – Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	HSMC	1BXX501	Industrial Engineering and management	TD/PSB:	3	0	0	0	3	50	50	100	3
2	IPCC	1BXX502	Industrial Robotics & Control	TD/PSB	3	0	2	0	3	50	50	100	4
3	PCC	1BXX503	Wireless Sensor Networks	TD/PSB	3	0	0	0	3	50	50	100	3
4	PCC	1BXX504	SCADA Systems & Industrial Communication	TD/PSB	3	0	0	0	3	50	50	100	3
5	PEC	1BXX505x	**Professional Elective Course-I**	TD/PSB	3	0	0	0	3	50	50	100	3
6	BSC	1BRM506	Research Methodology and IPR (**Online**)	VTU online CoE CIE and SEE by COE	2	0	0	0	02	50	50	100	2
7	PCCL	1BxxL507	PLC and SCADA lab	TD/PSB	0	0	2	0	02	50	50	100	1
8	SDC	1BXX508	**Hackathon-Based Project**	CIE: By Departments SEE: Evaluation by industry experts	0	0	0	2	--	50	50	100	2
								Total		**400**	**400**	**800**	**21**

Professional Elective Course-I

1BXX505A	FPGA-Based System Design for IoT	1BXX505C	Battery Management Systems for IoT Devices
1BXX505B	IoT Sensor Hardware Design & Calibration Techniques	1BXX505D	LPWAN Technologies

B.E. in Industrial IoT,

Scheme of Teaching and Examinations-2025

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

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	Self -Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	IPCC	1BXX601	AI & ML for IoT Systems	TD/PSB-	3	2	0	0	5	50	50	100	4
2	PCC	1BXX602	Real-Time Operating Systems (RTOS)	TD/PSB-	3	0	0	0	3	50	50	100	3
3	PCC	1BXX603	Cloud Computing for IoT	TD/PSB-	3	0	0	0	3	50	50	100	3
4	PCC	1Bxx604	Smart Manufacturing (Industry 4.0)	TD/PSB-	3	0	0	0	3	50	50	100	3
5	PEC	1BXX605x	Professional Elective Courses-II	TD/PSB-	3	0	0	0	3	50	50	100	3
6	PCCL	1BxxL606	Machine Learning for IoT Lab	TD/PSB-	0	0	2	0	2	50	50	100	1
7	AEC	1BxxL607x	Ability Enhancement Course Laboratory	TD/PSB-	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

1BXX605A	Edge Computing & Edge AI Deployment	1BXX605C	Advanced Process Control & Instrumentation
1BXX605B	Digital Twin Technology & System Simulation	1BXX605D	Industrial IoT Cybersecurity & Standards

Ability Enhancement Course Laboratory**

1BxxL607A	Digital Twin Modelling Lab	1BxxL607C	Cloud Platforms for IoT
1BxxL607B	ROS Basics (Robot Operating System)	1BxxL607D	Cybersecurity Basics for IoT

** 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.

 Overview of Courses, Credits, Projects, and Internships under VTU Curriculum-Details are listed on page number 11(onwards)

B.E. in Industrial IoT,

Scheme of Teaching and Examinations 2025

Outcome-Based Education (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)	Teaching Hours /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	IoT System Integration & Deployment	TD/PSB-	3	2	0	0	5	50	50	100	4
2	PEC	1BXX702x	Professional Elective Course-III	TD/PSB-	3	0	0	0	3	50	50	100	3
3	PEC	1BXX703x	Professional Elective Course -IV	TD/PSB-	3	0	0	0	3	50	50	100	3
4	OEC	1BXX704x	Open Elective Course-I	TD/PSB-	3	0	0	0	3	50	50	100	3
5	SDC	1BXX705	Capstone Project - Phase-II	TD/PSB-	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**

Professional Elective Course-III			
1Bxx702A	5G/6G for Industrial IoT & Smart Factories	1Bxx702C	AI Ops for IoT Systems
1Bxx702B	Time-Series Analysis & Forecasting for IIoT	1Bxx702D	Industrial Visualization Dashboards
Professional Elective Course-IV			
1BXX703A	Industrial Hydraulics & Pneumatics	1BXX703C	RF System Design for IoT
1BXX703B	Predictive Maintenance Analytics	1BXX703D	Industrial Drives, Motion Control & Mechatronics
Open Elective Course-I			
1BXX704A		1BXX704C	
1BXX704B		1BXX704D	**Foreign Language** (NPTEL/SWAYAM/online VTU)

 Overview of Courses, Credits, Projects, and Internships under VTU Curriculum-Details are listed on page number 11(onwards)

B.E. in the title of the program

Scheme of Teaching and Examinations 2025

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

VIII 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)	Teaching Hours /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**

Professional Elective Course (Online courses)-V

1Bxx801A	NPTEL/VTU Online Course	1Bxx801C	NPTEL/VTU Online Course
1Bxx801B	NPTEL/VTU Online Course	1Bxx801D	NPTEL/VTU Online Course

Open Elective Courses -II (Online Courses)

1Bxx802A	NPTEL/VTU Online Course	1Bxx802C	NPTEL/VTU Online Course
1Bxx802B	NPTEL/VTU Online Course	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

 Overview of Courses, Credits, Projects, and Internships under VTU Curriculum-Details are listed on page number 11(onwards)

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 the title of the program

Scheme of Teaching and Examinations 2025

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

VII and VIII semesters for the candidates who opt for a two-semesters internship along with Capstone Project (Scheme B)

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-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	Professional Elective Course-III (NPTEL/VTU Online Course)	Online Evaluation					--	50	50	100	3
3	PEC	1BXX703x	Professional Elective Course-IV (NPTEL/VTU Online Course)	Online Evaluation					--	50	50	100	3
4	OEC	1BXX704x	Open Elective Course (NPTEL/VTU Online course)-I	Online Evaluation					---	50	50	100	3
5	SDC	1BXX705	Capstone Project - Phase-II***	TD: PSB:					3	100	100	200	7
6	NCMC	1BIKS706	Indian Knowledge System (VTU online)		1	0	0	0	--	100	--	100	PP
								Total	**6**	**400**	**300**	**700**	**20**
1	PEC	1Bxx801x	Professional Elective-V (NPTEL/VTU Online Course)	Online Evaluation					---	50	50	100	3
2	OEC	1Bxx802x	Open Elective-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**

 Overview of Courses, Credits, Projects, and Internships under VTU Curriculum-Details are listed on page number 11(onwards)

NPTEL/VTU Online Professional Elective Course - 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 Online Professional Elective Course (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 Online Open Elective Courses (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-Details are listed on page number 11(onwards)

B.E. in Robotics & Automation
Scheme of Teaching and Examinations 2025
Outcome-Based Education(OBE) and Choice-Based Credit System (CBCS) (Effective from the academic year 2025-26)

III SEMESTER

Sl. No	Course	Course Code	CourseTitle	Teaching Department 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	S					
1	ASC/PCC	1BMAT301	Discrete Mathematics and Probability Theory	TD /PSB: Mathematics/ Respective Engineering Dept.	3	2	0	0	3	50	50	100	4
2	IPCC	1BRA302	Data Structures and Algorithms	TD/PSB: CSE/RA	3	0	2	0	3	50	50	100	4
3	IPCC	1BRA303	Mechanics and Design	TD/PSB: ME/RA	3	2	0	0	3	50	50	100	4
4	PCC	1BRA304	Analog and Digital Electronics	TD/PSP: ECE/RA	3	0	0	0	3	50	50	100	3
5	PCC	1BRA305	Fundamentals of Industrial Robots	TD/PSB: ME/RA	3	0	0	0	3	50	50	100	3
6	PCCL	1BRAL306	Computer Aided Modelling Lab	TD/PSB: ME/RA	0	0	2	0	3	50	50	100	1
7	AEC	1BRAL307A	Analog and Digital Electronics Lab	TD/PSB: ECE/RAI	0	0	2	0	3	50	50	100	1
8	SDC	1BSC308	Societal Project (Project-Based Learning)	Any Department	0	0	0	2	3	50	50	100	1
9	NCMC	1BNSS309	National Service Scheme(NSS)	NSS Coordinator	0	0	2	0	--	100	---	100	PP
		1BPE309	Physical Education(PE)(Sports and Athletics)	Physical Education Director									
		1BYOG309	Yoga	Yoga Teacher									
		1BMUK309	Music	Music Teacher									
				Total	**12**	**4**	**6**	**2**		**450**	**350**	**800**	**21**
10	**NCMC**	**1BMATDIP310**	**Maths course for Lateral Entry Students**	**TD/PSB-Maths Dept**	**3**	**0**	**0**	**3**	**03**	**100**	**---**	**100**	**PP**

ASC- Applied Science Course, PCC- Professional Core Course, IPCC-Integrated Professional Core Course, PCCL- Professional Core Course Laboratory, AEC-Ability Enhancement Course, SDC- Skill Development Course, NCMC- Non-Credit Mandatory Course, SL-Term-work and Self Study hours, CIE-Continuous Internal Evaluation, SEE- Semester End Evaluation.

