UNIVERSITY OF JAMMU

(NAAC ACCREDITED 'A ++' GRADE' UNIVERSITY)
Baba Sahib Ambedkar Road, Jammu-180006 (J&K)

Academic Section
Email: academicsection1u14@gmail.com

NOTIFICATION
(25/Sept./Adp./89)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation of the approval of the Academic Council, is pleased to authorize the adoption of the syllabi and courses of studies for **Post Graduate Programme** in **Information Technology (M.Sc.IT)** under **NEP-2020** as per details given below:-

Two Year Post Graduate Programme under NEP-2020

Subject	Semester	For the examinations to be held in the year
M.Sc. (Information Technology)		
	Semester-I	December 2025, 2026 and 2027
	Semester-II	May 2026, 2027 and 2028
	Semester-III	December 2026, 2027 and 2028
	Semester-IV	May 2027, 2028 and 2029

The Syllabi of the courses are also available on the University website: www.jammuuniversity.ac.in

Sd/-
DEAN ACADEMIC AFFAIRS

No. F. Acd/II/25/ 10232-245
Dated: 25/9/25

Copy for information and necessary action to:

1. Dean, Faculty of Mathematical Science
2. Director/Convener, Board of Studies in Computer Science and IT
3. Sr. P.A. to the Controller of Examinations
4. Director, Centre for IT Enabled services and Management, University of Jammu for information and for uploading on University Website.
5. All members of the Board of Studies
6. Joint Registrar (Evaluation/P.G. Exam.)
7. Programmer, Computer Section, Examination Wing

Abrora 24/9/25
Joint Registrar (Academic)

18/9/25 18/9/25

Proforma for syllabi

M.Sc. IT Syllabi (NEP-2020)

						Course Type	Marks		Nature of Course						
S. No.	Course No.	Course Title	No. of Credits	Credit Level	Credit points	Core/ Elective/ Any Other	Theory	Practical	Global	National	Regional	Skill	SWAYAM / MOOC	Vocational course	Research Project/Summer Internship/ Dissertation
1	P2ITTC111	Problem Solving Using C-Language	4	400		Core	100		Yes			Yes	No		
2	P2ITTC112	Logical Organization of Computers	4	400		Core	100		Yes				No		
3	P2ITTC113	Discrete Mathematics	4	400		Core	100		Yes				No		
4	P2ITTC114	Operating Systems	4	400		Core	100		Yes				No		
5	P2ITPC180	Practical based on above courses	6			Core		150	Yes			Yes	No		
6	P2ITTC211	Data and File Structures	4	400		Core	100		Yes				No		
7	P2ITTC212	Data Communication and Networks	4	400		Core	100		Yes				No		
8	P2ITTC213	Data Base Management System	4	500		Core	100		Yes				No		
9	P2ITTC214	Algorithm Design and Analysis	4	500		Core	100		Yes				No		
10	P2ITTC215	Object Oriented Programming in Java	4	500		Core	100		Yes			Yes	No		
11	P2ITPC280	Practical based on above courses	6			Core		150	Yes			Yes	No		

12	P2ITVC251	Web Technologies	4	500		Core	100		Yes			Yes	No	Yes	
13	P2ITTC311	Web Technologies	4	500		Core	100		Yes			Yes	No		
14	P2ITTC312	Artificial Intelligence	4	500		Core	100		Yes				No		
15	P2ITTC313	Compiler Design	4	500		Core	100		Yes				No		
16	P2ITTC314	Software Engineering	4	500		Core	100		Yes				No		
17	P2ITTC315	Computer Graphics	4	500		Core	100		Yes				No		
18	P2ITMO351	MOOC/ SWAYAM Course	4			Core	100						Yes		
19	P2ITPC-380	Practical based on above courses	6			Core		150	Yes			Yes	No		
20	P2ITTC411	Android Programming	4	500		Core	100		Yes			Yes	No		
21	P2ITTE-412	Programming in VB.NET	4	500		Elective	100		Yes			Yes	No		
22	P2ITTE-413	Python	4	500		Elective	100		Yes				No		
23	P2ITTE-414	Cyber Security	4	500		Elective	100		Yes				No		
24	P2ITRC-480	Project Work	16			Core		400	Yes			Yes	No		Yes

Master of Science in Information Technology (M.Sc. IT)

Program Objectives

- To provide advanced and in-depth knowledge of Information Technology and its applications.
- To provide a concrete academic base of Information Technology education so that students can develop an advanced career in IT.
- To inculcate an aptitude and interest for innovations and motivate students to pursue a career in Information and Communication Technology in related industry, business and research.
- To equip students with creativity, critical thinking, analysis and research skill and better understand the effects of future developments of computer systems and technology.
- To train students to work in a team and also to take leadership role in project management.

Course Objectives

- The student shall become capable to write and execute programs using C-language. They will learn to control the sequence of execution using programing constructs and manage I/O operations. They shall be able implement modular programming concepts using functions. In addition, they shall get hands-on training to work with files and pointers.
- The student shall become capable of formulating algorithms based on different design techniques and also shall be able to analyse their complexity.
- The students shall understand the basic concepts of data communication; computer networks and gain knowledge on internet protocol layers and various addressing mechanisms.
- The student shall learn the fundamentals of software engineering and various models for software development. They shall also understand software analysis design and its techniques.
- The student shall acquire the basic concepts of operating system and its process models. They shall also learn Inter-process communication, I/O & memory management.
- The student shall be able develop software applications using VB.NET programming and Java programming language.
- The student shall gain the basic knowledge of AI techniques and its issues, Predicate logic and logic programming, knowledge representation
- The students shall acquire knowledge about graphic devices, basic graphics algorithms, 2D & 3D transformation, Viewing, Clipping, Visible surface detection
- The students shall understand the major concept of language translation and compiler design and develop an awareness of the function and complexity of modern compilers.

Annexure-B

Revised Syllabus, 2025
(NEP-2020)

M.Sc. Information Technology

Programme Code: PGFMIOO3

SYLLABUS

Of

M.Sc. IT (2 Year) Programme

UNDER

National Education Policy (NEP-2020)

for the students to be admitted in the sessions

2025-26, 2026-27, 2027-28

DEPARTMENT OF COMPUTER SCIENCE & IT

University of Jammu

DEPARTMENT OF COMPUTER SCIENCE & IT, UNIVERSITY OF JAMMU, JAMMU

M.Sc.-IT COURSE STRUCTURE (NEP-2020)

SEMESTER WISE COURSE DISTRIBUTION AND PAPERWISE OUTLINE OF MASTERS DEGREE PROGRAMME IN INFORMATION TECHNOLOGY PROGRAMME [M.Sc.-IT]

TOTAL CREDITS: 102

Semester – I

Course No.	Course Title	Credits	Contact hours per week L-T-P
P2ITTC111	Problem Solving Using C-Language	4	4-0-0
P2ITTC112	Logical Organization of Computers	4	4-0-0
P2ITTC113	Discrete Mathematics	4	4-0-0
P2ITTC114	Operating Systems	4	4-0-0
P2ITPC180	Practical based on above courses	6	0-0-12
	Total	22	16-0-12

Semester – II

Course No.	Course Title	Credits	Contact hours per week L-T-P
P2ITTC211	Data and File Structures	4	4-0-0
P2ITTC212	Data Communication and Networks	4	4-0-0
P2ITTC213	Data Base Management System	4	4-0-0
P2ITTC214	Algorithm Design and Analysis	4	4-0-0
P2ITTC215	Object Oriented Programming in Java	4	4-0-0
P2ITPC280	Practical based on above courses	6	0-0-12
	Total	26	20-0-12
P2ITVC251	Web Technologies	4	4-0-0

Semester – III

Course No.	Course Title	Credits	Contact hours per week L-T-P
P2ITTC311	Web Technologies	4	4-0-0
P2ITTC312	Artificial Intelligence	4	4-0-0
P2ITTC313	Compiler Design	4	4-0-0
P2ITTC314	Software Engineering	4	4-0-0
P2ITTC315	Computer Graphics	4	4-0-0
P2ITMO351	MOOC/ SWAYAM Course*	4	4-0-0
P2ITPC-380	Practical based on abovecourses	6	0-0-12
	Total	30	24-0-12

*All the students must mandatorily complete on or before completion of 3rd semester, one PG MOOC course of four credits from SWAYAM UGC portal as per the existing guidelines and requirements of University of Jammu regarding SWAYAM course.

Semester – IV

Course No.	Course Title	Credits	Contact hours per week L-T-P
P2ITTC411	Android Programming	4	4-0-0
Elective-I P2ITTE-412 P2ITTE-413 P2ITTE-414	(any one of the following) Programming in VB.NET Python Cyber Security	4	4-0-0
P2ITRC-480	Project Work	16	0-0-32
	Total	24	08-0-32

SCHEME OF EXAMINATION

MCQ on LMS + Subjective Test	Syllabus to be covered in the examination	Time allotted for the examination	%Weightage (Marks)
TEST I (after 30 days)	20%	1 hour	10 + 10
TEST II (after 60days)	21 to 40%	1 hour	10 + 10
Theory	Syllabus to be covered in the examination	Time allotted for the examination	%Weightage (Marks)
Major test (after 90 days)	100%	3 hours	60
		Total	100
Practical Course			
Internal Examination	100%	4 hours	50
External Examination	100%	4 hours	50
Project Work			
Examination	**Time allotted for the examination**	**%Weightage (Marks)**	
Mid Term Appraisal	4 hours	25%	
External Examination	4 hours	75%	50% Project Report
			25% Viva-Voce
Total			100

The student shall be continuously evaluated during the conduct of each course on the basis of his/her performance as follows:

Test I and Test II

The Subjective Test of Test I and Test II would consist of three short answer type questions (05 marks each). Students are required to answer two questions. **No preparatory holidays shall be provided for the Test I and Test II**. Those candidates who have appeared in Test I and Test II and failed to get the minimum required marks i.e. 14 out of 40 will be eligible to re-appear in the Test I and Test II only once.

Major Test

The Major test will comprise of two sections, Section-A and Section-B. Section-A will be compulsory and comprising of 08 questions (minimum 01 from each unit) of 03 marks each. Section B will have 06 questions of 12 marks each to be set from the last three units (02 from each unit). In section B students are required to attempt 01 question from each unit. **In major test there should not be a gap of more than two days in between two tests.**

External Practical/ Research (thesis/project/patent) examination

External Practical/ Research examination shall be conducted by Board of Examiners consisting of Head of the Department, one/two Senior Professors of concerned department, concerned teacher and outside expert to be appointed by the Vice-Chancellor out of the panel to be provided by the Head of the Department who shall evaluate/assess final practical performance/ dissertation of the students.

SCHEME FOR PAPER SETTING OF MAJOR EXAMINATION

The question paper shall be divided into two sections (A & B). No question shall be repeated in the question paper.

Section A

There shall be 8 short answer type questions having atleast one question from each unit. Each question will carry 3 marks and the candidates are required to answer all the questions. (3 x 8 = 24 marks)

Section B

There shall be 3 long answer type questions each set from Unit –III, IV and V with internal choice. Each question shall carry 12 marks. (3 x 12 = 36 marks)

M.Sc. IT - FIRST SEMESTER

COURSE NO: P2ITTC111	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: PROBLEM SOLVING USING C – LANGUAGE	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**Major Test :60 Marks of 2.5 hours duration**

For examinations to be held in Dec- 2025, 2026, and 2027

UNIT-I

Steps for Problem Solving, Algorithm and its features. Computational Complexity of an Algorithm, Flowcharts and their design. Pseudocode, Decision tables, Classification of programming languages.

12 HOURS

UNIT-II

History of C – Language, Characteristics and Application Areas of C- languageGeneral Structure of C – program, Compiling and executing a program.

Character set of C – language, identifiers, keywords, data types, variables, constants, expressions and operators in C - language. Standard Input/Output.Control statements – decision making statements, loops and iterations.

12 HOURS

UNIT-III

Modular programming, Functions, Recursive functions, Command lineArguments, Storage classes in C - language

Arrays – One dimensional Arrays, Multidimensional Arrays, Strings, StringInput/Output, String manipulation functions, Array of Strings.

C–preprocessor directives, Macros, Macros vs functions

12 HOURS

UNIT-IV

Structure Declaration, assessing & initializing structures, structures as functionarguments, structures and Arrays.

Unions, Initializing and accessing the members of a union, Enumerated Data types.Syntax, Semantic, Linker, Logical and Runtime errors.

12 HOURS

UNIT-V

Pointers and their characteristics, Pointer arithmetic, Passing pointers tofunctions, Arrays and pointers, Pointers and strings.

Files: Files handling in C. Open and close a file in C, Input and output using filepointers, Sequential and random access files

12 HOURS

COURSE NO: P2ITTC111	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: PROBLEM SOLVING USING C – LANGUAGE	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**Major Test :60 Marks of 2.5 hours duration**

SUGGESTED READINGS:

1. E. Balguruswamy, "Programming in ANSI C", 4th edition, 2007, McGraw-Hill Publication, New Delhi.
2. B.W. Kernighan and D.M. Ritchie, The C Programming Language, PHI.
3. B.S. Gottfried, Schaum's Outline of Theory and Problems of Programmingwith C, McGraw-Hill.
4. H. Schildt, C Made Easy, Osborne McGraw-Hill.
5. Yashwant Kanetkar, "Let us C" Seventh Edition, BPB publication, 2007
6. Cooper H. & Mullish H. : The Sprit of C, Jaico Publication House, New Delhi

SCHEME FOR PAPER SETTING

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(3 x 8 = 24 marks)

Section B

There shall be 3 long answer type questions each set from Unit –III, IV and V with internal choice. Each question shall carry 12 marks.

(3 x 12 = 36 marks)

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M.Sc. IT - FIRST SEMESTER

COURSE NO: P2ITTC112	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Logical Organization of Computers	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**MajorTest :60 Marks of 2.5 hours duration**

For examinations to be held in Dec- 2025, 2026, and 2027

UNIT - I

Introduction & Data Representation

Overview of computers, Integer & floating point representation using IEEE FORMAT, Rules of Floating point Arithmetic, parity, Error detection and correction methods using Hamming technique, ASCII code representation, Number systems & their inter - conversion rules, Rules of addition/subtractionfor r's, (r - 1)'s complements, BCD, excess - 3 respectively and their circuits.

12 HOURS

UNIT - II

Logic Gates & Boolean Algebra

Logic gates, And, OR, NOT, NAND, XOR, NOR, XNOR Gates & their design. Boolean Algebra: Binary arithmetic, Boolean Expressions, Laws of BooleanAlgebra, De – Morgan laws, K - map, simplification of Boolean Expressionsusing SOP, POS, K – map techniques.

12 HOURS

UNIT – III

Memory & Register Organization

Memory: Basic memory cell, Static RAM, Static and Dynamic Memory, Types of ROM, associative memory, interleaved memory, Virtual memory,

Cache memory Random access, Sequential access, Direct access, virtual memory.Register transfer Language and Architecture:

Register transfer language, micro-operation, I/O processor, CPU busArchitecture.

Modes of I/O transfer like DMA, programmed control, interrupts technique.Interrupt & instruction: Interrupt, its types & its life cycle.

12 HOURS

UNIT - IV

Microprocessor & Control Design

Stack organisation, types of addressing modes, Instruction formats (one, two,three addressetc.)Microprocessor 8086: Microcomputer structure, Architecture of 8086, Instruction set, Instruction format of 8086, Bit Slices, I/O interface adapter (Serial and Parallel), Memory read, Memory write, Memory map and I/O map, Interrupts like Serial, Polling and vector methods. Features and comparison of higher microprocessors, bus bandwidth Processor, Hardwired & Micro-programmed control unit.

