VISVESVARAYA TECHNOLOGICAL UNIVERSITY

BELAGAVI

Scheme of Teaching and Examinations (2026)

Master of Computer Applications (MCA)

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

	I SEMESTER												
Sl. No	Course Type	Course Code	Course Title	Teaching & Learning Scheme					Examination				Credits
				CI		LI	TW & SL	Total Hours/Sem	Duration in hours	CIE Marks	SEE Marks	Total Marks	
				L	T	P							
1	BSC	1MMC101	Mathematical Foundations for Computer Applications	42	28		50	120	03	50	50	100	4
2	PCC	1MMC102	Database Management Systems (DBMS)	42			48	90	03	50	50	100	3
3	PCC	1MMC103	Introduction to AI and Applications	42			48	90	03	50	50	100	3
4	PCC	1MMC104	Data Structures and Algorithms	42			48	90	03	50	50	100	3
5	IPCC	1MMC105	Operating System and Shell Scripting	42		28	50	120	03	50	50	100	4
6	IPCC	1MMC106	Java Programming	42		28	50	120	03	50	50	100	4
7	PCCL	1MMCL107	Data Structures and Algorithms Lab			28	02	30	03	50	50	100	1
8	PCCL	1MMCL108	Web Programming Lab			28	02	30	03	50	50	100	1
9	NCMC	1MRMI109	Research Methodology and IPR (**Online**)		Online courses (online.vtu.ac.in)								PP
								TOTAL		**400**	**400**	**800**	**23**

Note: BSC-Basic Science Courses, PCC: Professional core. IPCC-Integrated Professional Core Courses, MCC- Mandatory Credit Course, AUD/AEC – Audit Course / Ability Enhancement Course, PP-Passing is Mandatory

	Master of Computer Applications												
	II SEMESTER												
Sl. No	Course	Course Code	Course Title	Teaching & Learning Scheme					Examination				Credits
				L	T	P	TW & SL	Total Hours /Semester	Duration in hours	CIE Marks	SEE Marks	Total Marks	
1	PCC	1MMC201	Machine Learning	56			64	120	03	50	50	100	4
2	PCC	1MMC202	Software Architecture	42			48	90	03	50	50	100	3
3	PCC	1MMC203	Computer Networks	42			48	90	03	50	50	100	3
4	PEC	1MMC204x	Professional Elective Course- I	42			48	90	03	50	50	100	3
5	PCCL	1MMCL205	Full Stack Development		28	28	04	60	03	50	50	100	2
6	PCCL	1MMCL206	Machine Learning Lab			28	02	30	03	50	50	100	1
7	PCCL	1MMCL207	Mobile Application Development Lab			28	02	30	03	50	50	100	1
8	AEC	1MMCL208	Data Visualization Lab			28	02	30	03	100	-	100	1
									Total	**450**	**350**	**800**	**18**

PEC-I	
Code	**Title of the Course**
1MMC205A	Natural Language Processing
1MMC205B	Content Management System
1MMC205C	Big Data Analytics
1MMC205D	Blockchain Technology

	Master of Computer Applications												
	III SEMESTER												
Sl. No	Course	Course Code	Course Title	Teaching & Learning Scheme					Examination				Credits
				L	T	P	TW & SL	Total Hours /Semester	Duration in hours	CIE Marks	SEE Marks	Total Marks	
1	IPCC	1MMC301	Internet of Things	42		28	50	120	03	50	50	100	4
2	PCC	1MMC302	Cloud Computing	42			48	90	03	50	50	100	3
3	IPEC	1MMC303x	Integrated Professional Elective - II	42		28	50	120	03	50	50	100	4
4	PEC	1MMC304x	Professional Elective Course - III	42			48	90	03	50	50	100	3
5	PCCL	1MMCL305	Devops		28	28	04	60	03	50	50	100	2
6	SDC	1MMC306	Project Work					210	03	100	100	100	7
									Total	**350**	**350**	**600**	**23**

