

SEMESTER V

Branch: B.Sc.(IT)	Semester-V
Subject Code: 5101	Lecture: 04 Credit: 04
Course Opted	Core Course – 15 (Theory)
Subject Title	MOBILE APPLICATION DEVELOPMENT

Course Objectives:

- To facilitate students to understand android SDK
- To help students to gain a basic understanding of Android application development
- To inculcate working knowledge of Android Studio development tool

Course Outcomes:

At the end of this course, students will be able to:

- Identify various concepts of mobile programming that make it unique from programming for other platforms,
- Critique mobile applications on their design pros and cons,
- Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces,
- Program mobile applications for the Android operating system that use basic and advanced phone features, and
- Deploy applications to the Android marketplace for distribution.

Modules	Sr. No.	Topic and Details	No of Lectures Assigned	Marks Weightage %
UNIT-I	1	Introduction: What is Android, Android versions and its feature set The various Android devices on the market, The Android Market application store, Android Development Environment – System Requirements, Android SDK, Installing Java, and ADT bundle – Eclipse Integrated Development Environment (IDE), Creating Android Virtual Devices (AVDs)	3	6
	2	Android Architecture Overview and Creating an Example Android Application: The Android Software Stack, The Linux Kernel, Android Runtime – Dalvik Virtual Machine, Android Runtime – Core Libraries, Dalvik VM Specific Libraries, Java Interoperability Libraries, Android Libraries, Application Framework, Creating a New Android Project ,Defining the Project Name and SDK Settings, Project Configuration Settings, Configuring the Launcher Icon, Creating an Activity, Running the Application in the AVD, Stopping a Running Application, Modifying the Example Application, Reviewing the Layout and Resource Files	3	6
	3	Android Software Development Platform: Understanding Java SE and the Dalvik Virtual Machine , The Directory Structure of an Android Project , Common Default Resources Folders , The	4	8

		Values Folder , Leveraging Android XML, Screen Sizes , Launching Your Application: The AndroidManifest.xml File , Creating Your First Android Application		
UNIT-II	4	Android Framework Overview: Android, Application Components, Android Activities: Defining the UI, Android Services: Processing in the Background, Broadcast Receivers: Announcements and Notifications Content Providers: Data Management, Android Intent Objects: Messaging for Components, Android Manifest XML: Declaring Your Components	4	8
	5	Understanding Android Views, View Groups and Layouts: Designing for Different Android Devices, Views and View Groups, Android Layout Managers, The View Hierarchy, Designing an Android User Interface using the Graphical Layout Tool	4	8
	6	Graphical User Interface Screen with views: Displaying Text with TextView, Retrieving Data from Users, Using Buttons, Check Boxes and Radio Groups, Getting Dates and Times from Users, Using Indicators to Display Data to Users, Adjusting Progress with SeekBar, Working with Menus using views	4	8
UNIT-III	7	Displaying Pictures: Gallery, ImageSwitcher, GridView, and ImageView views to display images, Creating Animation	4	8
	8	Files, Content Providers, and Databases: Saving and Loading Files, SQLite Databases, Android Database Design, Exposing Access to a Data Source through a Content Provider, Content Provider Registration, Native Content Providers	4	8
	9	Intents and Intent Filters: Intent Overview, Implicit Intents, Creating the Implicit Intent Example Project, Explicit Intents, Creating the Explicit Intent Example Application, Intents with Activities, Intents with Broadcast Receivers	5	10
UNIT-IV	10	A Basic Overview of Android Threads and Thread handlers: An Overview of Threads, The Application Main Thread, Thread Handlers, A Basic Threading Example, Creating a New Thread, Implementing a Thread Handler, Passing a Message to the Handler	5	10
	11	Messaging and Location-Based Services: Sending SMS Messages Programmatically, Getting Feedback after Sending the Message Sending SMS Messages Using Intent Receiving, sending email, Introduction to location-based service, configuring the Android Emulator for Location-Based Services, Geocoding and Map-Based Activities	5	10
	12	Multimedia: Audio, Video, Camera: Playing Audio and Video, Recording Audio and Video, Using the Camera to Take and Process Pictures	5	10
TOTAL			50	100

Text Books:

1. Lauren Darcey and Shane Conder, "Android Wireless Application Development", Pearson Education, 2nd ed. (2011)

Reference Books:

1. Reto Meier, "Professional Android 2 Application Development", Wiley India Pvt Ltd
2. Mark L Murphy, "Beginning Android", Wiley India Pvt Ltd
3. Android Application Development All in one for Dummies by Barry Burd, Edition: I

Branch: B.Sc.(IT)	Semester-V
Subject Code: 5201	Lecture: 04 Credit: 04
Course Opted	Core Course – 15 (Practical)
Subject Title	MOBILE APPLICATION DEVELOPMENT -LAB

Course Objectives:

- To facilitate students to understand android SDK
- To help students to gain a basic understanding of Android application development
- To inculcate working knowledge of Android Studio development tool

Course Outcomes:

At the end of this course, students will be able to:

- Identify various concepts of mobile programming that make it unique from programming for other platforms,
- Critique mobile applications on their design pros and cons,
- Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces,
- Program mobile applications for the Android operating system that use basic and advanced phone features, and
- Deploy applications to the Android marketplace for distribution.

Modules	Sr. No.	Topic and Details	No of Lectures Assigned	Marks Weightage %
UNIT-I	1	Introduction: Installing Java, and ADT bundle – Eclipse Integrated Development Environment (IDE), Creating Android Virtual Devices (AVDs)	2	4
	2	Android Architecture Overview and Creating an Example Android Application: Creating a New Android Project, Defining the Project Name and SDK Settings, Project Configuration Settings, Configuring the Launcher Icon, Creating an Activity, Running the Application in the AVD, Stopping a Running Application, Modifying the Example Application, Reviewing the Layout and Resource Files	2	4
	3	Android Software Development Platform: Creating Your First Android Application Developing a billing app in android.	2	4

UNIT-II	4	Understanding Android Views , View Design an application representing a simple calculator.	2	4
	5	Graphical User Interface Develop an application for working with Menus and Screen Navigation.	2	4
	6	Displaying Pictures: Add a drawable object an Image in the res/drawable folder	2	4
UNIT-III	7	Files, Content Providers, and Databases: Design a simple to-do list application using SQLite Develop an application demonstrating Internal Storage to store private data on the device memory. Develop an application for working with Notifications.	4	8
	8	Intents and Intent Filters: Intent Overview, