14/02/22

PUNJABI UNIVERSITY, PATIALA

OUTLINES OF TESTS, SYLLABI AND COURSES OF READINGS

FOR

M.Sc. (IT) FIRST YEAR (SEMESTER SYSTEM)

(Programme Code MITM2PUP)

SEMESTERI & II

(Sessions 2022-23& 2023-2024)

(As per RUSA Guidelines)

PUNJABI UNIVERSITY,
PATIALA 147002

SYLLABI, OUTLINES OF PAPERS AND TESTS FOR

M.Sc. (IT) Semester I
(Programme Code MITM2PUP)
Sessions 2022-23& 2023-2024

Code No.	Title of Paper	Lectures per Week	Univ. Exam. Marks	Int. Ass. Marks
MITM1101T	Introduction to Information Technology and E-Commerce	5	70	30
MITM1102T	Computer Programming Using C	5	70	30
MITM1103T	Web Technology	5	70	30
MITM1104T	Mathematical Foundation of Computer Science	5	70	30
MITM1105L	Programming Lab – I (Based on MITM 1102T)	8	70	30
MITM 1106L	Programming Lab-II (Based on MITM 1103T)	8	70	30

M.Sc. (IT) Semester II
(Programme Code MITM2PUP)
Sessions 2022-23 & 2023-2024

Code No.	Title of Paper	Lectures per Week	Univ. Exam. Marks	Int. Ass. Marks
MITM1201T	Database Management System	5	70	30
MITM1202T	Programming with Python	5	70	30
MITM1203T	Operating System	5	70	30
MITM1204T	Computer Organization and Architecture	5	70	30
MITM1205L	Programming Lab – III(Based on MITM 1201T)	8	70	30
MITM1206L	Programming Lab – IV (Based on MITM 1202T)	8	70	30

CONTINUOUS ASSESSMENT (THEORY PAPERS)

1.	Two tests will be conducted during the Semester. Both the tests will be considered for assessment.	:	60% of the marks allotted for Continuous Assessment
2.	Assignment/Quizzes	:	20% of the marks allotted for Continuous Assessment
3.	Attendance	:	10% of the marks allotted for Continuous Assessment.
4.	Class Participation and behavior	:	10% of the marks allotted for Continuous Assessment.

L T P C
4 1 0 4

MITM1101T : Introduction to Information Technology and E-Commerce

Maximum Marks: 70
Minimum Pass Marks: 35%

Maximum Time: 3 Hrs.
Lectures to be delivered: 45-55

Course Objective: This course is meant to prepare students for work in industry in the information processing fields as well as prepare students for business and computer-related courses. On completion of this course, the students will be able to:

- Have basic knowledge of computer hardware and software;
- Understand business areas to which computers may be applied;
- Provide an introduction to business organisation and information systems;
- Develop the skills in communication, verbal and written, which play an important part in business computing and information processing;

Course Content

SECTION A

Computer Fundamentals: Block structure of a computer, characteristics of computers, problem solving with computers, generations of computers, Classification of computers on the basis of capacity, purpose, and generation.
Number System: Decimal, hexadecimal, and octal systems, conversion from one system to the other.
Binary Arithmetic: Addition, subtraction and multiplication.
Memory types: Magnetic core, RAM, ROM, Secondary, Cache, Input and Output Units: functional characteristics; Overview of storage devices: floppy disk, hard disk, compact disk, tape; Printers: Impact, non-impact. Graphical I/O devices: Light pen, joystick, Mouse, Touch screen; OCR, OMR, MICR

SECTION B

Computer languages: Machine language, assembly language, high level language, 4GL. Compiler, Interpreter, Assembler, System Software, Application Software.
Data Network and Communication: Network types, Transmission Modes, Network topologies,
Internet: Evolution of Internet, E-mail WWW, FTP, TELNET, IRC, Video Conferencing.
E-Commerce: The scope of E commerce, Electronic Market, Electronic Data Interchange, Internet Commerce, Benefits and limitations of E-Commerce, Produce a generic framework for E-Commerce, Architectural framework of Electronic Commerce, Web based E Commerce Architecture.

Pedagogy:
The Instructor is expected to use leading pedagogical approaches in the class room situation, research-based methodology, innovative instructional methods, extensive use of technology in the class room, online modules of MOOCS, and comprehensive assessment practices to strengthen teaching efforts and improve student learning outcomes.
The Instructor of class will engage in a combination of academic reading, analyzing case studies, preparing the weekly assigned readings and exercises, encouraging in class discussions, and live project based learning.

Case/Class Discussion Assignments:
Students will work in groups of up to four to prepare a brief write-up due before the start of each class covering the case study or class material to be discussed in the next session. Questions may include a quantitative analysis of the problem facing the decision-maker in the case.

