



MUSLIM ARTS COLLEGE

(Autonomous)

(Accredited by NAAC with B+ grade & Affiliated to Manonmaniam Sundaranar University,
Tirunelveli; Recognized US 2(f) 12 (B) of UGC Act.)

Thiruvithancode, Kanyakumari District, Tamil Nadu - 629174.

DEPARTMENT OF INFORMATION TECHNOLOGY

CBCS SYLLABUS

Learning Outcome-based Curriculum Framework for

INFORMATION TECHNOLOGY (M.Sc.)

*Applicable for students admitted from June 2026 as per the Resolutions of the Academic Council Meeting held
on 01.06.2026*

Vision

- To strive towards becoming a centre of excellence in education, transforming students' lives through innovation, professionalism, and lifelong learning.

Mission

- To provide innovative and quality educational opportunities
- To create an environment that enables students to learn, grow, and succeed
- To develop technical expertise and professional skills
- To prepare students to contribute effectively to the digital and technological world

Academic and Professional Attributes of the Graduates

1. **Advanced Computing Knowledge**
Demonstrate in-depth knowledge of advanced computing concepts, software engineering, networking, databases, cloud computing, cybersecurity, artificial intelligence, and emerging information technologies.
2. **Research and Innovation**
Apply research methodologies, analytical reasoning, and innovative thinking to investigate complex computing problems and develop effective technology-driven solutions.
3. **Problem Solving and Critical Thinking**
Analyze, design, implement, and evaluate efficient computational solutions for real-world problems using modern tools, algorithms, and software engineering practices.
4. **Technical and Professional Competence**
Develop, deploy, and maintain enterprise-level software systems using current technologies, programming paradigms, frameworks, and industry standards.
5. **Communication and Leadership Skills**
Communicate technical information effectively, work collaboratively in multidisciplinary teams, and demonstrate leadership in academic, research, and professional environments.
6. **Ethics and Social Responsibility**
Uphold professional ethics, legal standards, cybersecurity principles, environmental sustainability, and social responsibility in the design and application of information technology.
7. **Lifelong Learning and Adaptability**
Continuously upgrade technical knowledge and professional skills to adapt to rapidly evolving technologies, industry trends, and global challenges.
8. **Entrepreneurship and Employability**
Demonstrate entrepreneurial skills, innovation, and industry readiness for careers in software development, system administration, data science, cloud computing, cybersecurity, research, consultancy, and higher education.
9. **Global Perspective**
Understand the global impact of information technology and contribute effectively to digital transformation, sustainable development, and international technological advancement.
10. **Professional Excellence**
Exhibit the confidence, technical expertise, project management ability, and research competence required for leadership roles in academia, industry, and research organizations.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEOs	Upon completion of the M.Sc. Information Technology Degree Programme, graduates are expected to	Mapping with Mission
PEO1	Demonstrate advanced knowledge in Information Technology, including software engineering, data analytics, networking, cloud computing, cybersecurity, artificial intelligence, and emerging technologies to pursue successful professional careers and higher studies.	M1, M2, M3
PEO2	Apply analytical thinking, research methodologies, computational techniques, and modern software tools to design, develop, and implement innovative solutions for complex computing problems in academia, industry, and society.	M2, M3, M4
PEO3	Exhibit professional ethics, leadership, teamwork, effective communication, and social responsibility while contributing to the development of sustainable and secure information technology solutions.	M3, M4, M5
PEO4	Engage in lifelong learning, research, innovation, entrepreneurship, and continuous professional development to adapt to technological advancements and global challenges in Information Technology.	M1, M4, M5

Programme Outcomes (POs)

POs	Upon successful completion of the M.Sc. Information Technology Degree Programme, students will be able to	Mapping with PEOs
PO1: Advanced Disciplinary Knowledge	Demonstrate advanced knowledge of Information Technology, including software engineering, data science, artificial intelligence, cloud computing, cybersecurity, networking, database systems, and emerging technologies.	PEO1
PO2: Critical Thinking and Analytical Skills	Analyze complex computing problems, evaluate alternative solutions, and apply logical reasoning, mathematical foundations, and computational techniques to solve real-world challenges.	PEO1, PEO2
PO3: Problem Solving and Innovation	Design, develop, implement, and evaluate innovative software systems and technology-based solutions using modern computing tools, methodologies, and research-oriented approaches.	PEO1, PEO2
PO4: Research Competence	Apply scientific research methods, data analysis, experimentation, and evidence-based reasoning to investigate advanced computing problems and contribute to technological innovation.	PEO2, PEO4
PO5: Modern Tool Usage	Select and effectively utilize contemporary software tools, programming frameworks, cloud platforms, development environments, and emerging technologies for professional practice and research.	PEO1, PEO2
PO6: Professional	Apply ethical principles, legal standards,	PEO3

Ethics and Social Responsibility	cybersecurity practices, environmental awareness, and social responsibility in the development and deployment of Information Technology solutions.	
PO7: Leadership, Teamwork and Communication	Demonstrate leadership, teamwork, project management, and effective communication skills while working in multidisciplinary and multicultural environments.	PEO3
PO8: Project Management and Entrepreneurship	Plan, manage, and execute IT projects efficiently while demonstrating entrepreneurial abilities, innovation, and decision-making skills in professional practice.	PEO3, PEO4
PO9: Lifelong Learning	Engage in self-directed learning, professional development, research, and continuous skill enhancement to adapt to evolving technologies and global industry requirements.	PEO4
PO10: Global Perspective and Sustainability	Understand the societal, economic, environmental, and global impact of Information Technology and contribute to sustainable development through responsible technological innovation.	PEO3, PEO4

Programme Specific Outcomes (PSOs)

PSOs	Programme Specific Outcomes	Mapping with POs
PSO1	Demonstrate advanced proficiency in software development, programming paradigms, algorithms, database systems, computer networks, cloud computing, and cybersecurity to design and implement robust IT solutions.	PO1, PO2, PO3, PO5
PSO2	Apply research methodologies, analytical techniques, machine learning, artificial intelligence, data analytics, and emerging technologies to solve complex computational and interdisciplinary problems.	PO2, PO3, PO4, PO5, PO9
PSO3	Design, develop, test, deploy, and manage enterprise-level applications, distributed systems, web technologies, mobile applications, and intelligent systems using modern tools and frameworks.	PO1, PO3, PO5, PO8
PSO4	Demonstrate leadership, innovation, entrepreneurship, project management, and effective communication while working collaboratively in multidisciplinary teams and professional environments.	PO6, PO7, PO8, PO10
PSO5	Exhibit professional ethics, social responsibility, lifelong learning, and research aptitude to contribute effectively to academia, industry, and society while adapting to emerging trends in Information Technology.	PO4, PO6, PO7, PO9, PO10

Mapping of Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)

POs / PSOs	PSO1	PSO2	PSO3	PSO4	PSO5
PO1: Advanced Disciplinary Knowledge	3	2	3	1	2
PO2: Critical Thinking and Analytical Skills	3	3	2	2	2
PO3: Problem Solving and Innovation	3	3	3	2	2
PO4: Research Competence	2	3	2	2	3
PO5: Modern Tool Usage	3	3	3	2	2
PO6: Professional Ethics and Social Responsibility	1	2	1	3	3
PO7: Leadership, Teamwork and Communication	2	2	2	3	3
PO8: Project Management and Entrepreneurship	2	2	3	3	2
PO9: Lifelong Learning	2	3	2	2	3
PO10: Global Perspective and Sustainability	1	2	2	3	3

●3 – High Correlation

●2 – Moderate Correlation

●1 – Low Correlation

COURSES OFFERED

SEMESTER I

Part	Course Code	Title of the Course	Credits	Hours / Week
Core Course -I	NMIT11	Mathematical Foundation For Information Technology	4	5
Core Course - II	NMIT12	Python Programming	4	5
Core Course - III	NMIT13	Java With Networking	4	4
Core Course -PI	NMITP1	Python Programming - Practical	3	4
Core Course -PII	NMITP2	Java With Networking - Practical	3	4
Elective Course - I	NEIT11	Distributed Operating System	3	4
Elective Course - II	NEIT12	Internet Of Things And Its Applications	3	4
Total			20	30

SEMESTER I

CORE COURSE I: MATHEMATICAL FOUNDATION FOR INFORMATION TECHNOLOGY

Course Code:

Subject Code	Category	L	T	P	S	Credits	Inst. Hours	Marks		
								CIA	External	Total
NMIT11	Core	Y	Y	-	-	4	5	25	75	100

Pre-requisite

Students should ideally have a foundational background in basic algebra, set theory, and symbolic logic.

Learning Objectives

The course aims to:

1. Propositional function, quantifiers, rules of inference.
2. Binary relations, posets, Hasse diagram, lattice, Functions, and pigeonhole principle.
3. Algebraic structures like groups and elementary combinatorics.
4. How to generate various types of functions recursively and solve them.
5. Various concepts in graphs like its representation, planar graphs, graph coloring and trees.

Course Outcomes (COs)

Upon successful completion of the course, students will be able to:

CO No.	Course Outcomes	BT Level
CO1	Apply mathematical concept for Information Technology problem solving.	K1
CO2	Design mathematical models for real time projects and applications.	K2
CO3	Analyze each learning model from a different algorithmic approach.	K3
CO4	Acquire knowledge of relations, functions and mathematical logic	K4
CO5	Understand the basic concepts of Graph Theory	K3

Bloom's Taxonomy Levels

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, K6 – Create

Course Content

Units	Contents	No. of Hours
I	MATRIX ALGEBRA Matrices-Rank of a matrix - Solving system of equations Eigenvalues and Eigenvectors – Cayley- Hamilton theorem - Inverse of a matrix.	15
II	BASIC SET THEORY Basic definitions- Venn diagrams and set operations - Laws of set theory – Relations- Properties of relations - Matrices of relations - Closure operations on relations Functions Injective, subjective and objective functions.	15
III	COMBINATORICS Review of Permutation and Combination - Mathematical Induction - Pigeon hole principle - Principle of Inclusion and Exclusion	15
IV	MATHEMATICAL LOGIC Propositions and logical operators - Truth table - Propositions generated by a set - Equivalence and implication - Basic laws - Some more connectives - Functionally complete set of connectives - Normal forms	15
V	GRAPH THEORY Graphs: An Introduction, Special Graphs, Subgraph, Degree of a Vertex - Paths and Circuits, Euler Paths, Hamiltonian Circuit, the Travelling Salesman Problem, Shortest Path Problem	15
	Total	75

S. No.	Text Book
1	J.P Trembley, R. Manohar, "Discrete Mathematical structures with applications to Computer Science", Tata McGrawHill publications, 2017
2	Seymour Lipschutz, Marc Lipson, "Discrete Mathematics", Revised Third Edition, Schaum's Outline Series, Tata McGraw Hill Publications, 2002.
3	John Vince, "Foundation Mathematics for Computer Science, A Visual Approach", Springer, 2015.
4	Jayant Ganguly, "Mathematical Foundations for Computer Science Engineers", PHI, 2011

S. No.	Reference Books
1	K. Trivedi, "Probability and Statistics with Reliability, Queuing, and Computer Science Applications", Wiley, 2016.
2	M. Mitzenmacher and E. Upfal, "Probability and Computing: Randomized Algorithms

	and Probabilistic Analysis”, Cambridge University Press, 2005.
3	Alan Tucker, “Applied Combinatorics”, 6th Edition, Wiley 2012.

S. No.	Web Resources
1	https://nptel.ac.in/courses/106/106/106106183/
2	https://nptel.ac.in/courses/111/105/111105035/
3	https://nptel.ac.in/courses/111/102/111102133/
4	https://nptel.ac.in/courses/106/103/106103015/

Mapping with Programme Outcomes

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	2	2	2	1	1	1	2	1
CO2	3	3	3	2	2	1	2	2	2	1
CO3	3	3	3	3	2	1	2	2	2	1
CO4	3	3	2	3	2	1	1	2	2	1
CO5	2	3	3	2	2	1	1	2	2	1

3 – Strong, 2 – Medium, 1 - Low

Mapping with Programme Specific Outcomes

CO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	1	1
CO2	3	3	2	2	2
CO3	3	3	3	2	2
CO4	3	3	2	2	3
CO5	2	3	3	2	2
Weightage	14	14	12	9	10
Weighted percentage of Course Contribution to PSOs	2.8	2.8	2.4	1.8	2

Mapping Scale: 3 – Strong Correlation, 2 – Moderate Correlation, 1 – Low Correlation

FIRST YEAR - SEMESTER I

CORE II - PYTHON PROGRAMMING

Subject Code	Category	L	T	P	S	Credits	Inst. Hours	Marks		
								CIA	External	Total
NMIT12	Core	Y	Y	-	-	4	5	25	75	100

Learning Objectives

The course aims to:

1. Develop a strong understanding of Python programming fundamentals and programming paradigms.
2. Apply Python data structures, control statements, functions, modules, and object-oriented programming techniques to solve computational problems.
3. Design and develop GUI-based applications using Python widgets and event-driven programming.
4. Build database-driven applications using Python and MongoDB for real-world data management.
5. Develop analytical and problem-solving skills through the implementation of efficient Python programs and software applications.

Course Outcomes

Upon successful completion of the course, students will be able to:

CO No.	Course Outcomes	BT Level
CO1	Explain the basic concepts in python language.	K2
CO2	Apply the various data types and identify the usage of control statements, loops, functions and modules in python for processing the data.	K4
CO3	Analyze and solve problems using basic constructs and techniques of python.	K2
CO4	Assess the approaches used in the development of interactive application.	K4
CO5	To build real time programs using python.	K5

Bloom's Taxonomy Levels

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, K6 – Create

Course Content

Units	Contents	No. of Hours
I	Core Python: Introduction - Python Basics: Comments -Statements and syntax - variable Assignment - Identifiers - Python objects: Built-in-types - Internal types - Standard Type operators - Standard type Built-in-functions. Numbers: Introduction to Numbers - Integers - Floating point numbers - Complex numbers - Operators - Built-in and factory functions-Conditionals and Loops - Sequences: Strings, Lists and Tuples	15
II	Mapping and set types. - Functions and functional programming: Introduction - Calling functions - Creating functions - passing functions - Formal arguments - Variable - Length Arguments - Functional Programming- Variable Scope - Recursion	15

III	Modules: Modules and Files - namespaces Importing Modules - Features - Built-in functions. Object Oriented Programming: Introduction - Object Oriented Programming - Encapsulation Inheritance - Polymorphism -Errors and Exceptions: Introduction Exceptions in Python.	15
IV	GUI Programming: Introduction - Using Widgets: Core widgets- Generic widget properties - Labels Buttons Radio Buttons - Check Buttons – Text – Entry - List Boxes - Menus -Frame - Scroll Bars- Scale	15
V	Database Programming: Connecting to a database using MongoDB - Creating Tables - INSERT-UPDATE - DELETE - READ operations.	15
	Total	75

S. No.	Text Book
1	Wesley J. Chun, (2007), "Core Python Programming", Pearson Education, Second Edition
2	Charles Dierbach, (2015), "Introduction to Computer Science Using Python A Computational Problem-Solving Focus", Wiley India Edition
3	Martin C Brown, (2018), "The Complete Reference Python", McGraw Hill Education (India) Private Limited

S. No.	Reference Books
1	Mark Lutz, (2013), "Learning Python Powerful Object Oriented Programming", O'reilly Media, 5 th Edition.
2	Timothy A. Budd, (2011), "Exploring Python", Tata MCGraw Hill Education Private Limited, First Edition.
3	Allen Downey, Jeffrey Elkner, Chris Meyers, (2012), "How to think like a computer scientist: learning with Python"

S. No.	Web Sources
1	http://interactivepython.org/courselib/static/pythonds
2	http://www.ibiblio.org/g2swap/byteofpython/read/
3	http://www.diveintopython3.net/
4	http://docs.python.org/3/tutorial/index.html
5	http://interactivepython.org/courselib/static/pythonds

Mapping Of Course Outcomes With Programme Outcomes (POs)

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	2	1	2	1	1	1	2	1
CO2	3	3	3	2	3	1	2	2	2	1
CO3	3	3	3	3	2	1	2	2	2	1
CO4	3	3	3	2	3	2	2	3	2	2
CO5	3	3	3	3	3	2	2	3	3	2

3 – Strong, 2 – Medium, 1 – Low

Mapping with Programme Specific Outcomes

CO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	1	1
CO2	3	3	3	2	2
CO3	3	3	3	2	2
CO4	3	3	3	3	2
CO5	3	3	3	3	3
Weightage	15	14	14	11	10
Weighted percentage of Course Contribution to PSOs	3	2.8	2.8	2.2	2

Mapping Scale: 3 – Strong Correlation, 2 – Moderate Correlation, 1 – Low Correlation

FIRST YEAR - SEMESTER I**CORE III - JAVA WITH NETWORKING**

Subject Code	Category	L	T	P	S	Credits	Inst. Hours	Marks		
								CIA	External	Total
NMIT13	Core	Y	Y	-	-	4	5	25	75	100

Learning Objectives

The course aims to:

1. To understand the core principles of Java programming, object-oriented concepts, and Java language features.
2. To develop applications using Java packages, interfaces, exception handling, multithreading, and JDBC.
3. To design graphical user interface (GUI) applications using AWT, Swing, and event handling mechanisms.
4. To develop dynamic web applications using Applets, Servlets, JSP, JavaBeans, and the MVC architecture.
5. To build enterprise-level Java applications integrating database connectivity, networking concepts, and web technologies.

Course Outcomes

Upon successful completion of the course, students will be able to:

CO No.	Course Outcomes	BT Level
CO1	Understand and explain programming language, constructs Java mechanisms, OOP and Internet programming concepts.	K2
CO2	Apply logical constructs as well as include Object oriented features, Packages, Interfaces, Exceptions and Threads , JDBC, Internet programming technologies	K4
CO3	Compare and contrast classical and advanced Java in terms of features, architecture, platform and technologies.	K2
CO4	Choose an approach to solve real world problem from the acquired knowledge of Java.	K4
CO5	Create programs that make strong use of classes and objects and develop JDBC, GUI, Web and Enterprise based applications	K5

Bloom's Taxonomy Levels

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, K6 – Create

Course Content

Units	Contents	No. of Hours
I	The Genesis of Java: Java's Magic, The Java Buzzwords-An Overview of Java - Data types, Variables, Arrays-Operators-Control Statements-Introducing Classes - A Close Look at Methods and Classes-Inheritance	15
II	String Handling Functions - Collections Framework: Collection Classes, String Tokenzier, Date, Calendar Abstract Classes Packages and Interfaces: Packages - Access Protection Importing Packages - Interfaces	15

III	Exception Handling: Exception types - Creating your own exceptions - Multithreaded Programming: Creating a Thread, Creating Multiple Threads, Using isAlive() and join(), Thread Priorities, Synchronization, Inter-thread Communication, Suspending, Resuming and Stopping Threads - JDBC	15
IV	The Applet Class-Event Handling - Introducing the AWT: Working with windows, graphics and Text, Using AWT Controls, Layout Managers and Controls - Developing Java Server Pages.	15
V	Developing Servlets -Structuring Web application with the MVC pattern - Sessions and Cookies - Using JSP tags with JavaBeans	15
	Total	75

S. No.	Text Book
1	Herbert Schildt, (2004), "Java 2: The Complete Reference", Fifth Edition, Tata McGraw Hill, New Delhi.
2	Joel Murach, (2008), "Andrea Steelman,, Murach's Java Servlets and JSP", Second Edition, Shroff Publishers

S. No.	Reference Books
1	Matthew Mac Donald, (2002), "ASP.NET : The Complete Reference", MC Graw Hill.
2	Vlada Matena, (2003), "Applying Enterprise JavaBeans", Second Edition, Addison Wesley.
3	Cay S Horstmann & Gary Cornell, Core Java Vol II Advanced Features, Eighth Edition, Addison Wesley.
4	Bruce W Perry (2004), Java Servlets & JSP Cook Book, Second edition, O'reilly Media.

S. No.	Web Sources
1	http://netbeans.org/kb/docs/javaee/javaee-intro.html
2	http://www.jsptube.com/
3	http://articles.sitepoint.com/article/java-servlets-1
4	http://www.java-tips.org/javatutorials/tutorials/introduction-to-java-servlets-with-netbeans.html
5	http://download.oracle.com/javase/tutorial/javabeans/index.html

Mapping with Programme Outcomes

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
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CO1	3	3	2	2	3	1	1	1	2	1
CO2	3	3	3	2	3	1	2	2	2	1
CO3	3	3	3	2	3	1	2	2	2	1
CO4	3	3	3	3	3	2	2	2	2	2
CO5	3	3	3	3	3	2	3	3	3	2

3 – Strong, 2 – Medium, 1 – Low

Mapping with Programme Specific Outcomes

CO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	1	2
CO2	3	3	3	2	2
CO3	3	3	3	2	2
CO4	3	3	3	3	2
CO5	3	3	3	3	3
Weightage	15	14	15	11	11
Weighted percentage of Course Contribution to PSOs	3	2.8	3	2.2	2.2

Mapping Scale: 3 – Strong Correlation, 2 – Moderate Correlation, 1 – Low Correlation

FIRST YEAR - SEMESTER I

CORE COURSE PI- PYTHON PROGRAMMING - PRACTICAL

Subject Code	Category	L	T	P	S	Credits	Inst. Hours	Marks		
								CIA	External	Total
NMITP1	Core	Y	Y	-	-	4	4	25	75	100

Learning Objectives

The course aims to:

1. Develop practical programming skills using Python syntax, operators, and control structures.
2. Apply Python data structures, functions, modules, and recursion to solve computational problems.
3. Design and implement object-oriented programs using classes, objects, inheritance, and polymorphism.
4. Develop efficient programs for real-world applications using appropriate Python programming techniques.
5. Enhance problem-solving, debugging, and analytical skills through hands-on Python programming exercises.

Course Outcomes

Upon successful completion of the course, students will be able to:

CO No.	Course Outcomes	BT Level
CO1	Understand the significance of control statements, loops and functions in creating simple programs.	K2
CO2	Apply the core data structures available in python to store, process and sort the data.	K5
CO3	Analyze the real time problem using suitable python concepts.	K2
CO4	Assess the complex problems using appropriate concepts in python.	K4
CO5	Develop the real time applications using python programming language.	K2

Bloom's Taxonomy Levels

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyse, K5 – Evaluate, K6 – Create

Course Content

S. No.	Contents	No. of Hours
	PRACTICAL	75
	1. Python Basic programs 2. Control Structures 3. Lists 4. Functions and Recursions 5. Modules 6. String Processing 7. Dictionaries and Sets 8. Classes and Objects 9. Polymorphism 10. Inheritance	
	Total	75

S. No.	Text Books
1	Wesley J. Chun, (2007), “Core Python Programming”, Pearson Education, Second Edition
S. No.	Reference Works
1	Mark Lutz, (2013), “Learning Python Powerful Object Oriented Programming”, O’reilly Media, 5 th Edition.
2	Timothy A. Budd, (2011), “Exploring Python”, Tata MCGraw Hill Education Private Limited, First Edition.
3	Allen Downey, Jeffrey Elkner, Chris Meyers, (2012), “How to think like a computer scientist: learning with Python”
S. No.	Web Sources (URL)
1	http://interactivepython.org/courselib/static/pythonds
2	http://www.ibiblio.org/g2swap/byteofpython/read/
3	http://www.diveintopython3.net/
4	http://docs.python.org/3/tutorial/index.html

Mapping Of Course Outcomes With Programme Outcomes (POs)

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	2	1	3	1	1	1	2	1
CO2	3	3	3	2	3	1	2	2	2	1
CO3	3	3	3	3	3	1	2	2	2	1
CO4	3	3	3	3	3	2	2	2	2	2
CO5	3	3	3	3	3	2	3	3	3	2

3 – Strong, 2 – Medium, 1 - Low

Mapping Of Course Outcomes With Programme Specific Outcomes (PSOs)

CO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	1	1
CO2	3	3	3	2	2
CO3	3	3	3	2	2
CO4	3	3	3	3	2
CO5	3	3	3	3	3
Weightage	15	14	14	11	10
Weighted percentage of Course Contribution to PSOs	3	2.8	2.8	2.2	2

FIRST YEAR - SEMESTER I

CORE COURSE PII– JAVA WITH NETWORKING – PRACTICAL

Subject Code	Category	L	T	P	S	Credits	Inst. Hours	Marks		
								CIA	External	Total
NMITP2	Core	Y	Y	-	-	2	4	25	75	100

Learning Objectives

The course aims to:

1. Using Graphics, Animations and Multithreading for designing Simulation and Game based applications.
2. Design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing and Event Handling.
3. Design and develop Web applications.
4. Designing Enterprise based applications by encapsulating an application's business logic.
5. Designing applications using pre-built frameworks.

Course Outcomes

Upon successful completion of the course, students will be able to:

CO No.	Course Outcomes	BT Level
CO1	Learn the Internet Programming, using Java Applets.	K2
CO2	Create a full set of UI widgets and other components, including windows, menus, buttons, checkboxes, text fields, scrollbars and scrolling lists, using Abstract Windowing Toolkit (AWT) & Swings.	K5
CO3	Apply event handling on AWT and Swing components.	K2
CO4	learn to access database through Java programs, using Java Data Base Connectivity (JDBC)	K4
CO5	Create dynamic web pages, using Servlets and JSP.	K2

Bloom's Taxonomy Levels

K1 – Remember, **K2** – Understand, **K3** – Apply, **K4** – Analyse, **K5** – Evaluate, **K6** – Create

Course Content

S. No.	Contents	No. of Hours
	1. Write a program to create a JTable. 2. Convert an image in RGB to a grayscale image. 3. Count number of access times of the servlet page. 4. Write a program to display a string in frame window with pink color as background. 5. Create chat application using either TCP or UDP protocol. 6. Implement TCP Server for transferring files using Socket and Server Socket. 7. Implement Student information system using JDBC and RMI. 8. Write a program to design simple calculator with the use of Grid Layout. 9. Write an Applet which will lay two sound notes in a sequence continuously use the play () methods available in the applet class and the methods in the audio clip interface. 10. Write a program to demonstrate the use of InetAddress class and its factor methods. 11. Develop simple shopping cart application using EJB [Stateful Session Bean]	75
	Total	75

S. No.	Text Books
1	Java the Complete Reference, ninth edition by Herbert Schild, Publisher: McGraw Hills
S. No.	Reference Works
1	Head First EJB 3.0 by Kathy Sierra, Bert Bates, Publisher: O'Reilly Media
2	Head First Servlets and JSP by Bryan Basham, Kathy Sierra & Bert Bates, Publisher: O'Reilly Media
3	Just Hibernate, A Lightweight Introduction to the Hibernate Framework by Madhusudhan Konda, Publisher: O'Reilly Media
4	Programming Jakarta Struts, 2nd Edition by Chuck Cavaness, Publisher: O'Reilly Media
S. No.	Web Sources (URL)
1	https://nptel.ac.in/courses/106/105/106105191/
2	https://onlinecourses.nptel.ac.in/noc19_cs84/preview

Mapping Of Course Outcomes With Programme Outcomes (POs)

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	2	1	3	1	1	1	2	1
CO2	3	3	3	2	3	1	2	2	2	1
CO3	3	3	3	2	3	2	2	2	2	1
CO4	3	3	3	3	3	2	2	2	2	2
CO5	3	3	3	3	3	2	3	3	3	2

3 – Strong, 2 – Medium, 1 - Low

Mapping with Programme Specific Outcomes (PSOs)

CO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	1	1
CO2	3	3	3	2	2
CO3	3	3	3	2	2
CO4	3	3	3	3	2
CO5	3	3	3	3	3
Weightage	15	14	14	11	10
Weighted percentage of Course Contribution to PSOs	3	2.8	2.8	2.2	2

Mapping Scale: 3 – Strong Correlation, 2 – Moderate Correlation, 1 – Low Correlation

SEMESTER I

ELECTIVE COURSE-I (EC-I) DISTRIBUTED OPERATING SYSTEM

Subject Code	Category	L	T	P	S	Credits	Inst. Hours	Marks		
								CIA	External	Total
NEIT11	Elective -I	Y	Y	-	-	2	2	25	75	100

Learning Objectives

The course aims to:

1. To understand the fundamentals, architecture, and design principles of distributed operating systems.
2. To explain inter-process communication mechanisms, message passing, and remote procedure call (RPC) techniques in distributed environments.
3. To analyze synchronization, process management, clock synchronization, and concurrency control in distributed systems.
4. To understand the design and implementation of distributed file systems, replication, fault tolerance, and transaction management.
5. To develop the ability to evaluate and design efficient, reliable, and scalable distributed computing solutions for modern networked environments.

Course Outcomes

Upon successful completion of the course, students will be able to:

CO No.	Course Outcomes	BT Level
CO1	Know the basic concepts of operating system	K2
CO2	Understand the details regarding the message passing	K3
CO3	Understand the Remote Procedure calls	K3
CO4	To know the synchronization	K4
CO5	To know about the distributed file system	K3

Bloom's Taxonomy Levels

K1 – Remember, **K2** – Understand, **K3** – Apply, **K4** – Analyse, **K5** – Evaluate, **K6** – Create

Course Content

Unit	Contents	No. of Hours
I	Fundamentals: What is Distributed Operating System? - Evolution of Distributed Computing System Distributed Computing System Models - Why are Distributed Computing Systems gaining popularity? - What is a Distributed Computing System? - Issues in Designing Distributed Computing System - Introduction to Distributed Computing Environment (DCE). Computer Networks: Introduction Network Types LAN Technologies-WAN Technologies Communication Protocols - Internetworking - ATM Technology.	6
II	Message Passing: Introduction-Desirable features of Good Message Passing System-Issues in IPC Message Passing-Synchronization – Buffering-Multi datagram Messages-Encoding and Decoding of Message Data Process Addressing - Failure Handling - Group Communication	6
III	Remote Procedure Calls: Introduction - The RPC Model Transparency of RPC- Implementing RPC mechanism-Stub Generation-RPC Messages-Marshaling Arguments and Results-Server Management-Parameter Passing Semantic-Call Semantics-Communication Protocol for RPC's - Complicated RPC's - Client Server Binding-Exception Handling – Security-Some Special Types of RPC's-RPC in Heterogeneous Environments-Light weight RPC.	6
IV	Synchronization: Introduction - Clock Synchronization - Event Ordering - Mutual Exclusion - Deadlock - Election Algorithms. Process Management: Introduction-Process Migration-Threads.	6
V	Distributed File System: Introduction - Desirable features of a Good Distributed File System-File Models-File Accessing Models-File Sharing Semantics-File Caching Schemes - File Replication-Fault Tolerance - Atomic Transactions - Design Principles.	6
	Total	30

S. No.	Text Book
1	Pradeep K Sinha, "Distributed Operating Systems", PHI Learning, 2012.
2	Andrew S Tanenbaum, "Distributed Operating Systems", FirstEdition. PHI 2002

S. No.	Reference Books
1	George Coulouris, Gordon Blair, Jean Dollimore, Tim Kindberg, "Distributed Systems - Concepts and Design", Fifth Edition Pearson 2017.
2	Manish Varshney, Shanoo Agarwal, "Concepts Of Distributed System", CBS Publisher and Distributors, 2016.

S. No.	Web Resources
1	https://tldp.org/
2	https://www.geeksforgeeks.org/distributed-operating-system/
3	https://www.tutorialspoint.com/distributed_operating_system/index.htm
4	https://www.ibm.com/docs/
5	https://learn.microsoft.com/en-us/

MAPPING OF COURSE OUTCOMES WITH PROGRAMME OUTCOMES (POs)

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	2	2	2	1	1	1	2	1
CO2	3	3	3	2	2	1	2	2	2	1
CO3	3	3	3	3	2	1	2	2	2	1
CO4	3	3	3	3	3	2	2	2	2	2
CO5	3	3	3	3	3	2	2	3	3	2

3 – Strong Correlation, 2 – Moderate Correlation, 1 – Low Correlation.

