



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-
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CIRCULAR

- Subject: Syllabus of Mathematics Bridge Course for MCA admitted students 2022 Scheme
- Reference: 1) AICTE Approval Process Hand Book 2023-24
2) KEA PG CET 2023 Information Bulletin dated 07-08-2023
3) Joint Board of Studies Proceedings dated 21-06-2024
4) 178th E.C. Resolution No. 2.2.1 dated 17-07-2024

The students who have completed undergraduate studies with a Mathematics course/subject at the 10+2 or degree level are eligible for admission to the MCA program. However, some students seek admission to the MCA program without having studied Mathematics at either of these levels. To support these students, the Board of Studies has introduced a bridge course designed to cover the necessary prerequisite mathematical knowledge for the MCA program.

Students required to take this bridge course must study and pass it in the 1st semester. Please note that this course will not count toward vertical progression. The syllabus for this course is enclosed with this Circular.

You are requested to ensure that all relevant faculty members and students are informed of the contents of this Circular for compliance.

This Circular applies to students admitted from the academic year 2024-25 onwards.

Encl: Syllabus

[Handwritten Signature]
REGISTRAR
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To,

- The Principals of All Engineering Colleges under the ambit of the University
- The Chairperson/s University Departments at Belagavi, Kalburgi, Mysuru, Bengaluru(Muddenhalli), Talakal.

Copy to:

- The Vice-Chancellor through the secretary to the VC for information.
- The Registrar (Evaluation) VTU Belagavi for information
- The Director(I/c) ITI SMU VTU Belagavi for information and to upload the circular on the VTU web portal.
- The Special Officer QPDS, Examination Section VTU Belagavi for information and needful
- Office Copy

(Mandatory Learning Course)			
A bridge course for B.Com & BA graduates joined for MCA Programme			
Course Title:	Mathematics Bridge Course for MCA Program		
Course Code:	MMAT108	CIE Marks	100
Teaching Hours/Week (L:T:P:S)	3:0:0:0	Total Marks	100
Total Hours of Pedagogy	40		
Course objectives:			
Course objectives: The mandatory learning course XXXXXXXXX viz., Mathematics Bridge Course for MCA aims to provide basic concepts of Sets, Relations, Logic, Matrices & Determinants, Sequences & Series and Probability Theory.			
Teaching-Learning Process (General Instructions)			
These are sample Strategies; which teachers can use to accelerate the attainment of the various course outcomes.			
<ul style="list-style-type: none"> ➤ The lecture method (L) need not be only the traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes. ➤ Use of Video/Animation to explain the functioning of various concepts. ➤ Encourage collaborative (Group Learning) Learning in the class. ➤ Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking. ➤ Adopt Problem-Based Learning (PBL), which fosters students' Analytical skills, and develops design thinking skills such as the ability to design, evaluate, generalize, and analyse information rather than simply recall it. ➤ Show the different ways to solve the same problem and encourage the students to come up with creative ways to solve them. ➤ Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding. 			
Module-1: Set Theory (8 hours)			
Introduction. Representation of sets, Types of Sets, Finite set, Infinite set, equivalent set, disjoint set, Subset, Power set. Venn diagram. Set operations: Union, Intersection, Complement of a set, Difference, Symmetric Difference. Laws of set theory. Cartesian product of sets, Relations and properties.			
Module-2: Logic and Propositions (8 hours)			
Logic Statement, Propositions, Connectives, Basic Logic Operations: Conjunction, Disjunction, Negation, Implication and Double Implication. Truth table, Logical Equivalence/Equivalent Statements, Tautologies and Contradictions.			
Module-3: Matrices and Determinants(8 hours)			
Matrix Introduction, Types of matrices, Scalar multiplication, Addition of matrices, Product of matrices. Transpose of a matrix, Symmetric and Skew Symmetric matrix, Rank of a matrix, Determinant of a matrix. Singular matrix.			
Module-4: Sequence and Series(8 hours)			
Introduction, Sequences, Series, Arithmetic Progression, Sum of Finite number of terms in A.P, Arithmetic Means, Geometric Progression, sum to n terms of G.P, Geometric Mean, relation between A.M and G.M.			
Module-5: Probability Theory (8 hours)			

Probability: Introduction, random experiments, sample space, events and algebra of events. Definitions of Probability – classical, and axiomatic. Conditional Probability, laws of addition and multiplication, independent events, theorem of total probability, Bayes’ theorem and its applications.