The course **1BXXL307 – Ability Enhancement Course Laboratory** shall be offered either as a single compulsory course or as multiple options under the course codes **1BXXL307x** (where *x = A, B, C, D*). Each student shall choose **one course** from the available options for study. Since this is a laboratory course, the **minimum strength required** for each course shall be **20 students**. If the number of students opting for a particular course is **less than 20**, the college shall seek permission from the **Registrar, VTU Belagavi**, to offer that course.

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

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, semesters.

- Colleges shall submit Continuous Internal Evaluation (CIE) marks each semester based on the activities completed by students under the selected course.
- Students may opt for different activities/courses across semesters. For instance, a student participating in PE during the 3rd semester may choose NSS in the 4th semester or Yoga.
- This flexible approach aligns with the student-centric vision of the National Education Policy (NEP) 2022, and facilitates equitable distribution of NSS/PE/Yoga-related responsibilities across departments.
- Activities shall be conducted over two semesters (III & IV), and successful completion of the registered course 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, and Yoga activities.

These courses shall not be considered for vertical progression, nor shall they be included in the calculation of SGPA or CGPA. However, completion is compulsory for degree eligibility.

Societal project work: Students shall undertake Societal Project Work to address real-world social challenges and contribute meaningfully to community well-being. They shall engage with domains such as health, education, sustainability, digital inclusion, and rural development through experiential learning. Students shall apply their domain-specific knowledge to design and implement solutions that respond effectively to identified societal needs. By interacting directly with communities and stakeholders, they shall develop practical skills, empathy, and ethical awareness.

A **Non-Credit Mandatory Course (NCMC)** shall constitute an integral component of the academic framework, aimed at enhancing students' knowledge, skills, and awareness beyond the core curriculum. These courses shall not carry academic credits nor be considered in the computation of CGPA; however, successful completion of the NCMC shall be compulsory for fulfilling the requirements of the academic program. Each student shall register for the designated NCMC in the prescribed semester as notified by the University/Institution. NCMCs shall not be considered for vertical progression. However, qualifying in the NCMC is mandatory for the award of the degree. A student who fails to qualify in the prescribed NCMC shall not be eligible for the conferment of the degree.

Credit Definition: 1-hour Lecture **(L)** per week=**1Credit**	04-Credit courses are designed for 50 hours of Teaching-Learning sessions 04-Credit (IC) courses are designed for 40 hours' theory and 10-12 hours of practical sessions

2-hoursTutorial**(T)** per week=**1Credit** 2-hours Practical / Drawing (**P**) per week=**1Credit**	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

AICTE Activity Points Requirement for BE/B.Tech. Programmes (Lateral Entry Students)

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 is:

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 are **non-credit** and will not be considered for **the SGPA/CGPA** or be used 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**. If a student completes all the semesters (eight or six) at the end of the programme but fails to earn the required Activity Points, the eighth-semester Grade Card will be withheld until the requirement is fulfilled. Also, the degree will be awarded only after the Grade Card has been released. 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.

Ability Enhancement Course Laboratory (May be one course or			
1BRIL307A	**Analog and Digital Electronic Circuits lab**		

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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 Hors	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	ASC/PCC	1BRA401	Robot Kinematics and Dynamics	TD/PSB: ME/RA	3	0	0	0	3	50	50	100	3
2	IPCC	1BRA402	Object Oriented Programming	TD/PSB: CSE/RA	3	0	2	0	3	50	50	100	4
3	IPCC	1BRA403	Control Systems	TD/PSB: ME/RA/ECE/EE	4	0	0	0	3	50	50	100	4
4	PCC	1BRA404	Sensors and Actuators	TD/PSB: ME/RA/ECE/EE	3	0	0	0	3	50	50	100	3
5	PCCL	1BRAL405	Sensors and Actuators Lab	TD/PSB: ME/RA/ECE/EE	0	0	2	0	3	50	50	100	1
6	AEC	1BRAL406	Industrial Robot Lab	TD/PSB: ME/RA	0	0	2	0	3	50	50	100	1
7	HSMC	1BRMI407	Research Methodology and IPR (VTU **Online**)	TD/PSB: Any Department	2	0	0	0	3	50	50	100	2
8	SDC	1BEP408	Environmental Science Project (Interdisciplinary Project Based Learning)	TD/PSB: Any Department	0	0	0	2	3	50	50	100	1
9	NCMC	1BNSK409	National Service Scheme(NSS)	NSS coordinator	0	0	2			100	---	100	PP
		1BPEK409	PhysicalEducation(PE)(SportsandAthletics)	Physical Education Director									
		1BYOK409	Yoga	Yoga Teacher									
		1BMUS409	Music	Music Teacher									
				Total	15	0	6	2		500	400	900	**19**
10	NCMC	1BMATDIP410	Maths for Lateral Entry Students	Maths Dept						100	--	100	PP

ASC- Applied Science Course, PCC- Professional Core Course, IPCC-Integrated Professional Core Course, PCCL- Professional Core Course Laboratory, AEC-Ability Enhancement Course, SDC- Skill Development Course, NCMC- Non-Credit Mandatory Course, SL-Term-work and Self Study hours, CIE-Continuous Internal Evaluation, SEE- Semester End Evaluation.

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

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, semesters.

- Colleges shall submit Continuous Internal Evaluation (CIE) marks each semester based on the activities completed by students under the selected course.
- Students may opt for different activities/courses across semesters. For instance, a student participating in PE during the 3rd semester may choose NSS in the 4th semester or Yoga.
- This flexible approach aligns with the student-centric vision of the National Education Policy (NEP) 2022, and facilitates equitable distribution of NSS/PE/Yoga-related responsibilities across departments.
- Activities shall be conducted over two semesters (III & IV), and successful completion of the registered course 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, and Yoga activities.

These courses shall not be considered for vertical progression, nor shall they be included in the calculation of SGPA or CGPA. However, completion is compulsory for degree eligibility.

A **Non-Credit Mandatory Course (NCMC)** shall constitute an integral component of the academic framework, aimed at enhancing students' knowledge, skills, and awareness beyond the core curriculum. These courses shall not carry academic credits nor be considered in the computation of CGPA; however, successful completion of the NCMC shall be compulsory for fulfilling the requirements of the academic program. Each student shall register for the designated NCMC in the prescribed semester as notified by the University/Institution. NCMCs shall not be considered for vertical progression. However, qualifying in the NCMC is mandatory for the award of the degree. A student who fails to qualify in the prescribed NCMC shall not be eligible for the conferment of the degree.

An **Environmental Science project** for engineering students shall aim to integrate ecological awareness with technical innovation. The project shall be either interdisciplinary—drawing from multiple branches of engineering—or domain-specific, focusing on a particular field. It shall encourage students to apply sustainable practices, analyze environmental impact, and propose viable solutions. The chosen topic shall reflect current environmental challenges and align with academic objectives. Students shall document their findings systematically and present actionable outcomes. The project shall foster responsible engineering aligned with environmental stewardship.

The course **1BXXL406 – Ability Enhancement Course Laboratory** shall be offered either as a single compulsory course or as multiple options under the course codes **1BXXL406x** (where *x = A, B, C, D*). Each student shall choose **one course** from the available options for study. Since this is a laboratory course, the **minimum strength required** for each course shall be **20 students**. If the number of students opting for a particular course is **less than 20**, the college shall seek permission from the **Registrar, VTU Belagavi**, to offer that course.

Ability Enhancement Course Laboratory			
1BRAL406A	Industrial Robot Lab	1BxxL406C	

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VSEMESTER

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	SL					
1	HSMC	1BRA501	Management and Economics	TD/PSB: ME/RA	3	0	0	0	3	50	50	100	3
2	IPCC	1BRA502	Artificial Intelligence and Machine Learning	TD/PSB:CSE/RA	3	0	2	0	3	50	50	100	4
3	PCC	1BRA503	Robot Operating System	TD/PSB:CSE/RA	3	0	0	0	3	50	50	100	3
4	PCC	1BRA504	Microcontroller and Applications	TD/PSB:CSE/RA	3	0	0	0	3	50	50	100	3
5	**PEC**	1BRA505	**Professional Elective I**	TD/PSB: Respective Department	3	0	0	0	3	50	50	100	3
6	BSC	1BRA506	Program Specific Biology	TD/PSB: Biology	2	0	0	0	2	50	50	100	2
7	PCCL	1BRAL507	Robot Operating System Lab	TD/PSB:CSE/RA	0	0	2	0	3	50	50	100	1
8	**SDC**	**1BRA508**	**Hackathon Based Project**	TD/PSB: Respective Department	0	0	0	2		50	50	100	2
				Total	17	0	4	2		400	400	800	**21**

HSMC- Humanities Studies and Management Course, IPCC-Integrated Professional Core Course, PCC- Professional Core Course, BSC-Basic Science Course, PCCL- Professional Core Course Laboratory, AEC-Ability Enhancement Course, SDC- Skill Development Course, SL-Term-work and Self Study hours, CIE-Continuous Internal Evaluation, SEE- Semester End Evaluation.