Professional Elective Courses (PECs)					
IPEC-II			**PEC-III**		
Code	**Title of the Course**		**Code**	**Title of the Course**	
1MMC303A	Cryptography and Network Security		1MMC304A	Wireless Network and Mobile Computing	
1MMC303B	Cyber Security		1MMC304B	Software Quality Assurance	
1MMC303C	Deep Learning		1MMC304C	Agentic AI	
1MMC303D	Generative AI		1MMC304D	Digital Forensics	

	Master of Computer Applications											
	IV SEMESTER											
Sl. No	Course	Course Code	Course Title	Teaching & Learning Scheme					Examination				Credits
				L	T	P	TW & SL	Total Hours /Semester	Duration in hours	CIE Marks	SEE Marks	Total Marks	
1	PEC	1MMC401x	Professional Elective Course – IV (Online Course VTU/NPTEL – 12 weeks)	Online Evaluation					03	50	50	100	3
2	PEC	1MMC402x	Professional Elective Course – IV (Online Course VTU/NPTEL – 12 weeks)	Online Evaluation					03	50	50	100	3
3	SDC	1MMC403x	Internship (15 weeks)					360	03	100	100	200	10
									Total	**200**	**200**	**400**	**16**

PEC - IV			PEC - V	
Code	**Title of the Course**		**Code**	**Title of the Course**
1MMC401A	VTU/NPTEL Online Course		1MMC402A	VTU/NPTEL Online Course
1MMC401B	VTU/NPTEL Online Course		1MMC402B	VTU/NPTEL Online Course
1MMC401C	VTU/NPTEL Online Course		1MMC402C	VTU/NPTEL Online Course
1MMC401D	VTU/NPTEL Online Course		1MMC402D	VTU/NPTEL Online Course

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. **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.

iv. **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.

v. **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.

vi. **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.

vii. **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.

Project Work:

The project work is a critical component of the curriculum, designed to bridge the gap between academic knowledge and industry practices. It provides students with an opportunity to apply their learning to solve real-world problems, develop innovative solutions, and gain hands-on experience in a professional environment.

Project work and Dissertation:

1. Each candidate shall carry out the project work independently as per the Scheme of Teaching and Examinations under the guidance of one of the faculty members of the Department in the Institution of study. If the project is of an inter-disciplinary nature, a co-guide shall be taken from the other concerned department.

2. The topic and title of the dissertation shall be chosen by the candidate in consultation with the guide and co-guide, if any, before the commencement of III semester.

3. The subject and topic of the dissertation shall be from the major field of study of the candidate. Modification of only the title but not the field of work may be permitted at the time of the final submission of the dissertation report during the third semester.

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

I. Abbreviations used in the Scheme of Teaching and Examinations

Abbreviations	Expanded Form of the Abbreviations
AICTE	**All India Council of Technical Education**
NCrF	**National Credit Framework**
VTU	**Visvesvaraya Technological University**
AEC	Ability Enhancement Course
ASC	Applied Science Course
BSC	Basic Science Course
CIE	Continuous Internal Evaluation
CI	Classroom Instruction
CCA	Continuous Comprehensive Assessment
CGPA	Cumulative Grade Point Average
CUL	Cultural
COE	Centre for Online Education
HSMC	Humanities Studies and Management Course
IPCC	Integrated Professional Core Course
LI	Laboratory Instruction
L	Lecture
NCMC	Non-Credit Mandatory Course
NSS	National Service Scheme
NPTEL	National Programme for Technical Enhanced Learning
OEC	Open Elective (Interdepartmental or interdisciplinary) Course

PCC	Professional Core Course
PCCL	Professional Core Course Laboratory
PEC	Professional Elective Courses
PE	Physical Education
P	Practical
SEC	Skill Enhancement Courses
SEE	Semester End Evaluation
SL	Self-Learning
SGPA	Semester Grade Point Average
SWAYAM	Study Webs of Active-Learning for Young Aspiring Minds
TW	Term Work
T	Tutorial
VTU online	VTU online courses offered by Centre for Online Education,
YOG	Yoga