12 HOURS

UNIT – V

Parallel processing

Classification of parallel machines, pipeline processing, Vector processing,multiprocessor system architecture-multiport memory, crossbar switch, timeshared common-bus, dual-bus, Bus arbitration.

12 HOURS

COURSE NO: P2ITTC112	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Logical Organization of Computers	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**MajorTest :60 Marks of 2.5 hours duration**

SUGGESTED READINGS:

1. MALVINO, A.P., LEACH, D.P.: Digital Principles and Applications,Tata McGraw-Hill, 3rd Edn. 1985
2. MILLMAN and HALKIAS: Integrated Electronics, McGraw-Hill.
3. STRANGIO, C.E.: Digital Electronics – Fundamental Concepts and sons, 1985
4. KHAMBATA, J.: Microprocessor and Microcomputer, John Wiley and Applications, PHI, 1984.
5. LIU, Y.GIBSON, G.A.: Microcomputer Systems: The 8086/808,Family, Prentice-Hall 2nd Edn, 1986.
6. ALEXANDRIDIS NIKITAS, A.: Microprocessor System Design Concepts, Galgotia Publications, 1984.
7. STONE, S.: Introduction to Computer Architecture, Galgotia Publications,2nd Edn, 1986.
8. MANO, M.M.: Computer System Architecture, Prentice-Hall, 1976.
9. BAER, J.L.: Computer System Architecture, Computer Science Press, 1980.

SCHEME FOR PAPER SETTING

The question paper shall be divided into two sections (A & B). No question shall be repeated in the question paper.

Section A

There shall be 8 short answer type questions having atleast one question from each unit. Each question will carry 3 marks and the candidates are required to answer all the questions.

(3 x 8 = 24 marks)

Section B

There shall be 3 long answer type questions each set from Unit –III, IV and V with internal choice. Each question shall carry 12 marks.

(3 x 12 = 36 marks)

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M.Sc. IT - FIRST SEMESTER

COURSE NO: P2ITTC113	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Discrete Mathematics	**Minor Test 2:20 Marks of 1 hourduration**
No. of credits: 04	**MajorTest :60 Marks of 2.5 hours duration**

For examinations to be held in Dec- 2025, 2026, and 2027

UNIT - I

Counting techniques:

Basics of counting pigeon hole principles, permutation and combination, Recurrence Relations & their solution (Homogeneous & non-homogenous),Decision trees, Divide & Conquer Relations function, Decision trees

12 HOURS

UNIT - II

Logic & Fuzzy sets:

Logic operators like AND. OR etc., Truth tables; theory of inference and deductions, Mathematical Induction, predicate calculus, predicate and quantifiers. Introduction to fuzzy systems, fuzzy sets, equality of fuzzy sets, normal fuzzy sets, containment, support of a fuzzy set. Alpha-level sets. Basic operation of Fuzzy sets.

12 HOURS

UNIT - III

Graph:

Introduction to Graphs; Incidence and degree; Handshaking Lemma; Isomorphism; Subgraphs and Union of graphs; connectedness; Walks, Paths and Circuits; Components; Connectedness Algorithm, shortest path Algorithms, Eulerian graph; Fleury's algorithms, Hamiltonian graph - Necessary conditions and sufficient conditions; Travelling saleman problem;
Bipartite graphs; Directed Graphs, Binary relations, connectedness in directedGraph.
Matrix representations of graph: Incidence; Adjacency matrices and theirproperties.

12 HOURS

UNIT -IV

Trees:

Properties of trees; Pendant vertices in a tree: Center of a tree; Rooted an binary trees;Spanning Trees – spanning tree algorithms;
Fundamental circuits; Spanning trees of a weighted graph, cutsets and cut –Vertices; Fundamental cutsets; connectivity and separativity;

UNIT - V

Planar graphs & colouring:

Combinatorial and geometric dual; Kuratowski's graphs; Detection of planarity;Thickness and crossings.
Colorings: Vertex coloring, Chromatic number; Chromatic polynomial, The fourcolour problem, edge coloring.

12 HOURS

COURSE NO: P2ITTC113	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Discrete Mathematics	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**MajorTest :60 Marks of 2.5 hours duration**

SUGGESTED READINGS:

1. Harry, F.: Graph Theory: Addison - Wesley Publ. Camp.
2. Trembly, J.P. and Manohar, R.P.: Discrete Mathematical Structures with Applications to Computer Science, McGraw – Hill.
3. Deo, N.: Graph Theory with Applications to Engineering andComputer Science, Prentice-Hall Inc.
4. Krishnamurthy, V.: Combinatorics: Theory and Applications,Affiliated East-West Press Pvt. Ltd.
5. Doerr, A. and Levasseur, K.: Applied Discrete Structures ofComputer Science, Galgotia Publications Ptv. Ltd.

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There shall be 8 short answer type questions having atleast one question from each unit. Each question will carry 3 marks and the candidates are required to answer all the questions.

(3 x 8 = 24 marks)

Section B

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(3 x 12 = 36 marks)

M.Sc. IT - FIRST SEMESTER

COURSE NO: P2ITTC114	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Operating Systems	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**MajorTest :60 Marks of 2.5 hours duration**

For examinations to be held in Dec- 2025, 2026, and 2027

UNIT – I

Introduction:

Evolution of operating systems, operating systems concepts, types of operatingsystems, different views of the operating system, operating system structure.

12 HOURS

UNIT – II

Processes:

Concept, Operating system's view of processes, Interprocess communication,mutual exclusion, Interprocess synchronization, semaphores, Monitors, Message passing, process scheduling and performance criteria, scheduling algorithms, deadlocks, deadlock handling strategies.

12 HOURS

UNIT – III

Memory Management:

Basic memory management, swapping, relocation & protection, virtual memory, paging, page replacement algorithms, Design issues for pagingsystems, segmentation.

12 HOURS

UNIT – IV

File & I/O Management:

Files, directories, disk organization, disk space management, disk scheduling,Protection Mechanisms, I/O devices, I/O buffering, device controllers.

12 HOURS

UNIT –V

Multiprocessors, Distributed OS:

Multiprocessors: Advantages, classification, Interconnection, types ofmultiprocessor OS Distributed system & Network Operating Systems: Introduction, benefits, algorithms for distributed processing, Network OS; Remote Login; remote filetransfer

12 HOURS

COURSE NO: P2ITTC114	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Operating Systems	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**MajorTest :60 Marks of 2.5 hours duration**

SUGGESTED READINGS:

1) Andrew. S. Tanenbaum : Modern operating systems, pearson prentice hall.
2) A. S. Tanenbaum , A. S. Woodhull : Operating systems-design andimplementation, Prentice hall of India pvt. ltd.
3) Milenkovic M : Operating system-concepts and design, McGrawhillinternatinal editions.
4) Silberschartz, Galvin, Gagne : Operating system Principles , WSE wiley.
5) A S Godbole : Operating systems, tata McGraw hill.
6) Bach M. : Design of the UNIX Operating Systems.
7) Deitel H. M. : An Introduction to operating system, addison- wesley publications.8) Madnick & Donovan: Operating systems, mcgraw-hill book co.
9) Understanding Operating Systems – Flynn – Thomson Learning

SCHEME FOR PAPER SETTING

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Section A

There shall be 8 short answer type questions having atleast one question from each unit. Each question will carry 3 marks and the candidates are required to answer all the questions.

(3 x 8 = 24 marks)

Section B

There shall be 3 long answer type questions each set from Unit –III, IV and V with internal choice. Each question shall carry 12 marks.

(3 x 12 = 36 marks)

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M.Sc. IT - FIRST SEMESTER

COURSE NO: P2ITPC180	Internal Evaluation:75 Marks
COURSE TITLE: Practical based on above courses	External Evaluation:75 Marks
No. of credits: 06	

Practical in this course shall be based on all above courses with special emphasis to C-Language.