Class Participation:
Attendance will be taken at each class. Class participation is scored for each student for each class

Text and Readings: Students should focus on material presented in lectures. The text should be used to provide further explanation and examples of concepts and techniques discussed in the course:

- P. K. Sinha and P. Sinha, "Foundation of Computers", BPB.
- D. H. Sanders, "Computers Today", McGraw Hill.
- SatishJain,"Information Technology", BPB.
- David Cyganski, John A. Orr, "Information Technology Inside and Outside" Pearson Education.
- V. Rajaraman, "Fundamentals of Computers" Prentice Hall of India.
- B. Ram, "Computer Fundamentals", Wiley.
- Elias. M. Awad, " Electronic Commerce", Prentice-Hall of India Pvt Ltd.
- Ravi Kalakota, Andrew B. Whinston, "Electronic Commerce-A Manager's guide", Addison-Wesley.

Scheme of Examination

- English will be the medium of instruction and examination.
- Written Examinations will be conducted at the end of each Semester as per the Academic Calendar notified in advance
- Each course will carry 100 marks of which 30 marks shall be reserved for internal assessment and the remaining 70 marks for written examination to be held at the end of each semester.
- The duration of written examination for each paper shall be three hours.
- The minimum marks for passing the examination for each semester shall be 35% in aggregate as well as a minimum of 35% marks in the semester-end examination in each paper.
- A minimum of 75% of classroom attendance is required in each subject.

Instructions to the External Paper Setter

The question paper will consist of three Sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 10.5 marks for each question. Section C will consist of 7-15 short answer type questions covering the entire syllabus uniformly and will carry a total of 28 marks.

Instructions for candidates

- Candidates are required to attempt five questions in all, selecting two questions each from section A and B and compulsory question of section C.
- Use of non-programmable scientific calculator is allowed.

L T P C
4 1 0 4

MITM1102T :Computer Programming Using C
Maximum Marks: 70 **Maximum Time: 3 Hrs.**
Minimum Pass Marks: 35% **Lectures to be delivered: 45-55**

Course Objective: This course is designed to explore computing and to show students the art of computer programming. Students will be able to learn Understand programming using C concepts for writing good programs. On completion of this course, the students will be able to

- Write, compile and debug programs in C language.
- Use different data types, operators and console I/O function in a computer program.
- Design programs involving decision control statements, loop control statements and case control structures.
- Understand the implementation of arrays, pointers and functions and apply the dynamics of memory by the use of pointers.

Course Content

SECTION A

Problem Solving with Computers, c character set, identifier, constants, variables, rules for defining variables, Data types, operators: arithmetic, relational, logical, comma, conditional, assignment, arithmetic expressions, input and output statements, assignment statements.

Decision statement: if, if else, nested if, switch statement, break statement, continue statement, go to statement.
Loops and control statements: While loop, for loop and do-while loop, nested loops
Arrays: one dimensional Array, multi-dimensional arrays, array initialization.

SECTION B

Pointers: Pointer data type, pointers and arrays, pointers and functions.
Functions: definition, declaration, function prototype, types of functions, call by value, call by reference, recursion, processing character strings.

Structures: Using structures, arrays of structures and arrays in structures, union
Files in C: Sequential files, random access files, Unformatted files, Text files, binary files.

Pedagogy:
The Instructor is expected to use leading pedagogical approaches in the class room situation, research-based methodology, innovative instructional methods, extensive use of technology in the class room, online modules of MOOCS, and comprehensive assessment practices to strengthen teaching efforts and improve student learning outcomes.
The Instructor of class will engage in a combination of academic reading, analyzing case studies, preparing the weekly assigned readings and exercises, encouraging in class discussions, and live project based learning.

Case/Class Discussion Assignments:
Students will work in groups of up to four to prepare a brief write-up due before the start of each class covering the case study or class material to be discussed in the next session. Questions may include a quantitative analysis of the problem facing the decision-maker in the case.
Class Participation:
Attendance will be taken at each class. Class participation is scored for each student for each class

Text and Readings: Students should focus on material presented in lectures. The text should be used to provide further explanation and examples of concepts and techniques discussed in the course:

- E. Balagurusamy, "Programming in C", Tata McGraw Hill.

- Kamthane, "Programming with ANSI and Turbo C", Pearson Education
- Rajaraman, V, "Fundamentals of Computers", PHI
- Kanetkar, "Let Us C", BPB Publications.

Scheme of Examination

- English will be the medium of instruction and examination.
- Written Examinations will be conducted at the end of each Semester as per the Academic Calendar notified in advance
- Each course will carry 100 marks of which 30 marks shall be reserved for internal assessment and the remaining 70 marks for written examination to be held at the end of each semester.
- The duration of written examination for each paper shall be three hours.
- The minimum marks for passing the examination for each semester shall be 35% in aggregate as well as a minimum of 35% marks in the semester-end examination in each paper.
- A minimum of 75% of classroom attendance is required in each subject.

