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	28	28		34	90	03	50	50	100	3
2	IPCC	1MMC102	Database Management Systems (DBMS)	42		28	20	90	03	50	50	100	4
3	PCC	1MMC103	Unix and Shell Programming	42			48	90	03	50	50	100	3
4	PCC	1MMC104	Data Structures and Algorithms	42			48	90	03	50	50	100	3
5	PCC	1MMC105	Operating System	42			48	90	03	50	50	100	3
6	PCC	1MMC106	Java Programming	42			48	90	03	50	50	100	3
7	PCCL	1MMCL107	Data Structures and Algorithms Lab	0		28	02	30	03	50	50	100	1
8	PCCL	1MMCL108	Web Programming Lab	0		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**	**21**

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 and Data Analytics	42			48	90	03	50	50	100	3
2	IPCC	1MMC202	Full Stack Development	42		28	50	120	03	50	50	100	4
3	PCC	1MMC203	Software Engineering and Design Patterns	42			48	90	03	50	50	100	3
4	PCC	1MMC204	Computer Networks	42			48	90	03	50	50	100	3
5	PCC	1MMC205	Mobile Application Development	42			48	90	03	50	50	100	3
6	PEC	1MMC206x	Professional Elective I	42			48	90	03	50	50	100	3
7	PCCL	1MMCL207	Machine Learning and Data Analytics Lab	0	00	28	02	30	03	50	50	100	1
8	PCCL	1MMCL208	Mobile Application Development Lab	0	00	28	02	30	03	50	50	100	1
9	NCMC	1MAEC209	Ability Enhancement Course with Seminar										PP
									Total	**400**	**400**	**800**	**21**

PEC-I	
Code	**Title of the Course**
1MMC206A	Cyber Security
1MMC206B	Content Management System
1MMC206C	Big Data Analytics
1MMC206D	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	PCC	1MMC301	Devops	42			48	90	03	50	50	100	3
2	IPCC	1MMC302	Internet of Things	42		28	50	120	03	50	50	100	4
3	PCC	1MMC303	Cloud Computing	42			48	90	03	50	50	100	3
4	PEC	1MMC304x	Professional Elective II	42			48	90	03	50	50	100	3
5	PEC	1MMC305x	Professional Elective III	42			48	90	03	50	50	100	3
6	PROJ	1MMCP306	Project Work			98	112	210	03	100	100	100	7
									Total	**350**	**350**	**700**	**23**

Professional Elective Courses (PECs)			
PEC-II		**PEC-III**	
Code	**Title of the Course**	**Code**	**Title of the Course**
1MMC304A	Cryptography and Network Security	1MMC305A	Wireless Network and Mobile Computing
1MMC304B	Natural Language Processing	1MMC305B	Software Quality Assurance
1MMC304C	Augmented and Virtual Reality	1MMC305C	Agile Software Development
1MMC304D	Generative AI	1MMC305D	Digital Forensics

Project work is aimed at fostering research, practical application of knowledge, and innovation. The evaluation process follows these steps:

1. Selection and Approval of Project Work:

• Topic Selection: Students propose project topics, often in consultation with their faculty advisor.

• Approval Process: The proposed topic is submitted for approval by a project committee or department, ensuring alignment with academic standards and relevance.

2. Project Execution:

• Research and Development: Students carry out research, experiments, or development work as per the project plan.

3. Submission of the Project Report:

• Format and Guidelines: The report must follow the prescribed format by the university/department.

• Plagiarism Check: The report is often checked for plagiarism to ensure originality.

4. Evaluation Process:

• Internal Evaluation: Faculty members from the department review the project report and presentation for content quality, innovation, and depth of research.

• External Evaluation: An external examiner, often an industry expert or academician from another institution, reviews the project.

• Viva Voce Examination: The student defends their project work before a panel comprising internal and external examiners. This assesses their understanding, analytical ability, and application of the project work.

5. Grading Criteria (Guidelines only)

• Report Quality: Depth of research, organization, and clarity of the document.

• Presentation Skills: Effectiveness in communicating key aspects of the project.

• Technical Merit: Innovation, accuracy, and the applicability of the research.

• Viva Performance: Understanding of the subject, responses to questions, and ability to discuss the work effectively.

6. Final Outcome:

• Marks Allocation: Typically, evaluation is a blend of internal (guided by the department) and external (examiner's input) assessments, distributed over the report, presentation, and viva.

• Pass Requirement: Students must meet a minimum threshold to pass, as per university policies.

This structured evaluation ensures a comprehensive assessment of the student's practical and research capabilities, preparing them for further research or professional practice.

• Periodic Reviews: Regular progress reviews are conducted by faculty to monitor the project's progress and provide feedback.

• Documentation: Students maintain a detailed record of their methodology, data, results, and analysis.

	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	1MMC401	Online Course (12 weeks)						03	50	50	100	3
2	INT	1MMCI402	Research Internship /Industry-Internship / Startup Internship	15 weeks of internship (24 hours per week)					03	100	100	200	12
									Total	**150**	**150**	**300**	**15**

INT: Industry/ Research Internship leading to the project work /startup

Industry Internship: The main objective of the industry internship is to ensure that the intern is exposed to a real-world environment and gain practical experience. Often, it may be a practical exposure to the theory that has been learned during the academic period. The industry internship helps students understand of analytical concepts and tools, hone their skills in real-life situations, and build confidence in applying the skills learned.

Research Internship: A research internship is an opportunity for students or early career professionals to gain hands-on experience in conducting research under the guidance of a mentor or within a research team. These internships can take place in academic institutions, research organizations, government agencies, or private companies

Research /Industry Internship: In the fifth-semester Students have to be in touch with a guide/mentor/coordinator and regularly submit the report referred to the progress internship. Based on the progress report the Guide/Mentor/coordinator has to enter the CIE marks. He/she has to attend the SEE at the parent Institute.

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.