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M.Sc. IT - SECOND SEMESTER

COURSE NO: P2ITTC211	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Data and File Structures	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**MajorTest :60 Marks of 2.5 hours duration**

For examinations to be held in May- 2026, 2027, and 2028

UNIT - I

Fundamental Notations:

Primitive and composite data types, Time and space complexity of algorithms.Storage structures for arrays & matrices, sparse matrices, strings, pattern matching.

12 HOURS

UNIT - II

Linear Data Structures:

Arrays and Linked Lists, Singly linked lists, Doubly linked list, Circular linked list, Doubly circular linked lists, Dynamic Storage Management. Applications oflinked lists

Stacks and Queues: representation and Applications. Deque, Priority queues

12 HOURS

UNIT - III

Non-Linear Data Structures:

Trees, Binary Trees, Traversing binary trees, Threaded binary trees, Binary search trees - representation and Applications, Heaps - representation and Applications.

Graphs - representation and Applications, Path matrix, Graph traversal- DFS and BFS

12 HOURS

UNIT - IV

File Structures:

Concepts of fields & records, Classification of files, File operations,

File organizations, Variable length records and text files. Indexing structures like B – trees, ISAM. Hashing techniques for Direct Files.

12 HOURS

UNIT - V

Sorting:

Internal and External Sorts, Bubble sort, Insertion sort, Selection Sort,

heap sort & Quick sort, Searching techniques- linear search & binary search , Merging algorithms.

12 HOURS

COURSE NO: P2ITTC211	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Data and File Structures	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**MajorTest :60 Marks of 2.5 hours duration**

SUGGESTED READINGS:

1. Seymour Lipschutz : Theory and Problems of Data StructuresSt. Sehaum's Outline Series in Computers Publisher: Tata McGraw-Hill

2. Richard Gilberg, Behrouz A. Forouzan, "Data Structures: A pseudo codeapproach with C", Second Edition, 2007, CENGAGE India Pvt. Ltd., New Delhi.

3. Horowitz, E., and Sahni, S.: Fundamentals of data StructuresComputer Science Press.

4. Aho, A.V., Hopcraft, and Ullman, J.E.; Data Structures and Algorithms,Addison Weseley.

5. Tanhenbaum, A.M., and Augenstein, M.J.: Data Structures with C,Prentice- Hall, and International.

6. Bhagat Singh and Naps Thompson : Introduction to Data Structures usingPascal Publisher: Galgotia

SCHEME FOR PAPER SETTING

The question paper shall be divided into two sections (A & B). No question shall be repeated in the question paper.

Section A

There shall be 8 short answer type questions having atleast one question from each unit. Each question will carry 3 marks and the candidates are required to answer all the questions.

(3 x 8 = 24 marks)

Section B

There shall be 3 long answer type questions each set from Unit –III, IV and V with internal choice. Each question shall carry 12 marks.

(3 x 12 = 36 marks)

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M.Sc. IT - SECOND SEMESTER

COURSE NO: P2ITTC212	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Data Communication and Networks	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**MajorTest :60 Marks of 2.5 hours duration**

For examinations to be held in May- 2026, 2027, and 2028

Unit – I

Data Communication Concepts : Signal and Data, Transmission, Bit rate, BaudRate, Digital Data, Analog Data, Digital Signal, Analog Signal, Simplex, Half Duplex and Full Duplex Modes of Transmission, Synchronous and Asynchronous Transmission, Modulation: Amplitude Modulation, Frequency Modulation, Phase Modulation, Bandwidth concepts, channel Capacity.
Introduction to Networking: Computer Network, Characteristics andadvantages of networking, Types of networking.

12 HOURS

Unit – II

Transmission media & Network Topologies: Guided and Unguided media, Twisted Pair Cable, Coaxial Cable, FOC(Fiber Optics Cable), Radio,VHF and Microwaves, Satellite link, Different Network Topologies, Their advantages andDisadvantages.
Multiplexing Channels and Concept of Multi Channeling and modulation, pulsecode modulation, Frequency Division Multiplexing, Time Division Multiplexing.

12 HOURS

Unit-III

Network Standards: OSI Model and different Layers, Protocols associated with different OSI layers , Functions and Responsibilities of each layer, SimpleNetwork Management Protocol(SNMP), Simple Mail Transfer Protocol (SMTP), Multipurpose Internet Mail Extension (MIME), Hyper Text Transfer Protocol(HTTP), File Transfer Protocol (FTP), Uniform Resource Locator(URL). Switching: Switching Concept, Circuit Switching , Packet Switching and Message switching.

12 HOURS

COURSE NO: P2ITTC212	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Data Communication and Networks	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**Major Test :60 Marks of 2.5 hours duration**

Unit–IV

Internet: Concepts, History of Internet, TCP-IP, Applications of Internet, email, Telnet, FTP, Remote Login, WWW, Dialup broadband, ISDN:-Elements, Uses of ISDN, Broadband ISDN,Leased line, Internet Service Providers, X.25, IEEE
802.11 - Architecture- BSS, ESS, Physical layer – FHSS, DSSS, OFDM; MAClayer – DCF, PCF, Bluetooth – Architecture, Bluetooth layers – Media layer, base band layer, physical links, L2 CAP

12 HOURS

Unit–V

Internetworking: Principles of Internetworking, Connectivity Devices, Hub, Bridges, Routers, Routing with bridges, Switches, Gateways, VAST, Modems, Connectionless internetworking, Connection oriented internetworking, WirelessProtocols (WIFI, Wimax)

12 HOURS

SUGGESTED READINGS:

1. Behrouz A. Forouzan. Data Communications and Networking. McGraw Hill.
2. Achyut S. Godbole Data Communication & Networking Tata McGraw-Hill
3. Michal Miller, Introduction to Digital And Data Communications, JAICO Pub.
4. Shay, William, Understanding Data Communications and Networks,Brooks/Cole Publishing Company
5. Computer Networks, A. Tanenbaum, PHI Pub.

SCHEME FOR PAPER SETTING

The question paper shall be divided into two sections (A & B). No question shall be repeated in the question paper.

Section A

There shall be 8 short answer type questions having atleast one question from each unit. Each question will carry 3 marks and the candidates are required to answer all the questions.

(3 x 8 = 24 marks)

Section B

There shall be 3 long answer type questions each set from Unit –III, IV and V with internal choice. Each question shall carry 12 marks.

(3 x 12 = 36 marks)

M.Sc. IT - SECOND SEMESTER

COURSE NO: P2ITTC213	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Data Base Management System	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**MajorTest :60 Marks of 2.5 hours duration**

For examinations to be held in May- 2026, 2027, and 2028

UNIT – I

Database Management System Concepts:

File based system, Need of database Management System (DBMS), Components of DBMS, data independence, three level architectural of database, entity relationship model, conversion of ER diagrams to relational Database, conventional file organizations, inverted files, hashing and B tree.

12 HOURS

UNIT – II

Data Models:

Hierarchical, network and relational data models, relational database Design,relation concepts of joins, relational algebra and calculus.

12 HOURS

UNIT – III

Normalisation:

Functional Dependencies, multivalued dependencies, theory of normalization,normal forms.

Concurrency Control:

Data security, recovery management, recovery techniques, concurrency management.

12 HOURS

UNIT – IV

SQL using Oracle:

SQL query processing table creation and management, using inbuilt functions, data integrity constraints, views, joins, SET operators, privileged roles and security policies.

12 HOURS

UNIT – V

Oracle PL/SQL

Architecture, Fundamentals, PL/SQL control structure, Exception, Cursors, procedures and functions, packages database triggers.

12 HOURS

COURSE NO: P2ITTC213	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Data Base Management System	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**MajorTest :60 Marks of 2.5 hours duration**

SUGGESTED READINGS:

1. Bipin C. Desai: An Introduction to Database Systems, West-publishing company.
2. Elmasri, Navathe: Fundamentals of Database Systems, Addison Wesley,Pearson Education.
3. Date, C.J.: An Introduction to Database Systems Addison Wesley PearsonEducation.
4. R.A. Parida, Vinod Sharma: The power of Oracle 9i, Firewall Media publications.
5. V.K. Jain: Database Mgt. System, Wiley India

SCHEME FOR PAPER SETTING

The question paper shall be divided into two sections (A & B). No question shall be repeated in the question paper.