Assessment Details (CIE)

The weightage of Continuous Internal Evaluation (CIE) is 100%. The minimum passing mark for the CIE is 40% of the maximum mark (100). A student shall be deemed to have satisfied the academic requirements if the student secures not less than 40% (40 Marks out of 100) in the CIE.

Continuous Internal Evaluation:

Three Unit Tests each of 20 Marks (duration 01 hour)

1. The first test at the end of 5th week of the semester
2. The second test at the end of the 10th week of the semester
3. Third test at the end of the 15th week of the semester

Two assignments each of 10 Marks:

4. First assignment at the end of the 4th week of the semester
5. Second assignment at the end of the 9th week of the semester

Course Seminar suitably planned to attain the COs and POs for 20 Marks (duration 01 hours).

The sum of three tests, two assignments, and a seminar will be out of 100 marks The student shall secure a minimum of 40% of marks of the course to qualify and become eligible for the award of a degree.

Course outcome (Course Skill Set)

At the end of the course, the student will be able to:

CO1	Widen the knowledge of Basic concepts in Set Theory and Apply the fundamentals of set theory and Relations to the given problem
CO2	Understand mathematical reasoning to read, comprehend and construct mathematical arguments
CO3	Understand the Basic Concepts in Matrices and Formulate the problems in Matrix expression
CO4	Determine the sum of the first n terms of an arithmetic and Geometric series
CO5	Get the basic concepts of probability and find the probability of simple and compound events

Suggested Learning Resources: Books

1. Kenneth H Rosen, “Discrete Mathematics and its Applications”, McGraw Hill publications, 7th edition.
2. Walpole Myers Ye “Probability and Statistics for engineers and Scientist” Pearson Education, 8th edition.
3. Richard A Johnson and C. B Gupta “Probability and statistics for engineers” Pearson Education.
4. J.K Sharma “Discrete Mathematics”, Mac Millan Publishers India, 3rd edition,2011.
5. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 43rd Edition, 2015.

Web links and Video Lectures (e-Resources):

- <http://.ac.in/courses.php?disciplineID=111>
- [http://www.class-central.com/subject/math\(MOOCs\)](http://www.class-central.com/subject/math(MOOCs))
- <http://academicearth.org/>
- VTU EDUSAT PROGRAMME-20

Activity-Based Learning (Suggested Activities in Class)/ Practical Based learning

- Quiz
- Group assignment
- Seminars

VISVESVARAYA TECHNOLOGICAL UNIVERSITY
BELAGAVI-590018



Scheme of Teaching and Examinations

Master of Computer Application (MCA)