Instructions to the External Paper Setter

The question paper will consist of three Sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 10.5 marks for each question. Section C will consist of 7-15 short answer type questions covering the entire syllabus uniformly and will carry a total of 28 marks.

Instructions for candidates

- Candidates are required to attempt five questions in all, selecting two questions each from section A and B and compulsory question of section C.
- Use of non-programmable scientific calculator is allowed.

L T P C
4 1 0 4

MITM1103T : Web Technology
Maximum Marks: 70 **Maximum Time: 3 Hrs.**
Minimum Pass Marks: 35% **Lectures to be delivered: 45-55**

Course Objective: This course is designed to explore the features of web technology and its significance in developing web-based applications. Students will be able to learn and Understand the concepts of web programming. On completion of this course, the students will be able to

- Understand the basics of HTML for creation of web pages
- Crete forms for interactive applications
- Integrate HTML and CSS
- Understand the design of applets

Course Content

SECTION A

Internet Basics: Networks, Protocols, TCP/IP, Internet Addresses, Ports, Sockets, Name Resolution, Firewalls, Protocol Tunneling, Proxy Servers, Internet Standards, governing the web HTTP, MIME, Inside URLs, Web applications, Overview of clients/servers web communication, comparison of web servers, Common Gateway Interface CGI.
Web Page Designing:Introduction to markup languages;.HTML: list, table, images, frames, forms, pages style sheets CSS;XML: DTD, XML Namespaces, XML schemes, Presenting XML with CSS and XSLT, XML-DOM, What is XHTML?

SECTION B

Client Side Scripting:Java script: Introduction, documents, forms, statements, functions, objects; Event and event handling; Browsers and the DOM, JQuery: Syntax, Selectors, Events and AJAX methods.
Server Side Programming: PHP: Introduction, requirements, PHP syntax, data type, variables, strings, operators, if-else, control structure, switch, array, function, file handling, form, sending email, file upload, session/state management, error and exception, PHP Database for dynamic Web pages.
Introduction to Servlets: Servlet Basic Servlet Structure, Servlet Lifecycle, Servlet APIs. Writing thread safe Servlets. Setting Cookies and Session Management with Servlet API.

Pedagogy:
The Instructor is expected to use leading pedagogical approaches in the class room situation, research-based methodology, innovative instructional methods, extensive use of technology in the class room, online modules of MOOCS, and comprehensive assessment practices to strengthen teaching efforts and improve student learning outcomes.

The Instructor of class will engage in a combination of academic reading, analyzing case studies, preparing the weekly assigned readings and exercises, encouraging in class discussions, and live project based learning.

Case/Class Discussion Assignments:
Students will work in groups of up to four to prepare a brief write-up due before the start of each class covering the case study or class material to be discussed in the next session. Questions may include a quantitative analysis of the problem facing the decision-maker in the case.

Class Participation:
Attendance will be taken at each class. Class participation is scored for each student for each class

Text and Readings: Students should focus on material presented in lectures. The text should be used to provide

further explanation and examples of concepts and techniques discussed in the course:

- Jeffrey C Jackson, "Web Technology – A computer Science perspective", Persoson Education, 2007.
- Chris Bates, "Web Programming – Building Internet Applications, "Wiley India, 2006.
- Xavier, C, " Web Technology and Design" , New Age International
- Ivan Bayross," HTML, DHTML, Java Script, Perl & CGI", BPB Publication.
- Ramesh Bangia, "Internet and Web Design" , New Age International
- Bhave, "Programming with Java", Pearson Education
- Ullman, "PHP for the Web: Visual QuickStart Guide", Pearson Education
- Deitel, "Java for programmers", Pearson Education
- Dustin R. Callaway, "Inside Servlets" Pearson Education.

Scheme of Examination

- English will be the medium of instruction and examination.
- Written Examinations will be conducted at the end of each Semester as per the Academic Calendar notified in advance
- Each course will carry 100 marks of which 30 marks shall be reserved for internal assessment and the remaining 70 marks for written examination to be held at the end of each semester.
- The duration of written examination for each paper shall be three hours.
- The minimum marks for passing the examination for each semester shall be 35% in aggregate as well as a minimum of 35% marks in the semester-end examination in each paper.
- A minimum of 75% of classroom attendance is required in each subject.

Instructions to the External Paper Setter

The question paper will consist of three Sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 10.5 marks for each question. Section C will consist of 7-15 short answer type questions covering the entire syllabus uniformly and will carry a total of 28 marks.

Instructions for candidates

- Candidates are required to attempt five questions in all, selecting two questions each from section A and B and compulsory question of section C.
- Use of non-programmable scientific calculator is allowed.

