

**HIMACHAL PRADESH TECHNICAL UNIVERSITY
HAMIRPUR**



Syllabus

of

Bridge Course (For students who have not studied Computer Science at
10+2 level or at Graduation level) for

MCA (Master of Computer Applications)

As per National Education Policy (NEP-2020)

(w.e.f. the Academic Year 2024-2025)

Department of Master of Computer Applications

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School of Computer Science and Engineering

Approved by the Board of Studies

Dean - Academic
H.P. Technical University
Hamirpur - 177 001, HP

Scheme of Bridge Course Teaching and Examination
Master of Computer Applications (MCA)

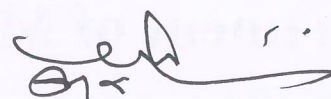
Semester-I

Subject Code	Course Category	Subject Title/ Subject Name	Periods			Credits	Evaluation Scheme
			L	T	P		
MCA-6109	BC	Mathematical Foundations for Computer Science	4	0	0	4	Satisfactory/Unsatisfactory
Total			4	0	0	4	

Legends:	BC -Bridge Course
	L – Lecture
	T – Tutorial
	P – Practical

Note:

- To be qualified for the MCA degree, candidates are required to pass the Bridge course. However, the evaluation, although shown on the final year grade sheet, will not be added to the CGPA/SGPA.
- The students who have passed mathematics as a major subject in graduation/ 10+2 level from a recognized university are not required to do the bridge course in first semester.



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MCA-6109 Mathematical Foundations for Computer Science							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P		C	Internal Assessment	End Semester Examination	
3	0	0	3	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Guidelines: Question paper of end semester examination will be of 60 marks. The question paper will consist of five sections A, B, C, D, E. Sections A, B, C and D will have 2 questions of 12 marks each and Section E has short answer type questions consisting of six parts of 02 marks each. The candidates will attempt five questions in all, i.e. one question each from sections A, B, C, D and the compulsory question from section E. In the question paper, the questions available in sections A, B, C and D will be covered from Unit-I, Unit-II, Unit-III and Unit-IV respectively and Section-E will be covered the whole syllabus. The evaluation of this course will be based on college level.

Course Objectives (COs)

- To make the students familiar with the commonly used mathematics in the field of Computer Science.

Unit I	12 Lectures
Set Introduction: Objectives, Representation of Sets (Roster Method, Set Builder Method). Types of Sets: Null Set, Singleton Set, Finite Set, Infinite Set, Equal Set, Equivalent Set, Disjoint Set, Subset, Proper Subset, Power Set, Universal Set. Set Operation: Union of Set, Intersection of Set, Difference of Set, Symmetric Difference of Set, Universal Sets, Complement of a Set.	
Unit II	12 Lectures
Logic Statement: Introduction, Connectives, Basic Logic Operations (Conjunction, Disjunction, Negation) Logical Equivalence/Equivalent Statements, Tautologies and Contradictions.	
Unit III	12 Lectures
Matrices: Introduction, Types of Matrix (Row Matrix, Column Matrix, Rectangular Matrix, Square Matrix, Diagonal Matrix, Scalar Matrix, Unit Matrix, Comparable Matrix, Equal Matrix), Scalar Multiplication, Negative of Matrix, Addition of Matrix, Difference of two Matrixes, Multiplication of Matrices.	
Unit IV	12 Lectures
Progressions: Introduction, Arithmetic Progression, Sum of Finite number of quantities in A.P, Arithmetic Means, Geometric Progression, Geometric Mean.	

Course Learning Outcomes (CLOs)

- The student will be capable of using the mathematical methods and algorithms learnt for analyzing and solving problems related to computer science.

Suggested Readings

- Discrete Mathematics and Its Applications by Kenneth H. Rosen, Mc Graw Hill, 6th Edition.
- College Mathematics, Schaum's Series, TMH.

Further References

- Elementary Mathematics, Dr. RD Sharma .
- Comprehensive Mathematics, Parmanand Gupta.
- Elements of Mathematics, ML Bhargava.