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

I SEMESTER (MCA)											
Sl. No	Course Type	Course Code	Course Title	Teaching Hours per Week			Examination				Credits
				Theory	Practical/Seminar	Tutorial/SDA	Duration in hours	CIE Marks	SEE Marks	Total Marks	
				L	P	T/SDA					
1	IPCC	MMC101	Programming and Problem-Solving in C	2	2	0	03	50	50	100	4
2	BSC	MMC102	Discrete Mathematics and Graph Theory	2	0	1	03	50	50	100	3
3	PCC	MMC103	Database Management Systems (DBMS)	3	0	0	03	50	50	100	3
4	PCC	MMC104	Operating System	2	0	1	03	50	50	100	3
5	PCC	MMC105	Web Technologies	3	0	0	03	50	50	100	3
6	PCCL	MMCL106	DBMS and Web Technologies Laboratory	0	2	2	03	50	50	100	2
7	NCMC	MRMI107	Research Methodology and IPR (Online)	Online courses (online.vtu.ac.in)							PP
8	NCMC	MMAT108	Mathematics for MCA Students	2	2	0	03	100	-	100	PP
Total								300	300	600	18
<p>Note: BSC-Basic Science Courses, PCC: Professional core. IPCC-Integrated Professional Core Courses, PCC(PB): Professional Core Courses (Project Based), PCCL-Professional Core Course lab ,NCMC- None Credit Mandatory Course, L-Lecture, P-Practical, T/SDA-Tutorial / Skill Development Activities(Hours are for Interaction between faculty and students) MRMI107- Research Methodology and IPR (Online) for the students who have not studied this course in the Undergraduate level. This course is not counted for vertical progression, Students have to qualify for the award of the master's degree.</p> <p>BSC: Basic Science Courses: Courses like Mathematics/ Science are the prerequisite courses that the concerned engineering stream board of Studies will decide. PCC: Professional Core Course: Courses related to the stream of engineering, which will have both CIE and SEE components, students have to qualify in the course for the award of the degree. Integrated Professional Core Course (IPCC): Refers to a Professional Theory Core Course Integrated with practicals of the same course. The IPCC's theory part shall be evaluated by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper. Project Based Learning Course (PCC(PB)): Project Based Learning course is a professional core Course only Students have to complete a project out of learning from the course and SEE will be viva voce on project work. PCCL: Professional Core Course Laboratory: Practical courses whose CIE will be evaluated by the class teacher and SEE will be evaluated by the two examiners.</p> <p>Skill development activities: Under Skill development activities in a concerning course, the students should</p> <ol style="list-style-type: none"> 1. Interact with industry (small, medium, and large). 2. Involve in research/testing/projects to understand their problems and help creative and innovative methods to solve the problem. 3. Involve in case studies and field visits/ fieldwork. 4. Accustom to the use of standards/codes etc., to narrow the gap between academia and industry. 5. Handle advanced instruments to enhance technical talent. 											

6. Gain confidence in the modeling of systems and algorithms for transient and steady-state operations, thermal study, etc.
7. Work on different software/s (tools) to simulate, analyze and authenticate the output to interpret and conclude.

All activities should enhance student's abilities to employment and/or self-employment opportunities, management skills, Statistical analysis, fiscal expertise, etc. Students and the course instructor/s are to be involved either individually or in groups to interact together to enhance the learning and application skills of the study they have undertaken. The students with the help of the course teacher can take up relevant technical –activities that will enhance their skills. The prepared report shall be evaluated for CIE marks.

MRMI107-Research Methodology and IPR- None Credit Mandatory Course (NMC) if students have not studied this course in their undergraduate program then he /she has to take this course at <http://online.vtu.ac.in> and to qualify for this course is compulsory before completion of the minimum duration of the program (Two years), however, this course will not be considered for vertical progression.

Bridge Course: Non-Credit Mandatory Course MMAT108-Mathematics for MCA Students: Students who have not taken Mathematics at the **10+2 or degree level** are required to study and pass this course in the 1st semester. However, this course/subject will not be considered for vertical progression.

II SEMESTER (MCA)											
Sl. No	Course Type	Course Code	Course Title	Teaching Hours per Week			Examination				Credits
				Theory	Practical/Seminar	Tutorial/SDA	Duration in hours	CIE Marks	SEE Marks	Total Marks	
				L	P	T/SDA					
1	IPCC	MMC201	Machine Learning and Data Analytics using python	2	2	0	03	50	50	100	4
2	PCC	MMC202	Object Oriented Programming using JAVA	4	0	0	03	50	50	100	4
3	PCC	MMC203	Data Structure and Algorithms	4	0	0	03	50	50	100	4
4	PCC	MMC204	Software Engineering	2	0	1	03	50	50	100	3
5	PCC	MMC205	Web Application Development	2	1	0	03	50	50	100	3
6	PCCL	MMCL206	Object Oriented Programming using JAVA Laboratory	0	2	0	03	50	50	100	2
7	PCCL	MMCL207	Data Structure and Algorithms Laboratory	0	2	2	03	50	50	100	2
8	NCMC	MAEC258	Ability Enhancement Courses with Seminar-I								PP
Total								300	300	600	22