Mini-project work: The Mini-Project shall be a laboratory-based, hands-on course intended to enhance students' practical skills and technical proficiency through the development of small-scale systems or applications. Projects may be assigned individually or in groups of up to four students, depending on the students' capabilities and the mentor's recommendations. The assignments may belong to a single discipline or span multiple disciplines.

CIE procedure for Mini-project: (out of 50 Marks)

(i) Single-Discipline Projects: The CIE marks shall be awarded by a departmental committee comprising the Head of the Department and two faculty members, one of whom shall be the project guide. The evaluation shall be based on the following components: Project Report – 50%, Presentation Skills – 25%, Question & Answer Session – 25%
The marks awarded for the project report shall be uniform for all members of the group. If the CIE is conducted for 100 marks, then the total score shall be scaled to a maximum of 50 marks.

(ii) Interdisciplinary: The CIE for interdisciplinary projects shall be conducted at the college level. The evaluation shall be carried out group-wise by a panel comprising all the project guides involved. The assessment criteria and weightage shall remain the same as for single-discipline projects. The SEE shall be conducted as per the Examination/University guidelines. (SEE will be as per Examination/University guidelines).

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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	Self Study	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	IPCC	1BRA601	Industrial IoT and Smart Manufacturing	TD/PSB-ME/RA/ECE	3	0	2	0	3	50	50	100	4
2	PCC	1BRA602	Industrial Automation	TD/PSB-ME/RA	3	0	0	0	3	50	50	100	3
3	PCC	1BRA603	Signal Processing	TD/PSB-ECE/RA	3	0	0	0	3	50	50	100	3
4	PCC	1BRA604	Computer Vision and Deep Learning	TD/PSB-CSE/RA	3	0	0	0	3	50	50	100	3
5	PEC	1BRA605x	Professional Elective Courses-II	TD/PSB-Respective Department	3	0	0	0	3	50	50	100	3
6	PCCL	1BRAL606	Mechatronics Lab (with signal processing Lab)	TD/PSB-ME/RA/ECE	0	0	2	0	3	50	50	100	1
7	AEC	1BRAL607	**Ability Enhancement Course Laboratory**	TD/PSB-Respective Department	0	0	2	0	3	50	50	100	1
8	SDC	1BRA608	Project Phase I	TD/PSB-RA	0	0	0	6	3	50	50	100	3
9	NCMC	1BRA609	**Universal Human Value (VTU ONLINE Course)**	TD/PSB-Any Department	1	0	0	0		100	---	100	PP
				Total	16	0	6	6		500	400	900	**21**

IPCC-Integrated Professional Core Course, PCC- Professional Core Course, BSC-Basic Science Course, PEC-Professional Elective Course, PCCL- Professional Core Course Laboratory, AEC-Ability Enhancement Course, SDC- Skill Development Course, NCMC- Non-Credit Mandatory Course, SL-Term-work and Self Study hours, CIE-Continuous Internal Evaluation, SEE- Semester End Evaluation.

Professional Elective Course-II

1BRA605A	Data Analytics/Reinforcement Learning	1BRA605C	Robot Integrated Manufacturing/ Computer Networks
1BRA605B	Cloud Computing	1BRA605D	Virtual Instrumentation / Finite Element Methods

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 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. If the number of students opting for a particular course is **less than 10**, the college shall seek permission from the **Registrar,**

VTU Belagavi, to offer that course.
The course **1BXXL607 – Ability Enhancement Course Laboratory** shall be offered either as a single compulsory course or as multiple options under the course codes **1BXXL607x** (where *x = A, B, C, D*). Each student shall choose **one course** from the available options for study. Since this is a laboratory course, the **minimum strength required** for each course shall be **20 students**. If the number of students opting for a particular course is **less than 20**, the college shall seek permission from the **Registrar, VTU Belagavi**, to offer that course.

Ability Enhancement Course Laboratory			
1BxxL607A	Finite Element Analysis Lab	1BxxL607C	Machine Learning Lab
1BxxL607B	Virtual Instrumentation Lab	1BxxL607D	ROS Lab

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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)	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	IPCC	1BRA701	Advanced Manufacturing	TD/PSB-ME/RA	3	0	2	0	3	50	50	100	4
2	PCC	1BRA702x	Professional Elective Course -III	TD/PSB-	3	0	0	0	3	50	50	100	3
3	PEC	1BRA703x	Professional Elective Course -IV	TD/PSB-	3	0	0	0	3	50	50	100	3
4	OEC	1BRA704x	Open Elective Course-I	TD/PSB-	3	0	0	0	3	50	50	100	3
5	SDC	1BRA705	Major Project Phase-II	TD/PSB-	0	0	0	14	3	100	100	200	7
6	**NCMC**	**1BIKS706**	**Indian Knowledge System (VTU online Course)**	TD/PSB-	**1**	**0**	**0**	0		**100**	**--**	**100**	**PP**
				Total	**13**	**0**	**2**	14		**400**	**300**	**700**	**20**

IPCC-Integrated Professional Core Course, PCC- Professional Core Course, PEC-Professional Elective Course, OEC-Open Elective Course, SDC- Skill Development Course, NCMC-Non-Credit Mandatory Course, SL-Term-work and Self Study hours, CIE-Continuous Internal Evaluation, SEE- Semester End Evaluation.

Professional Elective Course-III

1BRA702A	Collaborative Robots	1BRA702C	Mobile Application Development
1BRA702B	Reinforcement Learning	1BRA702D	Control Engineering

Professional Elective Course-IV

1BRA703A	Business Analytics	1BRA703C	Agentic AI
1BRA703B	Micro-Electro Mechanical Systems	1BRA703D	Wireless Communication

Open Elective Course-I

1BRA704A	Autonomous Mobile Robots	1BRA704C	Additive Manufacturing
1BRA704B	Industrial Automation	1BRA704D	Virtual Instrumentation

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

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 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. If the number of students opting for a particular course is **less than 10**, the college shall seek permission from the **Registrar,**

VTU Belagavi, to offer that course.

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.

(2) Interdisciplinary: Continuous Internal Evaluation shall be group-wise at the college level with the participation of all guides of the college. Participation of external guide/s, if any, is desirable. The CIE marks awarded for the project work, shall be based on the evaluation of 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.

SEE procedure for Project Work: SEE for project work will be conducted by the two examiners appointed by the University. The SEE marks awarded for the project work shall be based on the evaluation of project work Report, project presentation skill, and question and answer session in the ratio 50:25:25.

Swappable Semester Provision – Scheme A

To ensure equitable access to internship opportunities, the seventh and eighth semesters shall be swappable under Scheme A, as detailed below;

Standard Implementation: All students shall, by default, undertake seventh-semester courses during the ODD semester, and eighth-semester courses during the EVEN semester.

Alternative Implementation: Alternatively, in the ODD semester, a defined percentage of final-year students shall be permitted to take up eighth-semester courses, The remaining students shall pursue seventh-semester courses, in the EVEN semester, the student groups shall exchange roles. Those who completed seventh-semester courses in the ODD semester shall now undertake eighth-semester components, and vice versa.

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VIII 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)	Teaching Hours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Self Study	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	PEC	1BRA801x	**Professional Elective-V(NPTEL/VTU Online Courses)IV**	TD/PSB-	3	0	0	0					3
2	OEC	1BRA802x	**Open Elective (NPTEL/VTU Online Courses)-II**	TD/PSB-	3	0	0	0					3
3	SDC	1BRA803x	**Internship(Types)(15weeks) (90 working days)**	TD/PSB-	0	0	0	24		100	100	200	12
				Total	6	0	0	24					**18**

PEC-Professional Elective Course, OEC-Open Elective Course, SDC- Skill Development Course, SL-Term-work and Self Study hours, CIE-Continuous Internal Evaluation, SEE-Semester End Evaluation.

Professional Elective Course (Online courses)-IV

1BRA801A	**NPTEL/VTU Online Courses**	1BRA801C	**NPTEL/VTU Online Courses**
1BRA801B	**NPTEL/VTU Online Courses**	1BRA801D	**NPTEL/VTU Online Courses**

Open Elective Courses (Online Courses)-II

1BRA802A	**NPTEL/VTU Online Courses**	1BRA802C	**NPTEL/VTU Online Courses**
1BRA802B	**NPTEL/VTU Online Courses**	1BRA802D	**NPTEL/VTU Online Courses**

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 number 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

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 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. If the number of students opting for a particular course is **less than 10**, the college shall seek permission from the **Registrar, VTU Belagavi**, to offer that course.