L T P C
4 1 0 4

MITM1104T : Mathematical Foundation of Computer Science

Maximum Marks: 70 **Maximum Time: 3 Hrs.**
Minimum Pass Marks: 35% **Lectures to be delivered: 45-55**

Course Objective: The purpose of this course is to provide a clear understanding of the concepts that underlying fundamental concepts and tools in discrete mathematics with emphasis on their applications to computer science. It emphasizes mathematical definitions and proofs as well as applicable method. On completion of this course, the students will be able to

- Be familiar with the basic terminology of functions, relations, and sets and demonstrate knowledge of their associated operations.
- Master to solve advanced mathematical problems, apply various methods of mathematical proof, and communicate solutions in writing
- Master to comprehend advanced mathematics, and present the material orally and in writing
- Utilize the knowledge of computing and mathematics appropriate to the discipline.
- Evaluate mathematical principles and logic design

Course Content

SECTION A

Logic: Propositions, Implications, Precedence of Logical Operators, translating English Sentences, System Specifications. Propositional Equivalences, Predicates and Quantifiers, Nested Quantifiers, Order of Quantifiers, Sets, Power Set, Set Operations, Functions, One-to-One Functions and Onto Functions, Inverse and Composition of Functions, Floor Function, Ceiling Function.

Algorithms, Searching Algorithms, Sorting, Growth of Functions, Big-O Notation, Big-Omega and Big-Theta Notation, Complexity of Algorithms, Mathematical Induction, The Basic of counting, The Pigeonhole Principle.

SECTION B

Recurrence Relations, solving recurrence relations, Divide and Conquer Algorithms and Recurrence Relations, Generating functions for sorting recurrence relations, Inclusion-Exclusion.
Relations and their properties, n-any relations and their applications, representing relations, closure of relation, equivalence relations, partial ordering.

Graphs: Introduction, terminology, Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamiltonian Paths, Shortest Path Problems, Planar Graphs.

Pedagogy:
The Instructor is expected to use leading pedagogical approaches in the class room situation, research-based methodology, innovative instructional methods, extensive use of technology in the class room, online modules of MOOCS, and comprehensive assessment practices to strengthen teaching efforts and improve student learning outcomes.

The Instructor of class will engage in a combination of academic reading, analyzing case studies, preparing the weekly assigned readings and exercises, encouraging in class discussions, and live project based learning.

Case/Class Discussion Assignments:
Students will work in groups of up to four to prepare a brief write-up due before the start of each class covering the case study or class material to be discussed in the next session. Questions may include a quantitative analysis of the problem facing the decision-maker in the case.

Class Participation:
Attendance will be taken at each class. Class participation is scored for each student for each class

Text and Readings: Students should focus on material presented in lectures. The text should be used to provide further explanation and examples of concepts and techniques discussed in the course:

- Rosen, K.H: Discrete Mathematics and Its Applications, TMH Publications.
- Discrete and Combinational Mathematics, Ralph P. Grimaldi, Pearson Education.
- Elements of Discrete Mathematics, C. L. Luie, TMH Publications.
- Discrete Mathematics, Richard Johnson, Baugh, Pearson Education.
- Discrete Mathematical Structures with Applications to Computer Science, J. P. Tremblay& R. P. Manohar, MGH Publications.
- Discrete Mathematical Structures, B.Kotman, R.C. Busbay, S.Ross, PHI.

Scheme of Examination

- English will be the medium of instruction and examination.
- Written Examinations will be conducted at the end of each Semester as per the Academic Calendar notified in advance
- Each course will carry 100 marks of which 30 marks shall be reserved for internal assessment and the remaining 70 marks for written examination to be held at the end of each semester.
- The duration of written examination for each paper shall be three hours.
- The minimum marks for passing the examination for each semester shall be 35% in aggregate as well as a minimum of 35% marks in the semester-end examination in each paper.
- A minimum of 75% of classroom attendance is required in each subject.

Instructions to the External Paper Setter

The question paper will consist of three Sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 10.5 marks for each question. Section C will consist of 7-15 short answer type questions covering the entire syllabus uniformly and will carry a total of 28 marks.

Instructions for candidates

- Candidates are required to attempt five questions in all, selecting two questions each from section A and B and compulsory question of section C.
- Use of non-programmable scientific calculator is allowed.

L T P C
0 0 8 4

MITM 1105L: Programming Lab-I

Maximum Marks: 100*
Minimum Pass Marks: 35%

Max. Time: 3 Hrs.
Practical sessions to be conducted: 60-70

This laboratory course will mainly comprise of exercise based on subject MITM -1102T

*Maximum Marks for Continuous Assessment: 30
Maximum Marks for University Examination: 70

L T P C
0 0 8 4

MITM 1106L: Programming Lab-II

Maximum Marks: 100* **Max. Time: 3 Hrs.**
Minimum Pass Marks: 35% **Practical sessions to be conducted: 60-70**

This laboratory course will mainly comprise of exercise based on subject MITM 1103T

*Maximum Marks for Continuous Assessment: 30
Maximum Marks for University Examination: 70

MITM1201T: Database Management System

Maximum Marks: 70 **Maximum Time: 3 Hrs.**
Minimum Pass Marks: 35% **Lectures to be delivered: 45-55**

Course Objective: This course is designed to explore computing and to show students the art of design and creation of relational databases. On completion of this course, the students will be able to

- Gain the knowledge and understanding of Database analysis and design.
- Understand the use of Structured Query Language(SQL) and learn SQL syntax.
- Gain the knowledge of the processes of Database Development and Administration using SQL and PL/SQL.
- Understand the functional dependencies and design of the database
- Understand the concept of Transaction and Query processing

Course Content

SECTION A

Introduction: Database Approach, Characteristics of a Database Approach, Database System Environment.Roles in Database Environment: Database Administrators, Database Designers, End Users, Application Developers.Database Management Systems: Definition, Characteristics, Advantages of Using DBMS Approach, Classification of DBMSs.Architecture: Data Models, Database Schema and Instance, Three Schema Architecture, Data Independence – Physical and Logical data Independence.Database Conceptual Modelling by E-R model: Concepts, Entities and Entity Sets, Attributes, Mapping Constraints, E-R Diagram, Weak Entity Sets, Strong Entity Sets.
Relational Data Model: Concepts and Terminology. Constraints: Integrity Constraints, Entity and Referential Integrity constraints, Keys: Super Keys, Candidate Keys, Primary Keys, Secondary Keys and Foreign Keys.Relational Algebra: Basic Operations, Additional Operations, Example Queries. Relational Calculus: Tuple and Domain Relational Calculus, Example Queries.
Database Design: Problems of Bad Database Design. Normalization: Functional Dependency, Full Functional Dependency, Partial Dependency, Transitive Dependency, Normal Forms– 1NF, 2NF, 3NF, BCNF, Multi-valued Dependency, Join Dependency and Higher Normal Forms- 4NF, 5NF.

SECTION B

Transaction Processing Systems: Batch, On-line, Real time, Transaction ACID Properties.Database Protection: Security Issues, Discretionary Access Control-Granting and Revoking Privileges. Database Concurrency: Problems of Concurrent Databases, Serializability and Recoverability, Concurrency Control Methods-Two Phase Locking, Time Stamping. Database Recovery: Recovery Concepts, Recovery Techniques-Deferred Update, Immediate Update, Shadow Paging. Overview of the following:Data Mining, Data Warehousing and OLAP, Mobile Databases, Multimedia Databases, Temporal Database, Spatial Database.Technical Introduction to Oracle: Structure of Oracle, Background Processes.Data Objects: Tables, Views, Synonyms, Indexes, Snapshots, Sequences, Creation and Manipulation of Data Objects. SQL Queries.Applying Integrity Constraints.Functions, Procedures and Packages.Using Cursors and Triggers.

Pedagogy:
The Instructor is expected to use leading pedagogical approaches in the class room situation, research-based methodology, innovative instructional methods, extensive use of technology in the class room, online modules of MOOCS, and comprehensive assessment practices to strengthen teaching efforts and improve student learning outcomes.

The Instructor of class will engage in a combination of academic reading, analyzing case studies, preparing the weekly assigned readings and exercises, encouraging in class discussions, and live project based learning.

Case/Class Discussion Assignments:
Students will work in groups of up to four to prepare a brief write-up due before the start of each class covering the case study or class material to be discussed in the next session. Questions may include a quantitative analysis of the

problem facing the decision-maker in the case.

Class Participation:
Attendance will be taken at each class. Class participation is scored for each student for each class

Text and Readings: Students should focus on material presented in lectures. The text should be used to provide further explanation and examples of concepts and techniques discussed in the course:

- ElmasryNavathe, "Fundamentals of Database System", Pearson Education.
- Oracle SQL Complete Reference", Tata McGraw-Hill.
- T. Connolly, C Begg, "Database Systems", Pearson Education.
- Jeffrey D. Ullman, "Principles of Database Systems", Galgotia Publications.
- Henry F. Korth, A. Silberschhatz, "Database Concepts," Tata McGraw Hill.
- C.J. Date, "An Introduction to Database Systems", Pearson Education.
- Naveen Parkash, "Introduction to Database Management", Tata McGraw Hill.
- Bobrowski, "Client Server Architecture and Introduction to Oracle 7".

Scheme of Examination

- English will be the medium of instruction and examination.
- Written Examinations will be conducted at the end of each Semester as per the Academic Calendar notified in advance
- Each course will carry 100 marks of which 30 marks shall be reserved for internal assessment and the remaining 70 marks for written examination to be held at the end of each semester.
- The duration of written examination for each paper shall be three hours.
- The minimum marks for passing the examination for each semester shall be 35% in aggregate as well as a minimum of 35% marks in the semester-end examination in each paper.
- A minimum of 75% of classroom attendance is required in each subject.

Instructions to the External Paper Setter

The question paper will consist of three Sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 10.5 marks for each question. Section C will consist of 7-15 short answer type questions covering the entire syllabus uniformly and will carry a total of 28 marks.

Instructions for candidates

- Candidates are required to attempt five questions in all, selecting two questions each from section A and B and compulsory question of section C.
- Use of non-programmable scientific calculator is allowed.

L T P C
4 1 0 4

MITM1202T: Programming with Python

Maximum Marks: 70 **Maximum Time: 3 Hrs.**
Minimum Pass Marks: 35% **Lectures to be delivered: 45-55**

Course Objective: This course is designed to explore computing and to show students the art of computer programming. Students will be able to learn and Understand programming using python concepts for writing good programs. On completion of this course, the students will be able to

- Understand the basics of Python programming language
- Use different data types and control structures
- Explore the use of Python functions
- Create programs to access files in Python

Course Content

SECTION A

Introduction to Python: History of Python, Strength and Weakness, Different Versions, Installing Python , Setting up in local environment, IDLE, Executing from file, command line from interactive mode, Python Identifiers and reserved key words.
Python syntax: Variables and Variables type, Data types, Data Types Conversion, Operators (Arithmetic, Comparison, Assignment, Bitwise, Logical, Membership, Identity), Operators Precedence, Python Decision making (if, el if, else, nested if), Python loops (while, for, nested loops), Break and continue statements.
Python Collections or Sequence: Sequence introduction, Number operations, String Operations, List, Tuple, Dictionary, Set.
Python Functions: Function introduction, User defined functions, Functions with parameters, Keywords and optional parameters, Scope of variables (Global and Local), Anonymous function – Lambda, In-build function, List comprehension.

SECTION B

Python Modules: Modules, Standard Modules (Sys, Math, Time), Import Statement, from statement, Dir() functions.
Python File handling: Sending Output to STDOUT Using the print() Method, Reading Input with the input() Method, Creating File Objects with the open() Method, Controlling File Access Modes, Working with File Object Attributes, Closing File Objects with the close() Method, Reading and Writing to File Objects with read() and write(), Using File Processing Functions from the OS Module.

Pedagogy:
The Instructor is expected to use leading pedagogical approaches in the class room situation, research-based methodology, innovative instructional methods, extensive use of technology in the class room, online modules of MOOCS, and comprehensive assessment practices to strengthen teaching efforts and improve student learning outcomes.
The Instructor of class will engage in a combination of academic reading, analyzing case studies, preparing the weekly assigned readings and exercises, encouraging in class discussions, and live project- based learning.

Case/Class Discussion Assignments:
Students will work in groups of up to four to prepare a brief write-up due before the start of each class covering the case study or class material to be discussed in the next session. Questions may include a quantitative analysis of the problem facing the decision-maker in the case.

Class Participation:

Attendance will be taken at each class. Class participation is scored for each student for each class

Text and Readings:

- Paul Gries, Jennifer Campbell, Jason Montojo, Practical Programming- An Introduction to Computer Science Using Python 3.6, Shroff Publications and Distributors
- John V Guttag, Introduction to Computation and Programming Using Python", Revised and expanded Edition, MIT Press , 2013
- Robert Sedgewick, Kevin Wayne, Robert Dondero, —Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.
- Timothy A. Budd, Exploring Python, Mc-Graw Hill Education (India) Private Ltd., 2015.
- Paul Gries, Jennifer Campbell and Jason Montojo, Practical Programming: An Introduction to Computer Science using Python 3, Second edition, Pragmatic Programmers, LLC, 2013.
- Rossum, Introduction To Python ,Shroff Publications and Distributors
- Downey,Think Python 2/ED, Shroff Publications and Distributors
- Lutz, Learning Python, 5/ED, Shroff Publications and Distributors
- Campbell ,Practical Programming: An Introduction to Computer Science Using Python, Shroff Publications and Distributors

Scheme of Examination

- English will be the medium of instruction and examination.
- Written Examinations will be conducted at the end of each Semester as per the Academic Calendar notified in advance
- Each course will carry 100 marks of which 30 marks shall be reserved for internal assessment and the remaining 70 marks for written examination to be held at the end of each semester.
- The duration of written examination for each paper shall be three hours.
- The minimum marks for passing the examination for each semester shall be 35% in aggregate as well as a minimum of 35% marks in the semester-end examination in each paper.
- A minimum of 75% of classroom attendance is required in each subject.