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Annexure-IX

Scheme of Bridge Compulsory Course Teaching and Examination Master of Computer Applications (MCA)												
Semester-I												
Subject Code	Course Category	Subject Title/ Subject Name	Periods			Credits	Evaluation Scheme					Total
			L	T	P		ESE	Internal Assessment			Total	
								PE	TA	A		
MCA-6109	BCC	Mathematical Foundations for Computer Science	3	0	0	3	60	20	15	05	40	100
Total			3	0	0	3	60	20	15	05	40	100

Non University Examination (NUE)

Legends:	BCC -Bridge Compulsory Course	ESE-End Semester Examination
	PE – Periodical Examination	TA - Teacher's Assessment
	A – Attendance	L – Lecture
	T – Tutorial	P – Practical

Note:

- To be qualified for the MCA degree, candidates are required to pass the Bridge compulsory course which is considered as Non Credit (NC) course. However, the evaluation, although shown on the final year grade sheet, will not be added to the CGPA/SGPA.
- The students who will get 40% marks in both Internal and End Semester Examination, then the student will be awarded Satisfactory(S) grade else the student will be awarded Unsatisfactory(US) grade and have to reappear the examination.
- The students who have passed mathematics as a major subject in Graduation/10+2 level from a recognized university are not required to do the bridge compulsory course in first semester.


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Annexure-IX

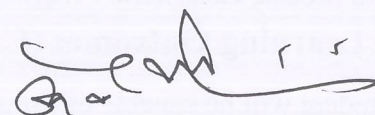
Scheme of Bridge Compulsory Course Teaching and Examination Master of Computer Applications (MCA)												
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Subject Code	Course Category	Subject Title/ Subject Name	Periods			Credits	Evaluation Scheme					Total
			L	T	P		ESE	Internal Assessment				
								PE	TA	A	Total	
MCA-6109	BCC	Mathematical Foundations for Computer Science	3	0	0	3	60	20	15	05	40	100
Total			3	0	0	3	60	20	15	05	40	100

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MCA-6109 Mathematical Foundations for Computer Science

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Course Objectives (COs)

- To make the students familiar with the commonly used mathematics in the field of Computer Science.

Unit I	12 Lectures
Set Introduction: Objectives, Representation of Sets (Roster Method, Set Builder Method). Types of Sets: Null Set, Singleton Set, Finite Set, Infinite Set, Equal Set, Equivalent Set, Disjoint Set, Subset, Proper Subset, Power Set, Universal Set. Set Operation: Union of Set, Intersection of Set, Difference of Set, Symmetric Difference of Set, Universal Sets, Complement of a Set.	
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Course Learning Outcomes (CLOs)

- The student will be capable of using the mathematical methods and algorithms learnt for analyzing and solving problems related to computer science.

Suggested Readings

- Discrete Mathematics and Its Applications by Kenneth H. Rosen, Mc Graw Hill, 6th Edition.
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Further References

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**Scheme of Bridge Compulsory Course Teaching and Examination
Master of Computer Applications (MCA)**

Semester-II

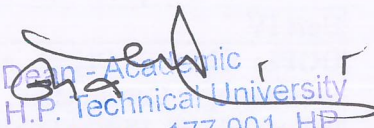
Subject Code	Course Category	Subject Title/ Subject Name	Periods			Credits	Evaluation Scheme				Total	
			L	T	P		ESE	Internal Assessment				
								PE	TA	A		Total
MCA-6210	BCC	Computer Fundamentals and Programming in C++	3	0	0	3	60	20	15	05	40	100
Total			3	0	0	3	60	20	15	05	40	100

Non University Examination (NUE)

Legends:	BCC -Bridge Compulsory Course	ESE-End Semester Examination
	PE – Periodical Examination	TA - Teacher's Assessment
	A – Attendance	L – Lecture
	T – Tutorial	P – Practical

Note:

- To be qualified for the MCA degree, candidates are required to pass the Bridge compulsory course which is considered as Non Credit (NC) course. However, the evaluation, although shown on the final year grade sheet, will not be added to the CGPA/SGPA.
- The students who will get 40% marks in both Internal and End Semester Examination, then the student will be awarded Satisfactory(S) grade else the student will be awarded Unsatisfactory(US) grade and have to reappear the examination.