Swappable Semester Provision – Scheme A

To ensure equitable access to internship opportunities, the seventh and eighth semesters shall be swappable under Scheme A, as detailed below;

Standard Implementation: All students shall, by default, undertake seventh-semester courses during the ODD semester, and eighth-semester courses during the EVEN

semester.

Alternative Implementation: Alternatively, in the ODD semester, a defined percentage of final-year students shall be permitted to take up eighth-semester courses, The remaining students shall pursue seventh-semester courses, in the EVEN semester, the student groups shall exchange roles. Those who completed seventh-semester courses in the ODD semester shall now undertake eighth-semester components, and vice versa.

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

VISVESVARAYATECHNOLOGICALUNIVERSITY,BELAGAVI

B.E. in the title of the program

SchemeofTeachingandExaminations2022

Outcome-Based - Education(OBE)andChoice-BasedCreditSystem (CBCS)

(Effectivefromtheacademicyear 2023-24)

VII and VIII semesters for the candidates who seek an internship for two semesters along with project work(Scheme B)

Sl. No	CourseandCourseCode		CourseTitle	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	TotalMarks	
					L	T	P	SL					
1	IPCC	1BXX701	**To be completed in the Summer Semester after 6th semester**										4
2	PEC	1BXX702x	**Professional Elective Course (NPTEL/VTU Online Courses)-III**										3
3	PEC	1BXX703x	**Professional Elective Course (NPTEL/VTU Online Courses)-IV**										3
4	OEC	1BXX704x	**Open Elective Courses(NPTEL/VTU Online courses)-I**										3
6	**NCMC**	**1BIKS706**	**Indian Knowledge System (VTU online)**		**1**	**0**	**0**	0		**100**	**--**	**100**	**PP**
			Total										**13**
1	PEC	1Bxx801x	**Professional Elective(Online Courses)-IV**										3
2	OEC	1Bxx802x	**Open Elective(Online Courses)-II**										3
3	SDC	1Bxx803x	**Internship(Industry/Research)(02semesters) (min-180 working days)(min-30 weeks)**										12
4	SDC	1BXX805	**Project Phase-II-**										**07**
			Total										**25**

IPCC- Integrated Professional Core Course, PEC-Professional Elective Course, OEC-Open Elective Course, NCMC-Non-Credit Mandatory Course, SDC- Skill Development Course, SL-Term-work and Self Study hours, CIE-Continuous Internal Evaluation, SEE- Semester End Evaluation.

Professional Elective Course (Online Courses)-III			
1BXX702A	**NPTEL/VTU Online Courses**	1BXX702C	**NPTEL/VTU Online Courses**
1BXX702B	**NPTEL/VTU Online Courses**	1BXX702D	**NPTEL/VTU Online Courses**
Professional Elective Course (Online Courses)-IV			
1Bxx703A	**NPTEL/VTU Online Courses**	1Bxx703C	**NPTEL/VTU Online Courses**

1Bxx703B	**NPTEL/VTU Online Courses**	1Bxx704D	**NPTEL/VTU Online Courses**
Open Elective Courses (Online Course)-I			
1Bxx704A	**NPTEL/VTU Online Courses**	1Bxx704C	**NPTEL/VTU Online Courses**
1Bxx704B	**NPTEL/VTU Online Courses**	1Bxx704D	**NPTEL/VTU Online Courses**
Professional Elective Course (Online Courses)-IV			
1Bxx801A	**NPTEL/VTU Online Courses**	1Bxx801C	**NPTEL/VTU Online Courses**
1Bxx801B	**NPTEL/VTU Online Courses**	1Bxx801D	**NPTEL/VTU Online Courses**
Open Elective Courses(Online Courses)-III			
1Bxx802A	**NPTEL/VTU Online Courses**	1Bxx802C	**NPTEL/VTU Online Courses**
1Bxx802B	**NPTEL/VTU Online Courses**	1Bxx802D	**NPTEL/VTU Online Courses**

Instructions for Two-Semester Internship:

1. Students who wish to take up the two-semester internship (minimum **180 working days** or **30 working weeks**) must plan in advance.
2. **Eligibility:**
    a. Students must clear all courses up to the **6th semester in the first attempt** (no backlogs). They must also clear all the remaining semester courses in the **first attempt only**.
3. If a student fails in **any 6th-semester course**, they will be shifted to **Scheme A** and cannot continue with the two-semester internship.
4. **Registration:**
    a. Students must register for **1Bxx701** in the **SUMMER SEMESTER** only, study and pass the course. If not qualified, he/she shall continue with scheme A.
    b. A request/approval letter must be submitted to the **Registrar (Evaluation)**. Only after receiving confirmation can the student proceed with the internship.

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

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

Jnana Sangam, Machhe, Belagavi-590018

Scheme of Teaching and Examinations 2025

Outcome-Based Education (OBE) and Choice-Based Credit System (CBCS)

(Effective from the academic year 2025-26)

The scheme and syllabus for Automation and Robotics Programme is same as scheme and syllabus for Robotics and Automation Programme

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Scheme of Teaching and Examinations 2025

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(Effective from the academic year 2025-26)

2025 Scheme VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

B.E. in Mechanical and Smart Manufacturing
Scheme of Teaching and Examinations 2025
Outcome-Based Education(OBE) andChoice-BasedCreditSystem(CBCS)(Effectivefromtheacademicyear2025-26)

III SEMESTER

Sl. No	Course	Course Code	CourseTitle	Teaching Department (TD) and QuestionPaperSettingBoard (PSB)		TeachingHours/Week				Examination				Credits
						Theory Lecture	Tutorial	Practical/Drawing	Self-Learning	Durationin hours	CIEMarks	SEE Marks	TotalMarks	
						L	T	P	SL					
1	ASC/PCC	1BMAT301	Engineering Mathematics - III	TD /PSB: Mathematics		3	0	0		3	50	50	100	4
2	IPCC	1BMM302	Manufacturing Technology - I	TD/PSB : MM/MM		3	0	2		3	50	50	100	4
3	IPCC	1BMM303	Material Science & Engineering	TD/PSB : : MM/MM		3	0	2		3	50	50	100	4
4	PCC	1BMM304	Mechanics of Materials	TD/PSB : : MM/MM		3	0	0		3	50	50	100	3
5	PCC	1BMM305	Engineering Thermodynamics	TD/PSB: MM/MM		3	0	0		3	50	50	100	3
6	PCCL	1BMML306	Computer Aided Machine Drawing	TD/PSB: ME/ME or MM/MM		0	0	3		2	50	50	100	2
7	AEC	1BMML307x	Ability Enhancement Course Laboratory**	TD/PSB : MM/MM		0	0	2		2	50	50	100	1
8	SDC	1BCP308	Community Project (Project-Based Learning)	Any Department/ Respective Engineering Dept.		0	0	0	2	2	50	50	100	1
9	NCMC	1BNSS309	National Service Scheme (NSS)	Campus	NSS Coordinator	0	0	2		--	100	---	100	PP
		1BPE309	Physical Education (PE) (Sports and Athletics)		PhysicalEducation Director									
		1BYOG309	Yoga		YogaTeacher									
		1BMUK309	Music		Music Teacher									
10	NCMC	1BMATDIP310	Diplamo Mathematics - I	TD -Maths Dept/ VTU Online (COE). CIE by VTU online COE		3	0	0	3	3	100	---	100	PP
					Total						**600**	**400**	**1000**	**22**

2025 Scheme VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

Ability Enhancement Course (Laboratory) 1BMML307x			
1BMML307A	**Virtual Reality Lab**	**1BMML307C**	**Python Programming Lab**
1BMML307B	**Introduction to Block Chain**	**1BMML307D**	**Spreadsheet for Beginners**

2025 Scheme VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

B.E. in Mechanical and Smart Manufacturing
Scheme of Teaching and Examinations 2025
Outcome-Based Education(OBE) and Choice-Based Credit System (CBCS) (Effective from the academic year 2025-26)