Section A

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(3 x 8 = 24 marks)

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(3 x 12 = 36 marks)

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M.Sc. IT - SECOND SEMESTER

COURSE NO: P2ITTC214	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Algorithm Design and Analysis	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**MajorTest :60 Marks of 2.5 hours duration**

For examinations to be held in May- 2026, 2027, and 2028

UNIT –I

Review of Algorithms and Data Structures

Algorithms, Problems and Instances, Characteristics, Basic Instructions, ControlMechanisms and Control Structures, Stacks and Queues, Trees, Graphs.

Understanding and Analyzing the Problem, Choice of Appropriate Data Structuresand Design Technology, Analyzing an Algorithm.

12 HOURS

Unit –II

Basics of Analysis

Asymptotic Bounds, Concept of Efficiency of an Algorithm, Well Known Asymptotic Functions & Notations.

Well Known Sorting & Searching Algorithms, Best-Case and Worst-Case Analyses, Average-Case Analysis, Amortized Analysis, Analysis of Sorting and Searching algorithms

12 HOURS

Unit – III

Design Techniques

Divide-and-Conquer, General Method, Binary Search, Merge Sort, Quick Sort, Strassen's Matrix multiplication, Exponentiation.

Greedy Algorithms, General Method, Knapsack problem, Job sequencing with dead lines, Minimum Cost Spanning Trees - Kruskal's Algorithm, Prim's Algorithm, Single Source Shortest Paths.

12 HOURS

UNIT – IV

Design Techniques

Dynamic Programming, General Method, Multistage Graphs, All-Pairs shortestPaths, The Principle of Optimality, The Traveling Salesperson Problem, Chained Matrix Multiplication.

Backtracking, General method, 8-queen's problem, Sum of Subsets problem. 12 HOURS

COURSE NO: P2ITTC214	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Algorithm Design and Analysis	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**MajorTest :60 Marks of 2.5 hours duration**

UNIT – V

Classification of Problems & Basic Traversals Techiniques
Non-Deterministic Algorithms, Introduction to NP-Completeness, Establishing NP-Completeness of Problems, NP-Completeness Proofs, NP-Hard Problems,
Basic Traversal and Search techniques: Traversing Trees, Depth-First Search,Breadth-First Search, Best-First Search & Minimax Principle, Topological Sort.

12 HOURS

SUGGESTED READINGS:

1) Ellis Horowitz and Sartaj Sahni – Fundamentals of Computer Algortihms,Galgotia Publ.
2) Aho A V , Hopcroft J E, Ullman J D – The Design and Analysis of ComputerAlgorithms, Addison Wesley.
3) G. Brassared and P. Brately - Fundamental of Algorithmics, Prentice-Hall-ofIndia.
4) D. Harel - Algorithmics : The spirit of computing , Addison Wesley.
5) R. Neapolitian and K. Naimipour – Foundation of Algorithms , D.C. Health-and Company
6) D. E. Knuth - Foundation Algorithms , Narosa Publishing House.

SCHEME FOR PAPER SETTING

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(3 x 12 = 36 marks)

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M.Sc. IT - SECOND SEMESTER

COURSE NO: P2ITTC215	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Object Oriented Programming in Java	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**Major Test :60 Marks of 2.5 hours duration**

For examinations to be held in May- 2026, 2027, and 2028

Unit -I

Java Language Basics, Object Oriented concepts, Java Virtual Machine Concepts, Primitive Data Type And Variables, Java Keywords, Java Operators, Expressions, Control Statements and Arrays.

12 HOURS

Unit –II

Class and Objects, Static methods, Final methods, Constructors, Method Overloading, Inheritance, Access Control, Method Overriding, Dynamic method dispatch, Garbage Collection, Abstract Classes, Polymorphism

12 HOURS

Unit –III

Packages, Interfaces, Nested classes and interfaces, Exceptions Handling, Typesof Exceptions, Writing Exception Subclasses, Multithreading, Synchronization in Java

12 HOURS

Unit –IV

I/O in Java, Byte Stream Classes, Character Stream Classes, Reading and Writing to Console, Reading and Writing Files, The Transient and Volatile Modifiers, The String and String Buffer Class, Network Programming in Java, TCP/IP Sockets and Datagrams.

12 HOURS

Unit –V

The Applet Class, An Applet Skeleton, Graphics and User Interfaces, AWT classes, Building User Interface with AWT, menus, Event Handling, Layouts and Layout Manager, Overview of Java Swing classes.

12 HOURS

COURSE NO: P2ITTC215	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Object Oriented Programming in Java	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**MajorTest :60 Marks of 2.5 hours duration**

SUGGESTED READINGS:

1) Herbert Schildt – "Java2 The Complete Reference" , Tata Mcgraw Hill.
2) E. Balagurusamy - " Programming with JAVA", Tata McGraw Hill.
3) Dietel & Dietel – "Java How to Program" , Pearson Education.
4) Steven Holzner – "Java2 Black Book" , Dreamtech Press.
5) Grant Palmer – "Java Programmer's Reference" , Wrox.
6) Jamie Jaworski – "Java2 Platform Unleashed", TechMedia.
7) Bruce Eckel – "Thinking in Java", Prentice Hall.

SCHEME FOR PAPER SETTING

The question paper shall be divided into two sections (A & B). No question shall be repeated in the question paper.

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(3 x 8 = 24 marks)

Section B

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(3 x 12 = 36 marks)

M.Sc. IT - SECOND SEMESTER

COURSE NO: P2ITPC280	**Internal Evaluation:75 Marks**
COURSE TITLE: Practical based on above courses	**External Evaluation:75 Marks**
No. of credits: 06	

Practical in this course shall be based on all above courses with special emphasis to SQL.

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VOCATIONAL COURSE

COURSE NO: P2ITVC251	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Web Technologies	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**MajorTest :60 Marks of 2.5 hours duration**

For examinations to be held in May- 2026, 2027, and 2028

Unit-I

Web Server, Web site, Web page, URL, Setting up of a web server, Web Browserand its Working. Introduction to HTML, Text Formatting Tags, BODY Tag, HEAD Tag, META Tag,Adding Lists, Table, Frame and Form, Embedding objects.

12 HOURS

Unit II

Introduction to DHTML, Cascading Style Sheet, Defining Styles, Elements of Style, Linking a Style Sheet to an HTML Document, In-line Styles, External Style Sheets, Internal Style Sheets, Multiple Styles.

JavaScript, Variables, String manipulation, Mathematical Functions, Statements, Operators, Arrays, and Functions, Data and Objects, Regular Expressions, Built- in Objects, Events, Data validation, Opening a New Window, Messages and Confirmations, The Status Bar, Writing to a Different Frame, Rollover Buttons, Moving Images.

12 HOURS

Unit III

Java Applets : Life Cycle of Applet, Creating Applets, Adding Applet to HTML File; Running the Applet, Passing Parameters to an Applet, Drawing Images on theapplet, Introduction to SWING. XML, structure of XML document, using DTD with XML, XML Entities, XML schema

12 HOURS

Unit IV

CGI, Servlets, HTTP servlet, Servlet Life Cycle, Servlet Request and Response Interface session tracking, Database connectivity, JDBC vs ODBC Inter-servlet communication.

12 HOURS

Unit V

JSP, scripting Elements, JSP Expression, JSP Declaration, Predefined variables/objects, Working with Databases Using JSP, Inserting, Updating, and Deleting Database Records.