MAPPING OF COURSE OUTCOMES WITH PROGRAMME SPECIFIC OUTCOMES (PSOs)

CO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	1	1
CO2	3	3	2	2	2
CO3	3	3	3	2	2
CO4	3	3	3	3	2
CO5	3	3	3	3	3
Weightage	15	14	13	11	10
Weighted percentage of Course Contribution to PSOs	3	2.8	2.6	2.2	2

3 – Strong Correlation, 2 – Moderate Correlation, 1 – Low Correlation

FIRST YEAR – SEMESTER I

ELECTIVE COURSE-II: INTERNET OF THINGS AND ITS APPLICATIONS

Subject Code	Category	L	T	P	S	Credits	Inst. Hours	CIA	External	Total
NEIT12	Elective -II	Y	Y	-	-	2	2	25	75	100

Learning Objectives

The course aims to:

1. To impart the knowledge on IoT Architecture.
2. To know the Protocol used in IoT.
3. To understand the various technologies and the application areas relating to IoT implementations.

Course Outcomes

Upon successful completion of the course, students will be able to:

CO No.	Course Outcomes	BT Level
CO1	Outline the fundamental concepts and Terminologies of IoT	K1
CO2	Determine the IoT enabling technologies, M2M and IoT, fundamentals and technological challenges faced by IoT in terms of Safety, privacy and trust	K2
CO3	Identify the different levels, models and standards of IoT and application areas in domain specific IoT	K3
CO4	Analyze the physical design, logical design, architecture Overview of M2M and IoT and reference models of IoT Architecture	K3
CO5	Assess the application areas and illustrate the implementation of IoT	

Course Content

Unit	Contents	No. of Hours
I	Introduction to IoT: - Introduction to Internet of Things: Introduction-Physical Design of IoT- Logical Design of IoT- IoT Enabling Technologies - IoT Levels & Deployment Templates	6
II	Domain Specific IoT: Introduction-Home Automation-Cities Environment-Energy-Retail- Logistics-Agriculture-Industry-Health & Lifestyle. IoT and M2M: Introduction - M2M- Difference between IoT and M2M - SDN and NFV for IoT.	6
III	M2M to IoT- An Architectural Overview: Building an Architecture Main design principles and needed capabilities-An IoT Architecture Outline-Standard Considerations. M2M and IoT Technology Fundamentals: Devices and Gateways-Local and wide area Networking-Data Management.	6
IV	IoT Architecture - Architecture Reference Model: Introduction Reference Model and Architecture- IoT Reference Model: IoT Domain Model-Information Model-Functional Model- Communication Model Safety, Privacy, Trust, Security Model IoT.	6
V	Implementation Examples: The Smart Grid-Introduction-Smart Metering-Smart House-Smart energy city. Case Study: Commercial Building automation today and in the future.	6
	Total	30

S. No.	Text Books
1	ArshdeepBahga, Vijay Madiseti, —Internet of Things – A hands on approach, Universities Press, 2015
2	Jan Holler, VlasiosTsiatsis , Catherine Mulligan, Stamatis , Karnouskos, Stefan Avesand. David Boyle, “From Machine-to Machine to the Internet of Things – Introduction to a New Age of Intelligence”, Elsevier, 2014.

S. No.	Reference Books
1	David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry, IoT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet of Things, Cisco Press, 2017
2	Olivier Hersent, David Boswarthick, Omar Elloumi , —The Internet of Things – Key applications and Protocols, Wiley, 2012
3	Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), —Architecting the Internet of Things, Springer, 2011

S. No.	Web Resources
1	https://www.tutorialspoint.com/internet_of_things/
2	https://www.geeksforgeeks.org/introduction-to-internet-of-things-iot-set-1/
3	https://www.slideshare.net/khusuma/domain-specific-iot
4	https://www.slideshare.net/PascalBodin/an-introduction-to-m2m-iot-technologies
5	https://www.smartgrid.gov/the_smart_grid/smart_grid.html

MAPPING OF COURSE OUTCOMES WITH PROGRAMME OUTCOMES (POs)

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	2	1	2	1	1	1	2	1
CO2	3	3	2	2	3	2	2	2	2	2
CO3	3	3	3	2	3	2	2	2	2	2
CO4	3	3	3	3	3	2	2	2	2	2
CO5	3	3	3	3	3	3	3	3	3	3

Mapping Scale: 3 – Strong Correlation, 2 – Moderate Correlation, 1 – Low Correlation

MAPPING OF COURSE OUTCOMES WITH PROGRAMME SPECIFIC OUTCOMES (PSOs)

CO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	1	1
CO2	3	3	2	2	2
CO3	3	3	3	2	2
CO4	3	3	3	2	3
CO5	3	3	3	3	3
Weightage	15	14	13	10	11
Weighted percentage of Course Contribution to PSOs	3	2.8	2.6	2	2.2

Mapping Scale

3 – Strong Correlation, 2 – Moderate Correlation, 1 – Low Correlation