Instructions to the External Paper Setter

The question paper will consist of three Sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 10.5 marks for each question. Section C will consist of 7-15 short answer type questions covering the entire syllabus uniformly and will carry a total of 28 marks.

Instructions for candidates

- Candidates are required to attempt five questions in all, selecting two questions each from section A and B and compulsory question of section C.
- Use of non-programmable scientific calculator is allowed.

L T P C
4 1 0 4

MITM1203T :Operating Systems

Maximum Marks: 70
Minimum Pass Marks: 35%

Maximum Time: 3 Hrs.
Lectures to be delivered: 45-55

Course Objective: This course is designed to explore the unifying concept of the operating system as a collection of cooperating sequential processes. On completion of this course, the students will be able to

- Learn the mechanisms of OS to handle processes and threads and their communication Use different data types, operators and console I/O function in a computer program.
- Learn the mechanisms involved in memory management in contemporary OS.
- Gain knowledge on distributed operating system concepts that includes architecture, deadlock detection algorithms and agreement protocols.
- Understand different approaches to memory management.
- Understand the structure and organization of the file system

Course Content

SECTION A

Introduction to Operating System: Definition, Types of Operating system, Operating system components, Operating system services.
Process Management:Process concept, Process cs. threads, CPU scheduling criteria, Scheduling algorithms, and Algorithm evaluation
Deadlocks:Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, avoidance, detection and recovery.
File Management:Files concept, Access methods, directory structure, Allocation methods – contiguous, linked and indexed.

SECTION B

Memory Management: Background, logical vs. physical address space, Contiguous memory management schemes using Multi partition memory allocation using fixed number of tasks and variable number of tasks, paging and segmentation.
Virtual Memory management: Concept, demand paging and demand segmentation.
Mass storage structure: Disk structure, disk scheduling algorithms.
Protection: Goals of protection, Access matrix.
Security: Security problem, Program threats, system threats, User Authentication, Cryptography.

Pedagogy:
The Instructor is expected to use leading pedagogical approaches in the class room situation, research-based methodology, innovative instructional methods, extensive use of technology in the class room, online modules of MOOCS, and comprehensive assessment practices to strengthen teaching efforts and improve student learning outcomes.

The Instructor of class will engage in a combination of academic reading, analyzing case studies, preparing the weekly assigned readings and exercises, encouraging in class discussions, and live project based learning.

Case/Class Discussion Assignments:
Students will work in groups of up to four to prepare a brief write-up due before the start of each class covering the case study or class material to be discussed in the next session. Questions may include a quantitative analysis of the problem facing the decision-maker in the case.

Class Participation:
Attendance will be taken at each class. Class participation is scored for each student for each class

Text and Readings: Students should focus on material presented in lectures. The text should be used to provide further explanation and examples of concepts and techniques discussed in the course:

Text Book:

- Silberschatz and Galvin, "Operating System Concepts", Addison-Wesley publishing.
- Nutt Gary, "Operating Systems" Addison Wesley Publication.
- Hansen, Per Brinch, "Operating System Principles", Prentice-Hall.
- N. Haberman, "Introduction to Operating System Design", Galgotia Publications.
- Hansen, Per Brich, "The Architecture of Concurrent Programs", PHI.
- Shaw, "Logical Design of Operating System", PHI.

Scheme of Examination

- English will be the medium of instruction and examination.
- Written Examinations will be conducted at the end of each Semester as per the Academic Calendar notified in advance
- Each course will carry 100 marks of which 30 marks shall be reserved for internal assessment and the remaining 70 marks for written examination to be held at the end of each semester.
- The duration of written examination for each paper shall be three hours.
- The minimum marks for passing the examination for each semester shall be 35% in aggregate as well as a minimum of 35% marks in the semester-end examination in each paper.
- A minimum of 75% of classroom attendance is required in each subject.

Instructions to the External Paper Setter
The question paper will consist of three Sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 10.5 marks for each question. Section C will consist of 7-15 short answer type questions covering the entire syllabus uniformly and will carry a total of 28 marks.

Instructions for candidates

- Candidates are required to attempt five questions in all, selecting two questions each from section A and B and compulsory question of section C.
- Use of non-programmable scientific calculator is allowed.