12 HOURS

COURSE NO: P2ITVC251	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Web Technologies	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**MajorTest :60 Marks of 2.5 hours duration**

SUGGESTED READINGS:

1. Web Programming – Chris bates – Wiley Dreamtech India – 2nd Ed. 2002.
2. Internet and Web Technologies – Raj kamal – Tata McGrawHill – 2002
3. The Complete Reference Java 2, Herbert Schildt and Pattrick Manghton, 3e,Tata McGraw Hill
4. Internet and Worldwide Web, H.M. Deitel, P.J. Dietel and A.B. Goldberg,3e, Pearson Education
5. Java Servlets, Karl Moss, 2e, Tata McGraw Hills
6. Mastering Javascript and Jscript, James Jaworski, 2e, BPB
7. HTML 4.0, E. Stephen Mack and Janan Platt, 1e, BPB
8. JSP The complete Reference, Phil Hana
9. Java Servlets and JSP, Bonce W. Perry,
10. "XML: Related Technologies and Programming with Java" PHI
11. The Complete Reference Java Script, Thomas Powell and Fritz Schneider,2e, Tata McGraw Hill
12. Java Server pages in 24 Hours, Jose Annunziato and Stephanie FeslerKaminaris 1e, Techmedia

SCHEME FOR PAPER SETTING

The question paper shall be divided into two sections (A & B). No question shall be repeated in the question paper.

Section A

There shall be 8 short answer type questions having atleast one question from each unit. Each question will carry 3 marks and the candidates are required to answer all the questions.

(3 x 8 = 24 marks)

Section B

There shall be 3 long answer type questions each set from Unit –III, IV and V with internal choice. Each question shall carry 12 marks.

(3 x 12 = 36 marks)

Note (Vocational Course): This 4 credit course is mandatory for the students who intend to exit after first year of the M.Sc. IT (2 year) programme and desire to get diploma of completion of first year, this course shall be held during the summer term.

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M.Sc. IT - THIRD SEMESTER

COURSE NO: P2ITTC311	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Web Technologies	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**MajorTest :60 Marks of 2.5 hours**
duration	

For examinations to be held in Dec- 2026, 2027 and 2028

Unit-I

Web Server, Web site, Web page, URL, Setting up of a web server, Web Browserand its Working. Introduction to HTML, Text Formatting Tags, BODY Tag, HEAD Tag, META Tag,Adding Lists, Table, Frame and Form, Embedding objects.

12 HOURS

Unit II

Introduction to DHTML, Cascading Style Sheet, Defining Styles, Elements of Style, Linking a Style Sheet to an HTML Document, In-line Styles, External Style Sheets, Internal Style Sheets, Multiple Styles.

JavaScript, Variables, String manipulation, Mathematical Functions, Statements, Operators, Arrays, and Functions, Data and Objects, Regular Expressions, Built- in Objects, Events, Data validation, Opening a New Window, Messages and Confirmations, The Status Bar, Writing to a Different Frame, Rollover Buttons, Moving Images.

12 HOURS

Unit III

Java Applets : Life Cycle of Applet, Creating Applets, Adding Applet to HTML File; Running the Applet, Passing Parameters to an Applet, Drawing Images on theapplet, Introduction to SWING. XML, structure of XML document, using DTD with XML, XML Entities, XML schema

12 HOURS

Unit IV

CGI, Servlets, HTTP servlet, Servlet Life Cycle, Servlet Request and Response Interface session tracking, Database connectivity, JDBC vs ODBC Inter-servlet communication.

12 HOURS

Unit V

JSP, scripting Elements, JSP Expression, JSP Declaration, Predefined variables/objects, Working with Databases Using JSP, Inserting, Updating, and Deleting Database Records.

12 HOURS

COURSE NO: P2ITTC312	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Artificial Intelligence	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**MajorTest :60 Marks of 2.5 hours duration**

SUGGESTED READINGS:

1. Charniak, E.: Introduction of Artificial Intelligence, Narosa Publishing House.
2. Winston, P.H.: LISP, Narosa Publishing House.
3. Milner, Common LISP: A Tutorial, Prentice-Hall Inc. 1988.
4. Marcellus: Expert System Programming in TURBO PROLOG, Prentice-Hall-Inc. 1989.
5. Elaime, R.: Artificial Intelligence, 1983.
6. Hunt, E.B.: Artificial Intelligence, Academic Press, 1975.
7. Lloyd, J.: Foundation of Logic Programming Springer-Verlog, 1982.
8. Clark, K.L. & McCabe, F.G.: Micro-prolog, Prentice-Hall, India, 1987.
9. Clockskin, W.F. and Mellish, C.S.: Programming in Prolog, Narosa Publishing House.

SCHEME FOR PAPER SETTING

The question paper shall be divided into two sections (A & B). No question shall be repeated in the question paper.

Section A

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Section B

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(3 x 12 = 36 marks)

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M.Sc. IT - THIRD SEMESTER

COURSE NO: P2ITTC313

COURSE TITLE: Compiler Design

No. of credits: 04

Minor Test 1:20 Marks of 1 hour duration

Minor Test 2:20 Marks of 1 hour duration

MajorTest :60 Marks of 2.5 hours duration

For examinations to be held in Dec- 2026, 2027 and 2028

Unit-I

Compiler Structure: Compilers and Translators, Analysis- Synthesis Model of Compilation, Various Phases of Compiler, Pass Structure, Bootstrapping & Compiler Construction Tools. Lexical Analysis: Interface with input, parser and symbol table, token, lexeme and patterns, difficulties in lexical analysis, Error Reporting, Regular definition, Transition diagrams, LEX. Capabilities of Lexical Analyzer

12 HOURS

Unit-II

Finite Automata: Nondeterministic Finite Automata, Deterministic Finite Automata, SubsetConstruction, Thompson's construction, DFA State Minimization.

The Syntactic Specification of Programming Languages: CFG, Derivation and Parse tree,Ambiguity, Capabilities of CFG.

12 HOURS

Unit-III

Basic Parsing Techniques: Top-Down parsers with backtracking, Recursive Descent Parsers, Predictive Parsers, Nonrecursive Predictive Parsers, Bottom–up Parsers, Shift- Reduce Parsing, Operator Precedence Parsers, LR parsers.

YACC, Syntax Directed Definitions, Type checking

12 HOURS

Unit-IV

Run Time Memory Management: Static and Dynamic storage allocation, stack basedmemory allocation schemes, Symbol Table management.

Error Detection and Recovery: Lexical phase errors, Syntactic phase errors, Semanticerrors.

Intermediate Code Generation: Different Intermediate forms: three address code,Quadruples & Triples.

12 HOURS

Unit-V

Sources of optimization, Local optimization, Loop optimization, Peephole optimization. Issues in the design of Code Generator, Basic Blocks and Flow Graphs, Transformationson Basic Blocks, DAG, Code Generation Algorithm, Register Allocation and Assignment.

12 HOURS

COURSE NO: P2ITTC313	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Compiler Design	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**MajorTest :60 Marks of 2.5 hours duration**

SUGGESTED READINGS:

1. Alfred V Aho , Jeffrey D. Ullman: "Principles of Compiler Design", Narosa Publ. House.
2. A.V. Aho, R. Sethi and J.D Ullman: "Compiler: principle, Techniques and Tools",Addison Wesley.
3. Tremblay and Sorenson: "The theory and Practice of Compiler Writing" – McGraw Hill.
4. Tremblay and Sorenson: "An Implementation Guide to Complier Writing" – McGrawHill.
5. Londan: "Compiler Construction" - Thomson Learning
6. H.C. Holub: "Compiler Design in C", Prentice Hall.
7. Apple: "Modern Computer Implementation in C: Basic Design", Cambridge press
8. Compiler Construction: Principles & Practice: Londa – Thomson Learning

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The question paper shall be divided into two sections (A & B). No question shall be repeated in the question paper.

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M.Sc. IT - THIRD SEMESTER

COURSE NO: P2ITTC314	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Software Engineering	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**MajorTest :60 Marks of 2.5 hours duration**

For examinations to be held in Dec- 2026, 2027 and 2028

UNIT-I

Software Process

Introduction –S/W Engineering Paradigm , life cycle models (water fall, incremental, spiral, WINWIN spiral, evolutionary, prototyping, object orientedsystem engineering, computer based system verification, validation, life cycle process, development process, system engineering hierarchy.