Note: **BSC**-Basic Science Courses, **PCC**: Professional core. **IPCC**-Integrated Professional Core Courses, **PCC(PB)**: Professional Core Courses (Project Based), **PCCL**-Professional Core Course lab ,**NCMC**- None Credit Mandatory Course, **L**-Lecture, **P**-Practical, **T/SDA**-Tutorial / Skill Development Activities(Hours are for Interaction between faculty and students) **MRMI107**- Research Methodology and IPR (**Online**) for the students who have **not studied** this course in the Undergraduate level. This course is not counted for vertical progression, Students have to qualify for the award of the master's degree.

BSC: Basic Science Courses: Courses like Mathematics/ Science are the prerequisite courses that the concerned engineering stream board of Studies will decide. **PCC: Professional Core Course:** Courses related to the stream of engineering, which will have both CIE and SEE components, students have to qualify in the course for the award of the degree. **Integrated Professional Core Course (IPCC):** Refers to a Professional Theory Core Course Integrated with practicals of the same course. The IPCC's theory part shall be evaluated by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper. **Project Based Learning Course (PCC(PB)):** Project Based Learning course is a professional core Course only Students have to complete a project out of learning from the course and SEE will be viva voce on project work. **PCCL: Professional Core Course Laboratory:** Practical courses whose CIE will be evaluated by the class teacher and SEE will be evaluated by the two examiners.

Skill development activities: Under Skill development activities in a concerning course, the students should

1. Interact with industry (small, medium, and large).
2. Involve in research/testing/projects to understand their problems and help creative and innovative methods to solve the problem.
3. Involve in case studies and field visits/ fieldwork.
4. Accustom to the use of standards/codes etc., to narrow the gap between academia and industry.
5. Handle advanced instruments to enhance technical talent.
6. Gain confidence in the modeling of systems and algorithms for transient and steady-state operations, thermal study, etc.

7. Work on different software/s (tools) to simulate, analyze, and authenticate the output to interpret and conclude.

All activities should enhance student's abilities to employment and/or self-employment opportunities, management skills, Statistical analysis, fiscal expertise, etc. Students and the course instructor/s are to be involved either individually or in groups to interact together to enhance the learning and application skills of the study they have undertaken. The students with the help of the course teacher can take up relevant technical –activities that will enhance their skills. The prepared report shall be evaluated for CIE marks.

MAEC258- Ability Enhancement Courses with Seminar-I - None Credit Mandatory Course (NMC), Students have to select the Topic like ERP, R Programming, Scripting language, Web Development Application, etc. They have to develop a small prototype and demonstrate to all the class.

III SEMESTER (B)											
Sl. No	Course	Course Code	Course Title	Teaching Hours /Week			Examination			Credits	
				Theory	Practical/ Mini-Project/ Internship	Tutorial/ Skill Development Activities	Duration in hours	CIE Marks	SEE Marks		Total Marks
				L	P	SDA					
1	PEC	MMCx311x	Specializations	3	0		03	50	50	100	3
2	PEC	MMCx311x	Specializations	3	0		03	50	50	100	3
3	PEC	MMCx311x	Specializations	3	0		03	50	50	100	3
4	PROJ	MPRJ384	Project Work	25-30 hours per week			03	100	100	200	15
TOTAL							12	250	250	500	24

Students can **opt** three specialisations from the listed below:

Specializations

Specialization	Data Science and Analytics(A)	Specialization	Web Application Development(B)	Specialization	Network and System Administration(C)
Course Code	Course Title	Course Code	Course Title	Course Code	
MMCA311A	Data Mining and Visualization	MMCB311A	Web Development using Full Stack Open	MMCC311A	Computer Networks
MMCA311B	Big Data Analytics	MMCB311B	Rich Internet Application Development	MMCC311B	Network and Linux Administration
MMCA311C	Business Data Analytics	MMCB311C	Web Development Using PHP and MySQL	MMCC311C	TCP/IP
MMCA311D	Enterprise Resource Planning	MMCB311D	Enterprise Application Programming	MMCC311D	Unix Shell Programming
MMCA311E	Exploratory Data Analysis	MMCB311E	Advances in Web Technologies	MMCC311E	Cloud Essentials
MMCA311F	Social Media Analytics	MMCB311F	Web Programming using Java	MMCC311F	Introduction to ERP and SAP Basis Administration

Specialization	Software Development and Systems(D)	Specialization	Computer Networks and Cloud(E)
Course Code	Course Title	Course Code	Course Title
MMCD311A	Management Information Systems	MMCE311A	Computer Networks
MMCD311B	Database Design & Applications	MMCE311B	Data Storage Technologies and Networks
MMCD311C	Software Architectures	MMCE311C	Design and Operation of Data Centres
MMCD311D	Computer Organization and Software Systems	MMCE311D	Wireless and Mobile Communication
MMCD311E	Software Design and Patterns	MMCE311E	Software Defined Networks
MMCD311F	Object-oriented Analysis & Design	MMCE311F	Cloud Computing

Specialization	AI and ML(F)	Specialization	IoT(G)	Specialization	Security(H)
Course Code	Course Title	Course Code	Course Title	Course Code	Course Title
MMCF311A	Introduction to Generative AI	MMCG311A	Data Management for IoT	MMCH311A	Ethical Hacking
MMCF311B	Artificial Neural Networks	MMCG311B	Networked Embedded Applications	MMCH311B	Cyber Security
MMCF311C	Natural Language Processing	MMCG311C	Cross Platform Application Development	MMCH311C	Cryptography and Network Security
MMCF311D	Deep Learning Fundamentals	MMCG311D	IoT Technology and Applications	MMCH311D	Blockchain Technologies
MMCF311E	Introduction to Machine Learning	MMCG311E	Communication and Networking Technologies in IoT	MMCH311E	Database & Web Application Security
MMCF311F	Computer Vision	MMCG311F	Software and Programming in IoT	MMCH311F	Mobile and Wireless Security

Project work is a significant component aimed at fostering research, practical application of knowledge, and innovation. The evaluation process generally 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.
- 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.

3. Submission of the Project Report:

- Format and Guidelines: The report must follow the prescribed format by the university or 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.

IV SEMESTER (B)										
Sl. No	Course	Course Code	Course Title	Teaching Hours /Week		Examination				Credits
				Theory	Practical/Field work	Duration in hours	CIE Marks	SEE Marks Viva voce	Total Marks	
				L	P					
1	PEC/MDC	MMC411	(Online Courses)12 weeks duration	--	--	--	--	--	100	3
2	TS	MMC452	Technical Seminar	--	--	03	100	--	100	2
4	INT	MINT483	Research Internship /Industry-Internship / Startup Internship			03	100	100	200	11
TOTAL				--	--	06	200	100	400	16
<p>INT: Industry/ Research Internship leading to the project work /startup PROJ: Project work outcome of Internship (Project Work Phase-II is Viva voce SEE)</p> <p>TS: Technical Seminar: Students can present the seminar based on the new technologies in the seminar by all postgraduate students of the program shall be mandatory. The CIE marks awarded for the Seminar shall be based on the evaluation of the Report, Presentation skill, and performance in the Question and Answer session in the ratio 50:25:25. Seminar shall be considered as a head of passing and shall be considered for the award of degree. Those, who do not take up/ complete shall be declared as fail in the seminar course and have to complete the same during the subsequent semester.</p> <p>Mxxx401: 1 course Online NPTEL can be cumbersome so one research article may be accepted/Published. A patent can be also one option.</p> <p>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.</p> <p>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</p> <p>Research /Industry Internship: In the third-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.</p>										