L T P C
4 1 0 4

MITM1204T :Computer Organization and Architecture

Maximum Marks: 70
Minimum Pass Marks: 35%

Maximum Time: 3 Hrs.
Lectures to be delivered: 45-55

Course Objective: This course will introduce students to the fundamental concepts underlying modern computer organization and architecture. On completion of this course, the students will be able to

- Understand the basics of computer hardware and how software interacts with computer hardware
- Analyze and evaluate computer performance
- Understand how computers represent and manipulate data
- Understand computer arithmetic and convert between different number systems
- Assemble a simple computer with hardware design including data format, instruction format, instruction set, addressing modes, bus structure, input/output, memory, Arithmetic/Logic unit, control unit, and data, instruction and address flow
- Use Boolean algebra as related to designing computer logic, through simple combinational and sequential logic circuits

Course Content

SECTION A

Concepts about bits, bytes and word, Number System: Number conversions, Arithmetic operations, Integer and floating point representation.Character codes (ASCII, EBCDIC, BCD, 8421, Excess-3). Boolean expression - Minimization of Boolean expressions - Minterm - Maxterm - Sum of Products (SOP) - Product of Sums (POS) - Karnaugh map Minimization - Don't care conditions - Quine-McCluskey method of minimization.

Basic Gates, Combinational logic design: half-adder, full-adder, half-subtractor, fullsubtractor, binary parallel adder, Multiplexer/ Demultiplexer, decoder, encoder.
Sequential circuits: concept, flip-flops (D, RS, JK, JK-Master-Slave, T), counters (Ripple, Asynchronous, Synchronous, Decade, Mod-5),Instruction codes, Instruction formats, Instruction cycle, Addressing modes.

SECTION B

Register Transfer Language, Arithmetic, Logic and Shift micro-operations, Arithmetic Logic Shift unit.
Control Memory: Design of control unit, Microprogrammed and Hardwired control unit (overview only), Features of RISC and CISC.

Memory organization: Concepts of semiconductor memory, CPU- memory interaction, organization of memory modules, Cache memory and related mapping and replacement policies, Virtual memory.
I/O organization: I/O interface, Modes of data transfer: Programmed I/O, Interrupt initiated I/O, DMA.

Pedagogy:
The Instructor is expected to use leading pedagogical approaches in the class room situation, research-based methodology, innovative instructional methods, extensive use of technology in the class room, online modules of MOOCS, and comprehensive assessment practices to strengthen teaching efforts and improve student learning outcomes.

The Instructor of class will engage in a combination of academic reading, analyzing case studies, preparing the weekly assigned readings and exercises, encouraging in class discussions, and live project based learning.

Case/Class Discussion Assignments:
Students will work in groups of up to four to prepare a brief write-up due before the start of each class covering the case study or class material to be discussed in the next session. Questions may include a quantitative analysis of the

problem facing the decision-maker in the case.

Class Participation:
Attendance will be taken at each class. Class participation is scored for each student for each class

Text and Readings: Students should focus on material presented in lectures. The text should be used to provide further explanation and examples of concepts and techniques discussed in the course:

- M.M. Mano, "Computer System Architecture", Prentice-Hall of India.
- A.S.Tanenbaum, "Structured Computer Organisation", Prentice- Hall of India.
- William Stallings, "Computer Organization and Architecture", Pearson Education.

Scheme of Examination

- English will be the medium of instruction and examination.
- Written Examinations will be conducted at the end of each Semester as per the Academic Calendar notified in advance
- Each course will carry 100 marks of which 30 marks shall be reserved for internal assessment and the remaining 70 marks for written examination to be held at the end of each semester.
- The duration of written examination for each paper shall be three hours.
- The minimum marks for passing the examination for each semester shall be 35% in aggregate as well as a minimum of 35% marks in the semester-end examination in each paper.
- A minimum of 75% of classroom attendance is required in each subject.

Instructions to the External Paper Setter
The question paper will consist of three Sections: A, B and C. Sections A and B will have four questions each from the respective section of the syllabus and will carry 10.5 marks for each question. Section C will consist of 7-15 short answer type questions covering the entire syllabus uniformly and will carry a total of 28 marks.

Instructions for candidates

- Candidates are required to attempt five questions in all, selecting two questions each from section A and B and compulsory question of section C.
- Use of non-programmable scientific calculator is allowed.

L T P C
0 0 8 4

MITM1205L:**Programming Lab-III**

Maximum Marks: 100* **Max. Time: 3 Hrs.**
Minimum Pass Marks: 35% **Practical sessions to be conducted: 60-70**

This laboratory course will mainly comprise of exercises based on subject MITM 1201T

*Maximum Marks for Continuous Assessment: 30
Maximum Marks for University Examination: 70

L T P C
0 0 8 4

MITM1206L **:Programming Lab-IV**

Maximum Marks: 100* **Max. Time: 3 Hrs.**
Minimum Pass Marks: 35% **Practical sessions to be conducted: 60-70**

This laboratory course will mainly comprise of exercises based on subject MITM1202T

*Maximum Marks for Continuous Assessment: 30
Maximum Marks for University Examination: 70