

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI
Scheme of Teaching and Examinations: 2026 - 27
MASTER OF COMPUTER APPLICATIONS (MCA)
Choice Based Credit System (CBCS) and Outcome Based Education (OBE)

II SEMESTER (Core Courses and Specialization Courses)

Sl. No.	Course	Subject Code				Teaching & Learning Hours scheme					Examination				Credits
		Cyber Security	Data Science	Internet of Things	Enterprise Application Development	L	T	P	TW&SL	Total Hours /Sem	Duration in hours	CIE Marks	SEE Marks	Total Marks	
1	PCC*	1MMC201*	1MMC201*	1MMC201*	1MMC201*	56			64	120	03	50	50	100	4
2	PCC*	1MMC202*	1MMC202*	1MMC202*	1MMC202*	42			48	90	03	50	50	100	3
3	PEC	1MCR203	1MDS203	1MOT203	1MED203	42			48	90	03	50	50	100	3
4	PEC	1MCR204	1MDS204	1MOT204	1MED204	42			48	90	03	50	50	100	3
5	PEC	1MCRL205	1MDSL205	1MOTL205	1MEDL205		28	28	04	60	03	50	50	100	2
6	PEC	1MCRL206	1MDSL206	1MOTL206	1MEDL206			28	02	30	03	50	50	100	1
7	PEC	1MCRL207	1MDSL207	1MOTL207	1MEDL207			28	02	30	03	50	50	100	1
8	AEC	1MCRL208	1MDSL208	1MOTL208	1MEDL208			28	02	30	03	100	-	100	1
Total											18	450	350	800	18
Note: PCC*: Professional Core Course, PEC: Professional Elective Course, IPCC-Integrated Professional Core Courses, IPEC – Integrated Professional Elective Courses															

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II SEMESTER
Core Courses

Subject Code	Title of the Subject	Subject Code	Title of the Subject	Subject Code	Title of the Subject	Subject Code	Title of the Subject
1MMC201*	Computer Networks and Security	1MMC201*	Computer Networks and Security	1MMC201*	Computer Networks and Security	1MMC201*	Computer Networks and Security
1MMC202*	Software Architecture	1MMC202*	Software Architecture	1MMC202*	Software Architecture	1MMC202*	Software Architecture

Specialisation Courses

Cyber Security Professional Elective Courses		Data Science Professional Elective Courses		Internet of Things Professional Elective Courses		Enterprise Application Development Professional Elective Courses	
1MCR203	Elements of Cyber Security	1MDS203	Data Engineering	1MOT203	Embedded Software Development	1MED203	Enterprise Application Architecture
1MCR204	AI for Cyber Security	1MDS204	Data Mining & Data Warehousing	1MOT204	Cloud and Edge Computing for IoT	1MED204	Java Enterprise Programming
1MCRL205	Cryptosystems Lab	1MDSL205	Statistical Machine Learning Lab	1MOTL205	Electronics Lab	1MEDL205	AI for Enterprise Applications Lab
1MCRL206	Cyber Security Lab	1MDSL206	Python for Data Analytics Lab	1MOTL206	Embedded Software Development Lab	1MEDL206	Java Enterprise Programming Lab
1MCRL207	Network Programming and Security Lab	1MDSL207	Cloud Data Science Lab	1MOTL207	Computer Networks and IoT Protocols Lab	1MEDL207	Software Automation Testing Lab
1MCRL208	Ethical Hacking Lab	1MDSL208	No SQL Lab	1MOTL208	Computing Systems from First Principles Lab	1MEDL208	UI/UX Lab

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III SEMESTER (Core Courses and Specialization Courses)