IV SEMESTER

Sl. No	Course and CourseCode		CourseTitle	Teaching Department (TD) and Question Paper Setting (Board(PSB)		TeachingHours/Week				Examination				Credits
						Theory Lecture	Tutorial	Practical/Drawing	Self-Learning	Durationin hours	CIEMarks	SEE Marks	TotalMarks	
						L	T	P	SL					
1	ASC/PCC	1BMM401	Sensors, Measurement and Metrology	TD/PSB: MM/MM		3	0	0		3	50	50	100	3
2	IPCC	1BMM402	Data Structures and Algorithms	TD/PSB: MM/MM/CS/IS		3	0	2		3	50	50	100	4
3	PCC	1BMM403	Fluid Mechanics	TD/PSB : MM/MM		4	0	0		3	50	50	100	4
4	PCC	1BMM404	Smart Materials and Systems	TD/PSB : MM/MM		3	0	0		3	50	50	100	3
5	PCCL	1BMML405	Sensors, Measurement and Metrology Lab	TD/PSB : MM/MM		0	0	2	0	3	50	50	100	1
6	AEC	1BMML406	Ability Enhancement Course Laboratory**	TD/PSB : MM/MM		0	0	2	0	3	50	50	100	1
7	BSC	1BBOK407	Programme Specific Biology	TD/PSB : Biology Dept.		2	0	0	0	3	50	50	100	2
8	SDC	1BEP408	Environmental Science Project	TD/PSB: Any Dept.		0	0	0	2	3	50	50	100	1
9	NCMC	1BNSK409	National Service Scheme (NSS)	Campus	NSS coordinator	0	0	2		--	100	---	100	PP
		1BPEK409	Physical Education (PE) (Sports and Athletics)		Physical Education Director									
		1BYOK409	Yoga		YogaTeacher									
		1BMUS409	Music		Music Teacher									
10	NCMC	1BMATDIP410	Diploma Mathematics - II	TD -Maths Dept/ VTU Online (COE). CIE by VTU online COE						--	100	--	100	PP
					Total						**600**	**400**	**1000**	**19**

Ability Enhancement Course (Laboratory) 1BMML406x

1BMML406A	Computer Graphics Laboratory	1BMML406C	Modeling and Analysis Laboratory
1BMML406B	Virtual Reality Lab	1BMML406D	C++ Programming lab

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V SEMESTER

Sl. No	Course and Course Code		CourseTitle	Teaching Department(TD)andQuestionPaperSettingBoard(PSB)	TeachingHours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/Drawing	Self–Learning	Durationin hours	CIEMarks	SEE Marks	TotalMarks	
					L	T	P	SL					
1	HSMC	1BMM501	Industrial Management and Economics	TD/PSB: MM/MM	3	0	0		3	50	50	100	3
2	IPCC	1BMM502	Manufacturing Technology - II	TD/PSB: MM/MM	3	0	2		3	50	50	100	4
3	PCC	1BMM503	Design of Machine Elements	TD/PSB: MM/MM	4	0	0		3	50	50	100	3
4	PCC	1BMM504	Robotics for Engineers	TD/PSB: MM/MM	3	0	0		3	50	50	100	3
5	PEC	1BMM505X	Professional Elective Course-I	TD/PSB: MM/MM	4	0	0		3	50	50	100	3
6	BSC	1BRM506	Research Methodology and IPR (Online)	VTU online CoE CIE and SEE by COE	2	0	0	0	02	50	50	100	2
7	PCCL	1BMML507	Smart Manufacturing Lab-1	TD/PSB: MM/MM	0	0	2	0	02	50	50	100	1
8	SDC	1BMM508	Hackathlon-Based Project	CIE: By Departments SEE: Evaluation by industry experts	0	0	0	2	--	50	50	100	2
								Total		**400**	**400**	**800**	**21**

Professional Elective Course-I

1BMM505A	Mechanical Design Concepts	1BMM505C	Finite Element Analysis
1BMM505B	Introduction to C++ Programming	1BMM505D	Mechanical vibrations

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VI SEMESTER

Sl. No	Courseand CourseCode		CourseTitle	TeachingDepartment(TD)andQuestionPaperSettingBoard(PSB)	TeachingHours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/Drawing	Self-Learning	Durationin hours	CIEMarks	SEE Marks	TotalMarks	
					L	T	P	SL					
1	IPCC	1BMM601	Industrial IOT and Smart Manufacturing	TD/PSB: MM/MM	3	0	2		3	50	50	100	4
2	PCC	1BMM602	Additive Manufacturing	TD/PSB: MM/MM	4	0	0		3	50	50	100	3
3	PCC	1BMM603	Artificial Intelligence for Manufacturing	TD/PSB: MM/MM/AI	3	0	0		3	50	50	100	3
4	PCC	1BMM604	Control Engineering	TD/PSB: MM/MM					3	50	50	100	3
5	PEC	1BMM605x	Professional Elective Courses-II	TD/PSB: MM/MM	3	0	0		3	50	50	100	3
6	PCCL	1BMML606	Smart Manufacturing Lab-2	TD/PSB: MM/MM	0	0	2	0	2	50	50	100	1
7	AEC	1BMML607x	Ability Enhancement Course Laboratory	TD/PSB: MM/MM	0	0	2	0	2	50	50	100	1
8	SDC	1BMM608	Capstone Project- Phase I	TD/PSB: MM/MM	0	0	0	6	3	100	--	100	3
9	NCMC	1BXX609	Universal Human Value (VTU ONLINECourse)	CIE:By VTU online COE	1	0	0	0		100	---	100	PP
				Total						**550**	**350**	**900**	**21**

Professional Elective Course-II

1BMM605A	Production and Operation Management	1BMM605C	Fluid Power Systems
1BMM605B	Geometric Modeling for CAD & Computer Graphics	1BMM605D	Mechanics of Composite Materials

Ability Enhancement Course Laboratory1BMML607x**

1BMML607A	Data Base Management systems Laboratory	1BMML607C	Fluid Power Systems Laboratory
1BMML607B	Cloud Computing Laboratory	1BMML607D	Cyber Security Laboratory

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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)	Teaching Hours/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	1BMM701	Computer Aided Design and Manufacturing	TD/PSB: MM/MM	3	0	2		3	50	50	100	4
2	PEC	1BMM702x	Professional Elective Course-III	TD/PSB: MM/MM	3	0	0		3	50	50	100	3
3	PEC	1BMM703x	Professional Elective Course -IV	TD/PSB: MM/MM	3	0	0		3	50	50	100	3
4	OEC	1BMM704x	Open Elective Course-I	TD/PSB: MM/MM	3	0	0		3	50	50	100	3
5	SDC	1BMM705	Capstone Project - Phase-II	TD/PSB: MM/MM	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**

Professional Elective Course-III			
1BMM702A	Product Design and Development	1BMM702C	Total Quality Management
1BMM702B	Lean Manufacturing	1BMM702D	Non Traditional Machining
Professional Elective Course-IV			
1BMM703A	Flexible Manufacturing Systems	1BMM703C	CNC In Manufacturing
1BMM703B	Design for Manufacturing	1BMM703D	Operation Research
Open Elective Course-I			
1BMM704A	Energy and Environment	1BMM704C	Computer Integrated Manufacturing
1BMM704B	Electric Vehicle Technology	1BMM704D	Foreign Language (NPTEL/SWAYAM/online VTU)

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

Sl. No	CourseandCourseCode		CourseTitle	TeachingDepartment(TD)andQuestionPaperSettingBoard(PSB)	TeachingHours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/Drawing	Self-Learning	Durationin hours	CIEMarks	SEE Marks	TotalMarks	
					L	T	P	SL					
1	PEC	1BMM801x	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	1BMM803x	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**

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VII and VIII semesters for the candidates who opt for a two-semesters internship along with Capstone Project(SchemeB)

Sl. No	CourseandCourse Code		CourseTitle	TeachingDepartment(TD)andQuestionPaperSettingBoard(PSB)	TeachingHours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/Drawing	Self-Learning	Durationin hours	CIEMarks	SEE Marks	TotalMarks	
					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: PSB:					3	100	100	200	7
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

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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-hours Tutorial (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:

- Students who have an offer to enrol for a 15-week internship, before the start of 4th year, shall register for VIII semester courses instead of VII semester courses and take up respective semester examination.
- Those who have no offer to enrol to a 15-week internship, before the start of 4th year, shall register VII and VIII semesters courses in the chronological manner and complete the programme. In this case the internship shall be carried out during VIII semester.

X. Option -2: Two-Semester Internship Scheme – B

- Students who have cleared all the courses up to VI semester in first attempt only (i.e., students having no backlogs) and have an internship offer for a period of 180 working days or 30 working weeks, are only eligible for Scheme – B. The internship commence date should coincide with the 4th year academic calendar of VTU. Such students, shall produce the confirmed internship letter, to the Principal/Academic Authority to get permission to register for the summer semester to opt for Scheme - B.
- Such eligibles students shall register for the course 1Bxx701 in the summer semester of the same academic year (i.e., after their VI semester) and complete the said course in first attempt only.
- In case, they absent for the examination or fails in the course 1Bxx701, they shall not be considered eligible for the Scheme – B. However, they shall register for Scheme – A.
- After completing the course 1Bxx701, students with confirmed internship letter to carry out the internship for a minimum 180 working days or 30 working weeks, shall register for the Scheme – B.
- In case students cannot commence the internship for various reasons, they not be considered for Scheme – B. In such cases, they shall register for Scheme – A. However, they will be exempted from studying the course 1Bxx701 again.

- A request letter with internship permission letter must be submitted to Registrar, VTU through concerned authorities of the institution. Only after receiving the approval from the Registrar, students proceed with the internship as mentioned in Option Scheme B.