12 HOURS

UNIT-II

Software Requirements

Functional and non functional user system, requirement engineering process, feasibility studies, requirements , elicitation, validation and management , software prototyping, prototyping in the software process – rapid prototyping techniques – user interface prototyping -S/W document. Analysis and modeling – data, functional and behavioral models – structured analysis and data dictionary.

12 HOURS

UNIT-III

Design Concepts and Principles

Design process and concepts – modular design – design heuristic – design model and document. Architectural design – software architecture – data design –architectural design – transform and transaction mapping – user interface design

– user interface design principles. Real time systems - Real time software design

– system design – real time executives – data acquisition system - monitoring and control system. SCM – Need for SCM – Version control – Introduction to SCM process – Software configuration items.

12 HOURS

UNIT-IV

Testing

Taxonomy of software testing – levels – test activities – types of s/w test – black box testing – testing boundary conditions – structural testing – test coverage criteria based on data flow mechanisms – regression testing – testing in the large. S/W testing strategies – strategic approach and issues - unit testing – integration testing – validation testing – system testing and debugging.

12 HOURS

COURSE NO: P2ITTC314	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Software Engineering	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**MajorTest :60 Marks of 2.5 hours duration**

UNIT-V

Software Project Management
Measures and measurements – S/W complexity and science measure – sizemeasure – data and logic structure measure – information flow measure. Software cost estimation – function point models – COCOMO model- Delphi method.- Defining a Task Network – Scheduling – Earned Value Analysis – Error Tracking - Software changes – program evolution dynamics – software maintenance – Architectural evolution. Taxonomy of CASE tools.

12 HOURS

SUGGESTED READINGS:

1. Roger S.Pressman, Software engineering- A practitioner's Approach, McGraw-Hill International Edition
2. Ian Sommerville, Software engineering, Pearson education Asia.
3. Pankaj Jalote- An Integrated Approach to Software Engineering, SpringerVerlag.
4. James F Peters and Witold Pedryez, "Software Engineering – An EngineeringApproach", John Wiley and Sons, New Delhi.

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(3 x 12 = 36 marks)

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M.Sc. IT – THIRD SEMESTER

COURSE NO: P2ITTC315	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Computer Graphics	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**MajorTest :60 Marks of 2.5 hours duration**

For examinations to be held in Dec- 2026, 2027 and 2028

UNIT-I

Concept of Computer Graphics and its applications. Graphics input and output devices. Graphic display devices (refreshing display devices, Random scan display device, Raster scan devices.

12 HOURS

UNIT-II

Concept of Graphic Primitives, points, lines etc., line generation algorithms (DDAand Bresemhams) Circle and its properties, generation of circle (mid point algorithms), Polygon filling,using scan line filing algorithm.

Point and Line clipping, Cohen Sutherland and Cyrus – Beck Line Clipping algorithms.

12 HOURS

UNIT-III

Concept of 2D transformations. Basic Transformations (translation, rotation, scaling, shearing) composite transformations, transformations using homogeneous coordinate systems.

3D transformations (Translation, rotation, scaling, shearing, reflection).

12 HOURS

UNIT-IV

Introduction, objectives of viewing transformation. Concept of projections: parallel projection, orthographic and oblique projections, isometric projections, perspective projections (concept of vanishing points, single point, perspective transformation, 2- point and 3-point perspective transformation and general perspective transformation with COP at the origin.

12 HOURS

COURSE NO: P2ITTC315	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Computer Graphics	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**MajorTest :60 Marks of 2.5 hours duration**

UNIT-V

Polygon representation methods (polygon surfaces, polygon tables, plain equation,polygon meshes) Hermite and Bezier curves and their properties. Surface of revolution.
Concept of visible surface detection.Methods of visible surface detection (depthbuffer, scan line, area sub division)

12 HOURS

SUGGESTED READINGS:

1. Giloi, Wk.: Interactive Computer Graphics, Prentice-Hall.
2. Newman, W., Sproul, R.F.: Principles of Interactive Computer Graphics,McGraw-Hill.
3. Rogers, D.F.: Procedural Elements for Computer Graphics, McGraw-Hill.
4. Harrington, S.: Computer Graphics: A Programming Approach, TataMcGraw- Hill.
5. Foley, J.D., Van Dam, A.: Fundamentals of Interactive Computer Graphics,Addison Wesley.
6. Hearn, D., Baker, and P.M.: Computer Graphics, Prentice-Hall.
7. Tosijasu, L.K.: Computer Graphics, Springer Verlog.
8. Rogers, D.F. McGraw Hill: Mathematical Elements of Computer Graphics,

SCHEME FOR PAPER SETTING

The question paper shall be divided into two sections (A & B). No question shall be repeated in the question paper.

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(3 x 12 = 36 marks)

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M.Sc. IT - THIRD SEMESTER

COURSE NO: P2ITPC380	**Internal Evaluation:75 Marks**
COURSE TITLE: Practical based on above courses	**External Evaluation:75 Marks**
No. of credits: 06	

Practical in this course shall be based on all above courses with special emphasis to JAVA and Web Technologies.

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M.Sc. IT - FOURTH SEMESTER

COURSE NO: P2ITTC411	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Android Programming	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**Major Test :60 Marks of 2.5 hours duration**

For examinations to be held in May- 2027, 2028 and 2029

UNIT-I

Android Fundamentals

Introduction to Android and Eclipse, Dalvik Virtual Machine & .apk file extension, Basic Building blocks - Activities, Services, Broadcast Receivers & Content providers, UI Components - Views & notifications, Android API levels (versions & version names). Android Debug Bridge (adb) tool.

12 HOURS

UNIT-II

Building Application Framework

Using the Android Documentation, Introduction to Android Manifest File, Debugging Applications with DDMS, Working with the Android Using Other Android Tools, Designing a Typical Android Application Using the Application Context, Working with Activities, Working with Intents, Working with Dialog, Using Dialogs to Collect User Input.

12 HOURS

UNIT-III

Application Enrichment with Powerful Android Features

Adding Support for Location-Based Services, Adding Network Support, Adding More Network Support, Adding Social Features, Creating a Home Screen App Widget, Working with Files.

12 HOURS

UNIT-IV

Adding More Features to Android Application

Internationalizing Android Application, Designing Advanced User Interfaces, Working with Multimedia, Working with 2D and 3D Graphics, Testing Android Applications, Accessing Underlying Device Hardware.

12 HOURS

COURSE NO: P2ITTC411	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Android Programming	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**Major Test :60 Marks of 2.5 hours duration**

UNIT-V

Debugging and Publishing Android Application
Debugging the Android Application, Testing Android Application, Introduction toAndroid Market(Google Play Store), Publishing Android Application.

12 HOURS

SUGGESTED READINGS :

1. Android Programming for Beginners,by John Horton, Packt Publishing Limited,2015.
2. Android Application Development in 24 Hours, Sams Teach Yourself (4th Edition)byCarmen Delessio, Lauren Darcey, Shane Conder, Sams Publishing, 2015.
3. Android Programming: The Big Nerd Ranch Guide, Big Nerd Ranch Guides; 3edition, 2017.
4. Android App Development for Dummies by Michael Burton, Wiley; Thirdedition,2015.
5. Head First Android Development by Dawn Griffiths, David Griffiths, O'Reilly; 1edition, 2015.
7. Android wireless application development ,2nd edition by shane conder ,Laurendarcey –Addison - Welsey
8. Android Application Development by Rick rogers,John Lombardo – O'Reilly
9. Professional Android 2 application development by Reto Meier –Wrox

SCHEME FOR PAPER SETTING

The question paper shall be divided into two sections (A & B). No question shall be repeated in the question paper.

Section A

There shall be 8 short answer type questions having atleast one question from each unit. Each question will carry 3 marks and the candidates are required to answer all the questions.

(3 x 8 = 24 marks)

Section B

There shall be 3 long answer type questions each set from Unit –III, IV and V with internal choice. Each question shall carry 12 marks.