II. Credit Representation

1-hour Lecture (L) per week=1Credit

2-hoursTutorial(T) per week=1Credit

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

Teaching & Learning Scheme
As per the new National Credit Framework (NCrF), 30 hours of learning of a student is considered equivalent to 1 credit. A semester is considered as a 14-week period of academic interaction with students. The learning components are categorized as follows: 1. **Classroom Instruction (CI):** Includes different instructional / implementation strategies i.e. Lecture (L), Tutorial (T), Case method, Demonstrations, Video demonstration, Problem based learning etc. to deliver theoretical concepts within the classroom measured in Number of hours per semester. 2. **Laboratory Instruction (LI):** Expressed as number of hours per semester which Includes experiments / practical performances / problem-based experiences in laboratory, workshop, field or other locations using different instructional / Implementation strategies. 3. **Term work (TW):** Includes assignments, seminars, presentations, case studies, micro projects, field activities, industrial visits, academic preparation duration and any other student activities in Number of hours per semester. 4. **Self-Learning (SL):** MOOCs (SWAYAM/NPTEL/Industry certified courses), spoken tutorials, online educational resources, self-initiated projects, Learning through digital resources etc in Number of hours per semester. (If provided in curriculum structure).

	Course Details	
1.	**One Credit Theory Courses:**	
	Teaching-Learning sessions in a semester	14 hours
	Examination pattern for CIE and SEE	Multiple Choice Question (MCQ)
	Teaching hours per week - L:T:P	1:0:0
2.	**One Credit Laboratory Courses:**	
	Teaching-Learning sessions in a semester	28 hours (2 hours session /week)
	Examination pattern for CIE and SEE	Continuous assessments, lab Internal test and SEE
	Teaching hours per week - L:T:P	0:0:2
3.	**Two Credit Theory Courses:**	
	Teaching-Learning Sessions in a semester	28 hours

	Examination pattern for CIE and SEE	Descriptive
	Teaching hours per week - L:T:P	2:0:0
4.	**Three Credit ESC/ETC/PCC/PEC/OEC Courses:**	
	Teaching-Learning Sessions in a semester	42 hours
	Examination pattern for CIE and SEE	Descriptive
	Teaching hours per week for theory courses - L:T:P	3:0:0
5.	**Four Credit Program Core Courses (PCC):**	
	Teaching-Learning Sessions in a semester	56 hours
	Examination pattern for CIE and SEE	Descriptive
	Teaching hours per week for theory courses - L:T:P	4:0:0
6.	**Four Credit Integrated Professional Core Courses (IPCC):**	
	Teaching-Learning Sessions in a semester (Teaching sessions: 42 hours + Practical sessions: 28 hours)	70 hours
	Examination pattern for CIE and SEE	Descriptive
	Practical part of examination	CIE (No SEE).
	Teaching hours per week - L: T: P	3: 0: 2

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) 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.

(5) 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.

(6) 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.

(7) 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.

(8) 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. Ability Enhancement Project (AEP) / Skill Development Project (SDP)

An Ability Enhancement Project (AEP) or Skill Development Project (SDP) is a focused project aimed at enhancing specific skills or abilities in a particular domain. It's designed to bridge the gap between theoretical knowledge and practical application.

Key Objectives:

1. Develop practical skills relevant to the industry or field.
2. Enhance problem-solving, critical thinking, and analytical abilities.
3. Improve communication, teamwork, and collaboration skills.
4. Apply theoretical concepts to real-world problems or scenarios.
5. Foster creativity, innovation, and entrepreneurship.

Characteristics:

1. Practical and hands-on approach.
2. Industry-relevant skills and tools.
3. Mentorship and guidance.
4. Opportunity to work on real-world projects or case studies.
5. Emphasis on skill development and enhancement.