Capstone Project Evaluation Guidelines for Students Opting for Internship for two semesters duration:

a) **Industry Internship Leading to Capstone Project:** For students opting for a two-semester Industry Internship that leads to the completion of the Capstone Project, the Phase-I evaluation will be conducted at the end of the VII semester, and the Phase-II evaluation will be conducted at the end of the VIII semester.

b) **Industry Internships Not Leading to Capstone Project:** For students opting for aIndustry Internship that does **not** lead to the completion of the Capstone Project, they are required to undertake the Capstone Project separately. Both Phase-I and Phase-II of the Project Work must be completed as per the prescribed guidelines, under the guidance of a college-level guide or mentor.

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

III SEMESTER

Sl. No	Course	Course Code	Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Self Learning	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	ASC/PCC	1BMAT301	Engineering Statistics	TD /PSB: Mathematics	3	2	0	0	3	50	50	100	4
2	IPCC	1BSA302	Plant Water Relations	TD/PSB	3	0	2	0	3	50	50	100	4
3	PCC	1BSA303	Farm Machinery & equipment – I	TD/PSB	3	2	0	0	3	50	50	100	4
4	PCC	1BSA304	Principles of Agronomy	TD/PSB	3	0	0	0	3	50	50	100	3
5	PCC	1BSA305	Artificial Intelligence and Machine learning	TD/PSB	3	0	0	0	3	50	50	100	3
6	PCCL	1BSAL306	Basic Workshop Practice Lab	TD/PSB	0	0	2	0	3	50	50	100	1
7	AEC	1BSAL307x	Ability Enhancement Course Laboratory	TD/PSB	0	0	2			50	50	100	1
8	SDC	1BSC308	Societal Project (Project-Based Learning)	Any Department/ Respective Engineering Dept.	0	0	0	2		50	50	100	1
9	NCMC	1BNSS309	National Service Scheme (NSS)	NSS coordinator	0	0	2			100	---	100	PP
		1BPE309	Physical Education (PE) (Sports and Athletics)	Physical Education Director									
		1BYOG309	Yoga	Yoga Teacher									
		1BMUK309	Music	Music Teacher									
				Total						**100**	**--**	**100**	**21**
10	NCMC	1BMATDIP310	Maths course for Lateral Entry Students	TD/PSB-Maths Dept	3	0	0	3	03	100	---	100	PP

ASC- Applied Science Course, PCC- Professional Core Course, IPCC-Integrated Professional Core Course, PCCL- Professional Core Course Laboratory, AEC-Ability Enhancement Course, SDC- Skill Development Course, NCMC- Non-Credit Mandatory Course, SL-Term-work and Self Study hours, CIE-Continuous Internal Evaluation, SEE- Semester End Evaluation.

Ability Enhancement Course Laboratory (May be one course or			
1BSAL307A	**Advanced Python Programming**	**1BSAL307C**	**Spreadsheet for Engineers**
1BSAL307B	**Personality development and soft skills**	**1BSAL307D**	**Importance of solar energy in agriculture**

The course **1BSAL307 – Ability Enhancement Course Laboratory** shall be offered either as a single compulsory course or as multiple options under the course codes **1BSAL307x** (where *x = A, B, C, D*). Each student shall choose **one course** from the available options for study. Since this is a laboratory course, the **minimum strength required** for each course shall be **20 students**. If the number of students opting for a particular course is **less than 20**, the college shall seek permission from the **Registrar, VTU Belagavi**, to offer that course.

The course **1BSAL307 – Ability Enhancement Course Laboratory** shall be offered either as a single compulsory course or as multiple options under the course codes **1BSAL307x** (where *x = A, B, C, D*). Each student shall choose **one course** from the available options for study. Since this is a laboratory course, the **minimum strength required** for each course shall be **20 students**. If the number of students opting for a particular course is **less than 20**, the college shall seek permission from the **Registrar, VTU Belagavi**, to offer that course.

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

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, semesters.

- Colleges shall submit Continuous Internal Evaluation (CIE) marks each semester based on the activities completed by students under the selected course.
- Students may opt for different activities/courses across semesters. For instance, a student participating in PE during the 3rd semester may choose NSS in the 4th semester or Yoga.
- This flexible approach aligns with the student-centric vision of the National Education Policy (NEP) 2022, and facilitates equitable distribution of NSS/PE/Yoga-related responsibilities across departments.
- Activities shall be conducted over two semesters (III & IV), and successful completion of the registered course 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, and Yoga activities.

These courses shall not be considered for vertical progression, nor shall they be included in the calculation of SGPA or CGPA. However, completion is compulsory for degree eligibility.

Societal project work: Students shall undertake Societal Project Work to address real-world social challenges and contribute meaningfully to community well-being. They shall engage with domains such as health, education, sustainability, digital inclusion, and rural development through experiential learning. Students shall apply their domain-specific knowledge to design and implement solutions that respond effectively to identified societal needs. By interacting directly with communities and stakeholders, they shall develop practical skills, empathy, and ethical awareness.

A **Non-Credit Mandatory Course (NCMC)** shall constitute an integral component of the academic framework, aimed at enhancing students' knowledge, skills, and awareness beyond the core curriculum. These courses shall not carry academic credits nor be considered in the computation of CGPA; however, successful completion of the NCMC shall be compulsory for fulfilling the requirements of the academic program. Each student shall register for the designated NCMC in the prescribed semester as notified by the University/Institution. NCMCs shall not be considered for vertical progression. However, qualifying in the NCMC is mandatory for the award of the degree. A student who fails to qualify in the prescribed NCMC shall not be eligible for the conferment of the degree.

Credit Definition: 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 (IC) 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

AICTE Activity Points Requirement for BE/B.Tech. Programmes (Lateral Entry Students)

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 is:

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 are **non-credit** and will not be considered for **the SGPA/CGPA** or be used 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**. If a student completes all the semesters (eight or six) at the end of the programme but fails to earn the required Activity Points, the eighth-semester Grade Card will be withheld until the requirement is fulfilled. Also, the degree will be awarded only after the Grade Card has been released. 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.

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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	SL					
1	ASC/PCC	1BSA401	Fundamentals of fruit, vegetable and ornamental Crops	TD/PSB:	3	0	0	0	3	50	50	100	3
2	IPCC	1BSA402	Irrigation and Drainage Engineering	TD/PSB	3	0	2	0	3	50	50	100	4
3	PCC	1BSA403	Agricultural Process Engineering	TD/PSB	4	0	0	0	3	50	50	100	4
4	PCC	1BSA404	Farm Machinery & Equipment-II	TD/PSB	3	0	0	0	3	50	50	100	3
5	PCCL	1BSAL405	Machine Drawing and GD &T Lab	TD/PSB	0	0	2	0	02	50	50	100	1
6	AEC	1BSAL406	**Ability Enhancement Course Laboratory**		0	0	2	0	02	50	50	100	1
7	HSMC	1BRMI407	Research Methodology and IPR (VTU **Online**)	TD / PSB: ,	2	0	0	0	03	50	50	100	2
8	SDC	1BEP408	**Environmental Science Project** **(Interdisciplinary Project Based Learning)**	TD/PSB	0	0	0	2	03	50	50	100	1
9	NCMC	1BNSK409	National Service Scheme (NSS)	NSS coordinator	0	0	2			100	---	100	PP
		1BPEK409	Physical Education (PE) (Sports and Athletics)	Physical Education Director									
		1BYOK409	Yoga	Yoga Teacher									
		1BMUS409	Music	Music Teacher									
				Total									**19**
10	NCMC	1BMATDIP410	Maths for Lateral Entry Students	Maths Dept						100	--	100	PP

ASC- Applied Science Course, PCC- Professional Core Course, IPCC-Integrated Professional Core Course, PCCL- Professional Core Course Laboratory, AEC-Ability Enhancement Course, SDC- Skill Development Course, NCMC- Non-Credit Mandatory Course, SL-Term-work and Self Study hours, CIE-Continuous Internal Evaluation, SEE- Semester End Evaluation.

Professional Core Course (IPCC): The Integrated Professional Core Course (IPCC) refers to a core theory course that is integrated with practical components of the same subject. Each IPCC carries 4 credits, with Teaching–Learning hours structured as either (3:0:2) or (2:2:2). The theory component of the IPCC shall be evaluated through both

Continuous Internal Evaluation (CIE) and Semester End Examination (SEE). The practical component shall be assessed exclusively through CIE, with no separate SEE. However, questions derived from the practical component may be included in the SEE question paper to ensure comprehensive evaluation.

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, semesters.

- Colleges shall submit Continuous Internal Evaluation (CIE) marks each semester based on the activities completed by students under the selected course.
- Students may opt for different activities/courses across semesters. For instance, a student participating in PE during the 3rd semester may choose NSS in the 4th semester or Yoga.
- This flexible approach aligns with the student-centric vision of the National Education Policy (NEP) 2022, and facilitates equitable distribution of NSS/PE/Yoga-related responsibilities across departments.
- Activities shall be conducted over two semesters (III & IV), and successful completion of the registered course 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, and Yoga activities.