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MCA-6210 Computer Fundamentals and Programming in C++							
Teaching Scheme			Credit	Marks Distribution			Duration of End Semester Examination
L	T	P		C	Internal Assessment	End Semester Examination	
3	0	0	3	Maximum Marks: 40	Maximum Marks: 60	100	3 Hours
				Minimum Marks: 16	Minimum Marks: 24	40	

Guidelines: Question paper of end semester examination will be of 60 marks. The question paper will consist of five sections A, B, C, D, E. Sections A, B, C and D will have 2 questions of 12 marks each and Section E has short answer type questions consisting of six parts of 02 marks each. The candidates will attempt five questions in all, i.e. one question each from sections A, B, C, D and the compulsory question from section E. In the question paper, the questions available in sections A,B, C and D will be covered from Unit-I, Unit-II, Unit-III and Unit-IV respectively and Section-E will covered the whole syllabus. The evaluation of this course will be based on college level.

Course Objectives (COs)

- To make the students familiar with the commonly used computer fundamentals and programming in C++.

Unit I	12 Lectures
Computer Fundamentals: Evolution of computers, Basics of computer and its operation; Functional Components and their interconnections, Classification of Computers. Programming Languages: Machine Language, Assembly Language and High-Level Language. Software Concepts: Types of Software - System Software, Utility Software and Application Software; System Software: Compiler, Interpreter and Assembler; Need and Functions of Operating System.	
Unit II	12 Lectures
Number System, Codes and Memories: Binary, Octal, Decimal and Hexadecimal Number System and their Inter Conversion; BCD and ASCII Codes, Processor Clock Speed (MHz, GHz), 16-bit, 32 bit and 64-bit processors. Storage Units: Byte, Kilo Byte, Mega Byte, Giga Byte, Tera Byte, etc. Memory Types: Cache, RAM, ROM, Secondary Memory –Internal and External storage.	
Unit III	12 Lectures
Introduction to C++: C++ character set, C++ Tokens, Operators, Structure of a C++ Program, Header files cout, cin, use of I/O operators, Error Messages, Use of editor, basic commands of editor, compilation, linking and execution. Basics: Concept of Data types, Operator, Precedence of Operators, Automatic type conversion in expressions. Conditional & Looping statements, Arrays, Functions.	
Unit IV	12 Lectures
OOPS: Class & Object, accessing the members of class, Access specifier, inline function, function overloading, Construction, Types of Constructor, Destructor, Inheritance, Types of Inheritance, Polymorphism, Virtual Function.	

Course Learning Outcomes (CLOs)

- The student will be able to understand the computer fundamentals and programming fundamentals using C++.
- The student will get an overall view of concepts in C++ with OOPS.

Suggested Readings

- Foster and Foster “C by Discovery” RRI Penram.
- Bjarne Stroustrup “The C++ Programming Language” Pearson Education.

Further References

- E.Balagurusamy “Programming in C++” Tata McGraw Hill.
- Herbert Schild “C++ The complete Reference” Tata McGraw Hill.


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9. Bridge Compulsory Course

- This Bridge Compulsory course is for the students who have not studied Computer Science at 10+2 level or at Graduation level.
- To be qualified for the MCA degree, candidates are required to pass the Bridge compulsory course which is considered as Non Credit (NC) course. However, the evaluation, although shown on the final year grade sheet, will not be added to the CGPA/SGPA.
- The students who will get 40% marks in both Internal and End Semester Examination, then the student will be awarded Satisfactory(S) grade else the student will be awarded Unsatisfactory(US) grade and have to reappear the examination.
- The Students have to study Mathematical Foundations for Computer Science as a subject in first semester and in second semester Computer fundamentals and programming in c++.
- The students who have passed mathematics as a major subject in Graduation/10+2 level from a recognized university are not required to do the bridge compulsory course in first semester.
- The syllabus and the credit scheme for the bridge compulsory course are given in annexure IX.


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