Sl. No.	Course	Subject Code				Teaching & Learning Hours scheme					Examination				Credits
		Cyber Security	Data Science	Internet of Things	Enterprise Application Development	L	T	P	TW&SL	Total Hours /Sem	Duration in hours	CIE Marks	SEE Marks	Total Marks	
1	PEC	1MCR301	1MDS301	1MOT301	1MED301	42		28	50	120	03	50	50	100	4
2	PEC	1MCR302	1MDS302	1MOT302	1MED302	42			48	90	03	50	50	100	3
3	PEC	1MCR303	1MDS303	1MOT303	1MED303	42		28	50	120	03	50	50	100	4
4	PEC	1MCR304	1MDS304	1MOT304	1MED304	42			48	90	03	50	50	100	3
5	PEC	1MCRL305	1MDSL305	1MOTL305	1MEDL305		28	28	04	60	03	50	50	100	2
6	PCC*/SEC *	1MMC306*	1MMC306*	1MMC306*	1MMC306*					210	03	100	100	200	8
Total												350	350	700	24
Note: PCC*: Professional Core Course, PEC: Professional Elective Course, IPCC-Integrated Professional Core Courses, IPEC-Integrated Professional Elective Courses, SDC-Skill Enhancement Course															

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III SEMESTER

Specialisation Courses

Cyber Security Professional Elective Courses		Data Science Professional Elective Courses		Internet of Things Professional Elective Courses		Enterprise Application Development Professional Elective Courses	
1MCR301	Vulnerability and Penetration Testing	1MDS301	Big Data Analytics	1MOT301	Industrial Internet of Things Systems	1MED301	Devops for Enterprise Applications
1MCR302	Blockchain Technology	1MDS302	Optimization Techniques for Analytics	1MOT302	IoT Security and Privacy	1MED302	Low-code / No-code Enterprise Platforms
1MCR303	Digital Forensics	1MDS303	Information Retrieval and Natural Language Processing	1MOT303	Vision Computing for Intelligent IoT Systems	1MED303	Cloud Native Enterprise Applications
1MCR304	LLM and Agentic AI Security	1MDS304	IoT and AI Analytics	1MOT304	Generative AI for Intelligent Systems	1MED304	Enterprise Application Security
1MCRL305	Security Operations and SIEM Lab	1MDSL305	Intelligent Systems and Data Science Lab	1MOTL305	IoT Systems Integration and Deployment Lab	1MEDL305	API Engineering Lab
1MMC306*	Project Work	1MMC306*	Project Work	1MMC306*	Project Work	1MMC306*	Project Work

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IV SEMESTER (Core Courses and Dual Specialization Courses)

Sl. No.	Course	Subject Code				Teaching & Learning Hours scheme					Examination				Credit s
		Cyber Security	Data Science	Internet of Things	Enterprise Application Development	L	T	P	TW&SL	Total Hours /Sem	Du ratio n in ho ur s	CI E Ma rk s	SEE Mar ks	Total Mar ks	
1	PEC	1MCR401	1MDS401	1MOT401	1MED401	Online Evaluation					03	50	50	100	3
2	PEC	1MCR402	1MDS402	1MOT402	1MED402	Online Evaluation					03	50	50	100	3
3	PCC*/ SEC*	1MMC403	1MMC403	1MMC403	1MMC403	Internship (15 weeks)			360		03	100	100	200	9
Total												200	200	400	15

Note: PCC*: Professional Core Course, PEC: Professional Elective Course. The online Courses must be domain/specialization specific.

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IV SEMESTER

Specialisation Courses

Cyber Security Professional Elective Courses		Data Science Professional Elective Courses		Internet of Things Professional Elective Courses		Enterprise Application Development Professional Elective Courses	
1MCR401	VTU/NPTEL Online Course	1MDS401	VTU/NPTEL Online Course	1MOT401	VTU/NPTEL Online Course	1MED401	VTU/NPTEL Online Course
1MCR402	VTU/NPTEL Online Course	1MDS402	VTU/NPTEL Online Course	1MOT402	VTU/NPTEL Online Course	1MED402	VTU/NPTEL Online Course
1MMC403*	Internship	1MMC403*	Internship	1MMC403*	Internship	1MMC403*	Internship

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.

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:

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.

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.

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.

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.

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.

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.

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>.

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 Course	VTU online courses offered by Centre for Online Education, Mysuru
YOG	Yoga

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

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:

- 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.
- 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.
- 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.
- 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.