These courses shall not be considered for vertical progression, nor shall they be included in the calculation of SGPA or CGPA. However, completion is compulsory for degree eligibility.

A **Non-Credit Mandatory Course (NCMC)** shall constitute an integral component of the academic framework, aimed at enhancing students' knowledge, skills, and awareness beyond the core curriculum. These courses shall not carry academic credits nor be considered in the computation of CGPA; however, successful completion of the NCMC shall be compulsory for fulfilling the requirements of the academic program. Each student shall register for the designated NCMC in the prescribed semester as notified by the University/Institution. NCMCs shall not be considered for vertical progression. However, qualifying in the NCMC is mandatory for the award of the degree. A student who fails to qualify in the prescribed NCMC shall not be eligible for the conferment of the degree.

An **Environmental Science project** for engineering students shall aim to integrate ecological awareness with technical innovation. The project shall be either interdisciplinary—drawing from multiple branches of engineering—or domain-specific, focusing on a particular field. It shall encourage students to apply sustainable practices, analyze environmental impact, and propose viable solutions. The chosen topic shall reflect current environmental challenges and align with academic objectives. Students shall document their findings systematically and present actionable outcomes. The project shall foster responsible engineering aligned with environmental stewardship.

The course **1BSAL406 – Ability Enhancement Course Laboratory** shall be offered either as a single compulsory course or as multiple options under the course codes **1BSAL406x** (where *x = A, B, C, D*). Each student shall choose **one course** from the available options for study. Since this is a laboratory course, the **minimum strength required** for each course shall be **20 students**. If the number of students opting for a particular course is **less than 20**, the college shall seek permission from the **Registrar, VTU Belagavi**, to offer that course.

Ability Enhancement Course Laboratory			
1BSAL406A	Mastering MS - Office (MS Word, Excel, PPT, Outlook)	1BSAL406C	Principles of Soil Science
1BSAL406B	Animation in agriculture	1BSAL406D	Fuzzy Logic for Automation

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V 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	Selp Study	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	HSMC	1BSA501	Management and Economics for agriculture	TD/PSB:	3	0	0	0	3	50	50	100	3
2	IPCC	1BSA502	Water Harvesting and Soil Conservation Structures	TD/PSB	3	0	2	0	3	50	50	100	4
3	PCC	1BSA503	Precision Agriculture	TD/PSB	3	0	0	0	3	50	50	100	3
4	PCC	1BSA504	Robotics and automation	TD/PSB	3	0	0	0	3	50	50	100	3
5	PCC	1BSA505	Landscape Irrigation Design and Management	TD/PSB	3	0	0	0	3	50	50	100	3
6	BSC	1BSA506	**Program Specific Biology**	TD/PSB	2	0	0	0	02	50	50	100	2
7	PCCL	1BSAL507	Manufacturing process lab	TD/PSB	0	0	2	0	02	50	50	100	1
8	SDC	1BSA508	**Minor Project**	TD/PSB	0	0	0	2		50	50	100	2
				Total									**21**

HSMC- Humanities Studies and Management Course, IPCC-Integrated Professional Core Course, PCC- Professional Core Course, BSC-Basic Science Course, PCCL- Professional Core Course Laboratory, AEC-Ability Enhancement Course, SDC- Skill Development Course, SL-Term-work and Self Study hours, CIE-Continuous Internal Evaluation, SEE- Semester End Evaluation.

Mini-project work: The Mini-Project shall be a laboratory-based, hands-on course intended to enhance students' practical skills and technical proficiency through the development of small-scale systems or applications. Projects may be assigned individually or in groups of up to four students, depending on the students' capabilities and the mentor's recommendations. The assignments may belong to a single discipline or span multiple disciplines.

CIE procedure for Mini-project: (out of 50 Marks)

(i) Single-Discipline Projects: The CIE marks shall be awarded by a departmental committee comprising the Head of the Department and two faculty members, one of whom shall be the project guide. The evaluation shall be based on the following components: Project Report – 50%, Presentation Skills – 25%, Question & Answer Session – 25%

The marks awarded for the project report shall be uniform for all members of the group. If the CIE is conducted for 100 marks, then the total score shall be scaled to a maximum of 50 marks.

(ii) Interdisciplinary: The CIE for interdisciplinary projects shall be conducted at the college level. The evaluation shall be carried out group-wise by a panel comprising all the

project guides involved. The assessment criteria and weightage shall remain the same as for single-discipline projects. The SEE shall be conducted as per the Examination/University guidelines. (SEE will be as per Examination/University guidelines).

B.E. in the title of the program

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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	Self Study	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	IPCC	1BSA601	Basics Concepts and Applications of Agrochemicals	TD/PSB-	3	0	2	0	3	50	50	100	4
2	PCC	1BSA602	Soil & Water Conservation Engineering	TD/PSB-	3	0	0	0	3	50	50	100	3
3	PCC	1BSA603	Agriculture Structures and Environmental Control	TD/PSB-	3	0	0	0	3	50	50	100	3
4	PCC	1BSA604	Emerging Agricultural technology	TD/PSB-	3	0	0	0	3	50	50	100	3
5	PEC	1BSA605x	Professional Elective Courses-I	TD/PSB-	3	0	0	0	3	50	50	100	3
6	PCCL	1BSAL606	AI and Image Processing Lab	TD/PSB-	0	0	2	0		50	50	100	1
7	AEC	1BSAL607	**Ability Enhancement Course Laboratory**	TD/PSB-	0	0	2	0		50	50	100	1
8	SDC	1BSA608	Project Phase I	TD/PSB-	0	0	0	6		50	50	100	3
9	NCMC	1BSA609	**Universal Human Value (VTU ONLINE Course)**	TD/PSB-	1	0	0	0		100	---	100	PP
				Total									**21**

IPCC-Integrated Professional Core Course, PCC- Professional Core Course, BSC-Basic Science Course, PEC-Professional Elective Course, PCCL- Professional Core Course Laboratory, AEC-Ability Enhancement Course, SDC- Skill Development Course, NCMC- Non-Credit Mandatory Course, SL-Term-work and Self Study hours, CIE-Continuous Internal Evaluation, SEE- Semester End Evaluation.

Professional Elective Course-I

1BSA605A	IOT in Architecture and Protocols	1BSA605C	Principles of Organic Farming
1BSA605B	Agriculture Structures and Environmental Control	1BSA605D	Virtual Instrumentation

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 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. If the number of students opting for a particular course is **less than 10**, the college shall seek permission from the **Registrar, VTU Belagavi**, to offer that course.

The course **1BSAL607 – Ability Enhancement Course Laboratory** shall be offered either as a single compulsory course or as multiple options under the course codes **1BSAL607x**

(where *x = A, B, C, D*). Each student shall choose **one course** from the available options for study. Since this is a laboratory course, the **minimum strength required** for each course shall be **20 students**. If the number of students opting for a particular course is **less than 20**, the college shall seek permission from the **Registrar, VTU Belagavi**, to offer that course.			
Ability Enhancement Course Laboratory			
1BSAL607A	Finite Element Analysis Lab	1BSAL607C	Augmented reality lab
1BSAL607B	Virtual Instrumentation and Automation Lab	1BSAL607D	Hydrology Lab

B.E. in SMART AGRITECH, Scheme of Teaching and Examinations 2025

Outcome-Based Education (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)	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	IPCC	1BSA701	Agricultural meteorology & Climate Change	TD/PSB-	3	0	2	0	3	50	50	100	4
2	PCC	1BSA702x	Professional Elective Course -II	TD/PSB-	3	0	0	0	3	50	50	100	3
3	PEC	1BSA703x	Professional Elective Course -III	TD/PSB-	3	0	0	0	3	50	50	100	3
4	OEC	1BSA704x	Open Elective Course-I	TD/PSB-	3	0	0	0	3	50	50	100	3
5	SDC	1BSA705	Major Project Phase-II	TD/PSB-	0	0	0	14		100	100	200	7
6	**NCMC**	**1BIKS706**	**Indian Knowledge System (VTU online Course)**	TD/PSB-	**1**	**0**	**0**	0		**100**	**--**	**100**	**PP**
				Total									**20**

IPCC-Integrated Professional Core Course, PCC- Professional Core Course, PEC-Professional Elective Course, OEC-Open Elective Course, SDC- Skill Development Course, NCMC-Non-Credit Mandatory Course, SL-Term-work and Self Study hours, CIE-Continuous Internal Evaluation, SEE- Semester End Evaluation.