(3 x 12 = 36 marks)

-X-

M.Sc. IT - FOURTH SEMESTER

COURSE NO: P2ITTE412	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Programming in VB.NET	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**Major Test :60 Marks of 2.5 hours duration**

For examinations to be held in May- 2027, 2028 and 2029

UNIT-I

Introduction to VB.NET, Event Driven Programming, Need for VB.NET, .NET Framework, .NET Architecture, The Just-In-Time Compiler, .NET Framework Class Library Introduction, VB.NET Development Environment, Creating VB.NET applications, Using simple components, Introduction to forms, data types, variables, type conversion, constants, operators and expressions.

12 HOURS

UNIT-II

Conditional Statements and Loops, Procedures, Argument passing mechanism, Arrays, Error Handling, Classes and objects, Properties, methods and events, Constructors and Destructors, Inheritance, Access modifiers : Public, Private, Protected, Friend, Overloading and Overriding, Interfaces, Polymorphism.

12 HOURS

UNIT-III

Windows Applications, Windows Forms, Text Boxes, Buttons, Labels, Check Boxes, and Radio Buttons, List Boxes, Combo Boxes, Picture Boxes, Scrollbars, Splitters, Timer, Menus, Built-in Dialogs, Image List, Tree Views, List Views, Toolbars, Status Bar and Progress bars.

12 HOURS

UNIT-IV

Database Connectivity, Connection Objects, Command Objects, Data Adapters, Datasets, Data Reader, Connection to database with Server Explorer, Multiple Table Connection, Data binding , Navigating Data Source, Data Grid View, Data form wizard, Data Validation.

12 HOURS

UNIT-V

File handling using FileStream, StreamWriter, StreamReader, BinaryReader, BinaryWriter classes, File and Directory Classes.

Introduction to Crystal Reports, Connection to Database, Table, Queries, Building Report, Modifying Report, Working with formula fields, Parameter fields, SQL in Crystal Report.

12 HOURS

COURSE NO: P2ITTE412	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Programming in VB.NET	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**Major Test :60 Marks of 2.5 hours duration**

SUGGESTED READINGS:

1) Francesco Balena, "Programming Microsoft Visual Basic.NET", MicrosoftPress.
2) Steven Holzner et al., "Visual Basic 2005 Programming – Black Book",Dreamtech Press.
3) Steven Holzner, Bob Howell, "ADO.NET Programming in Visual Basic .NET", Prentice Hall.
4) Kevin Goff, Rod Paddock, "Pro VS 2005 Reporting using SQL Serverand Crystal Reports", APress
5) George Peck, "The Complete Reference- Crystal Reports", TataMcGraw Hill

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Section B

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(3 x 12 = 36 marks)

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M.Sc. IT - FOURTH SEMESTER

COURSE NO: P2ITTE413	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Python	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**Major Test :60 Marks of 2.5 hours duration**

For examinations to be held in May- 2027, 2028 and 2029

UNIT - I

Introduction to Python Programming Language: Python Interpreter/Shell, Identifiers, Keywords, Statements and Expressions, Variables, Operators, Precedence and Associativity, Data types, Indentation, Comments, Reading Input, Print Output, Type Conversions, The type() function and Is operator, Dynamic and Strongly Typed Language. Control Flow Statements: The if Decision Control Flow Statement, The if...else Decision Control Flow Statement, The if...elif...else Decision Control Statement, Nested if Statement, The while Loop, The for Loop, The continue and break Statements.

12 HOURS

UNIT - II

Functions: Types of Functions; Function Definition- Syntax, Function Calling, Passing Parameters/ arguments, the return statement; Default Parameters; Command line Arguments; Key Word Arguments. Creating and Storing Strings; Accessing String Characters; the str() function; Operations on Strings- Concatenation, Comparison, Slicing and Joining, Traversing; Format Specifiers; Escape Sequences; Raw and Unicode Strings; Python String Methods; Illustrative programs.

12 HOURS

UNIT - III

Lists: Creating Lists, Basic List Operations, Indexing and Slicing in Lists, Built-In Functions Used on Lists, List Methods, Dictionaries: Creating Dictionary, Accessing and modifying key:value pairs in Dictionaries, Built-In Functions Used on Dictionaries, Dictionary methods, The del Statement. Tuples and Sets: Creating Tuples, Basic Tuple Operations, Indexing and Slicing in Tuples, Built-In Functions Used on Tuples, Relations between Tuples and Lists, Relations between Tuples and Dictionaries, Tuple Methods, Using zip() Function, Sets, Set Methods, Frozen set.

12 HOURS

UNIT - IV

Files: Types of files, Creating and Reading Text Data, File Methods to Read and Write Data, Reading and Writing Binary Files,The Pickle module, Reading and writing CSV files, Object Oriented Programming: Classes and Objects, Creating Classes in Python, Creating Objects in Python, The Constructor Method, Classes with Multiple Objects, Class Attributes versus Data attributes, Encapsulation, Inheritance, The Polymorphism.

12 HOURS

UNIT-V

Exceptions: Concept of Exceptions, Exceptions in python, Detecting and handling exceptions, Exceptions as strings, Raising Exceptions, Standard Exceptions. Multithreading: Understanding threads, Forking threads, synchronizing the threads, programming using multithreading. Database Interaction: SQL database connection using python. Creating , accessing and modifying tables through python.

12 HOURS

COURSE NO: P2ITTE413	**Minor Test 1:20 Marks of 1 hour duration**
COURSE TITLE: Python	**Minor Test 2:20 Marks of 1 hour duration**
No. of credits: 04	**Major Test:60 Marks of 2.5 hours duration**

SUGGESTED READINGS:

1) Gowrishankar S, Veena A, "Introduction to Python Programming", 1st Edition, CRC Press/Taylor & Francis, 2018. ISBN-13: 978-0815394372.
2) Mark Lutz, "Learning Python", 5th edition, Orelly Publication, 2013, ISBN 978- 1449355739.
3) R. Nageswara Rao, "Core Python Programming", Dreamtech Press, 2nd Edition, 2018.
4) Kamthane, A. N., & Kamthane, A.A. , "Programming and Problem Solving with Python", McGraw Hill Education, 2017.
5) Wesley J. Chun, "Core Python Applications Programming", 3rd Edition, Pearson Education, 2016.
6) Ljubomir Perkovic, "Introduction to Computing Using Python- An Application Development Focus",Wiley,2012.

SCHEME FOR PAPER SETTING

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(3 x 8 = 24 marks)

Section B

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(3 x 12 = 36 marks)

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M.Sc. IT - FOURTH SEMESTER

COURSE NO: P2ITRC480	**Internal Evaluation: 100 Marks**
COURSE TITLE: Project Work	**External Evaluation: 300 Marks**
No. of credits: 16	

For examinations to be held in May- 2027, 2028 and 2029

The project in fourth semester shall carry 400 marks distributed as follows:

Project Component		Marks
Mid-Semester Presentation & Internal Evaluation		100
End-Semester Evaluation	Project Evaluation	200
	Project Viva-voce	100
	Total: -	400

In this course a student is required to undertake up a project work of four to six months duration. During this period the student shall work on a real life project under the supervision of a teacher of the department. The guidelines for undergoing the project work within the department or outside the department shall be as follows:

- Each student shall carry out the project work in an Industrial Organization/ Institution/Department as approved by the Department.
- In the beginning of the Semester, each student will prepare and submit a synopsis for approval of the department.
- Each student will work under the supervision of a teacher of the department. The allocation of the supervisor shall be done by the department.
- There shall be a Mid-Semester Presentation of each student where in the student will make a PowerPoint presentation of his/her work completed within that period. The date of Mid-Semester Presentation will be fixed by the department tentatively after two months duration.
- All the students are required to keep in touch with the respective project supervisor.
- The evaluation of Mid-Semester presentation shall be internal, to be done at the departmental level.
- End semester evaluation will be carried out by external and internal examiners.

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