Professional Elective Course-II

1BSA702A	Principles of Seed Technology	1BSA702C	Design of Agricultural Machinery
1BSA702B	Manures, Fertilizers and Soil Fertility Management	1BSA702D	Control Engineering

Professional Elective Course-III

1BSA703A	Business Analytics	1BSA703C	Remote Sensing and GIS Applications
1BSA703B	Drone Technology	1BSA703D	Fundamentals of Renewable Energy Sources

Open Elective Course-I

1BSA704A	Introduction to Forestry	1BSA704C	Agriculture Waste Management.
1BSA704B	Agricultural Automation	1BSA704D	Agricultural Finance and Co-Operation

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

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 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. If the number of students opting for a particular course is **less than 10**, the college shall seek permission from the **Registrar, VTU Belagavi**, to offer that course.

PROJECT WORK (21SAP75): 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.

(2) Interdisciplinary: Continuous Internal Evaluation shall be group-wise at the college level with the participation of all guides of the college. Participation of external guide/s, if any, is desirable. The CIE marks awarded for the project work, shall be based on the evaluation of 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.

SEE procedure for Project Work: SEE for project work will be conducted by the two examiners appointed by the University. The SEE marks awarded for the project work shall be based on the evaluation of project work Report, project presentation skill, and question and answer session in the ratio 50:25:25.

Swappable Semester Provision – Scheme A

To ensure equitable access to internship opportunities, the seventh and eighth semesters shall be swappable under Scheme A, as detailed below;

Standard Implementation: All students shall, by default, undertake seventh-semester courses during the ODD semester, and eighth-semester courses during the EVEN semester.

Alternative Implementation: Alternatively, in the ODD semester, a defined percentage of final-year students shall be permitted to take up eighth-semester courses, . The remaining students shall pursue seventh-semester courses, in the EVEN semester, the student groups shall exchange roles. Those who completed seventh-semester courses in the ODD semester shall now undertake eighth-semester components, and vice versa.

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

B.E. in the title of the program

Scheme of Teaching and Examinations2022

Outcome-Based Education (OBE) and Choice Based Credit System (CBCS)

(Effective from the academic year 2023-24)

VIII 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)	Teaching Hours /Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Self Study	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	SL					
1	PEC	1BSA801x	**Professional Elective-V (NPTEL/VTU Online Courses)IV**	TD/PSB-									3
2	OEC	1BSA802x	**Open Elective (NPTEL/VTU Online Courses)-II**	TD/PSB-									3
3	SDC	1BSA803x	**Internship (Types) (15 weeks) (90 working days)**	TD/PSB-	0	0	0	24		100	100	200	12
				Total									**18**

PEC-Professional Elective Course, OEC-Open Elective Course, SDC- Skill Development Course, SL-Term-work and Self Study hours, CIE-Continuous Internal Evaluation, SEE-Semester End Evaluation.

Professional Elective Course (Online courses)-IV

1BSA801A	**NPTEL/VTU Online Courses**	1BSA801C	**NPTEL/VTU Online Courses**
1BSA801B	**NPTEL/VTU Online Courses**	1BSA801D	**NPTEL/VTU Online Courses**

Open Elective Courses (Online Courses)-II

1BSA802A	**NPTEL/VTU Online Courses**	1BSA802C	**NPTEL/VTU Online Courses**
1BSA802B	**NPTEL/VTU Online Courses**	1BSA802D	**NPTEL/VTU Online Courses**

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 number 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

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 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. If the number of students opting for a particular course is **less than 10**, the college shall seek permission from the **Registrar, VTU Belagavi**, to offer that course.

Swappable Semester Provision – Scheme A

To ensure equitable access to internship opportunities, the seventh and eighth semesters shall be swappable under Scheme A, as detailed below;

Standard Implementation: All students shall, by default, undertake seventh-semester courses during the ODD semester, and eighth-semester courses during the EVEN semester.

Alternative Implementation: Alternatively, in the ODD semester, a defined percentage of final-year students shall be permitted to take up eighth-semester courses, The remaining students shall pursue seventh-semester courses, in the EVEN semester, the student groups shall exchange roles. Those who completed seventh-semester courses in the ODD semester shall now undertake eighth-semester components, and vice versa.

Types of Internships (Course Code: 1BSA803)

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

1. **1BSA803A – Industry Internship**: Shall involve practical exposure and training within an industrial or corporate setting.
2. **1BSA803B – Research Internship**: Shall focus on academic or applied research under the guidance of faculty or research institutions.
3. **1BSA803C – Post-Placement Internship**: Shall be undertaken by students who have secured placement, aligning with their future employment domain.
4. **1BSA803D – Societal Internship**: Shall engage students in community-based or social impact projects with NGOs, government bodies, or civic organizations.
5. **1BSA803E – Online Internship**: Shall be conducted through recognized digital platforms offering structured internship modules.
6. **1BSA803F – 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

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

B.E. in the title of the program

Scheme of Teaching and Examinations 2022

Outcome-Based - Education (OBE) and Choice-Based Credit System (CBCS)

(Effective from the academic year 2023-24)

VII and VIII semesters for the candidates who seek an internship for two semesters along with project work (Scheme B)

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	SL					
1	IPCC	1BSA701	To be completed in the Summer Semester after 6th semester										4
2	PEC	1BSA702x	Professional Elective Course (NPTEL/VTU Online Courses)-III										3
3	PEC	1BSA703x	Professional Elective Course (NPTEL/VTU Online Courses)-IV										3
4	OEC	1BSA704x	Open Elective Courses (NPTEL/VTU Online courses)-I										3
6	**NCMC**	**1BIKS706**	**Indian Knowledge System (VTU online)**		**1**	**0**	**0**	0		**100**	**--**	**100**	**PP**
			Total										**13**
1	PEC	1BSA801x	Professional Elective (Online Courses)-IV										3
2	OEC	1BSA802x	Open Elective (Online Courses)-II										3
3	SDC	1BSA803x	Internship (Industry/Research) (02 semesters) (min-180 working days)(min-30 weeks)										12
4	SDC	1BSA805	Project Phase-II -										**07**
			Total										**25**

IPCC- Integrated Professional Core Course, PEC-Professional Elective Course, OEC-Open Elective Course, NCMC-Non-Credit Mandatory Course, SDC- Skill Development Course, SL-Term-work and Self Study hours, CIE-Continuous Internal Evaluation, SEE- Semester End Evaluation.

Professional Elective Course (Online Courses)-III			
1BSA702A	NPTEL/VTU Online Courses	1BSA702C	NPTEL/VTU Online Courses
1BSA702B	NPTEL/VTU Online Courses	1BSA702D	NPTEL/VTU Online Courses
Professional Elective Course (Online Courses)-IV			
1BSA703A	NPTEL/VTU Online Courses	1BSA703C	NPTEL/VTU Online Courses

1BSA703B	**NPTEL/VTU Online Courses**	1BSA704D	**NPTEL/VTU Online Courses**
Open Elective Courses (Online Course)-I			
1BSA704A	**NPTEL/VTU Online Courses**	1BSA704C	**NPTEL/VTU Online Courses**
1BSA704B	**NPTEL/VTU Online Courses**	1BSA704D	**NPTEL/VTU Online Courses**
Professional Elective Course (Online Courses)-IV			
1BSA801A	**NPTEL/VTU Online Courses**	1BSA801C	**NPTEL/VTU Online Courses**
1BSA801B	**NPTEL/VTU Online Courses**	1BSA801D	**NPTEL/VTU Online Courses**
Open Elective Courses (Online Courses)-III			
1BSA802A	**NPTEL/VTU Online Courses**	1BSA802C	**NPTEL/VTU Online Courses**
1BSA802B	**NPTEL/VTU Online Courses**	1BSA802D	**NPTEL/VTU Online Courses**

Instructions for Two-Semester Internship:

1. Students who wish to take up the two-semester internship (minimum **180 working days** or **30 working weeks**) must plan in advance.
2. **Eligibility:**
   a. Students must clear all courses up to the **6th semester in the first attempt** (no backlogs). They must also clear all the remaining semester courses in the **first attempt only**.
3. If a student fails in **any 6th-semester course**, they will be shifted to **Scheme A** and cannot continue with the two-semester internship.
4. **Registration:**
   a. Students must register for **1BSA701** in the **SUMMER SEMESTER** only, study and pass the course. If not qualified, he/she shall continue with scheme A.
   b. A request/approval letter must be submitted to the **Registrar (Evaluation)**. Only after receiving confirmation can the student proceed with the internship.

Types of Internships (Course Code: 1BSA803)

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

1. **1BSA803A – Industry Internship**: Shall involve practical exposure and training within an industrial or corporate setting.
2. **1BSA803B – Research Internship**: Shall focus on academic or applied research under the guidance of faculty or research institutions.
3. **1BSA803C – Post-Placement Internship**: Shall be undertaken by students who have secured placement, aligning with their future employment domain.
4. **1BSA803D – Societal Internship**: Shall engage students in community-based or social impact projects with NGOs, government bodies, or civic organizations.
5. **1BSA803E – Online Internship**: Shall be conducted through recognized digital platforms offering structured internship modules.
6. **1BSA803F – 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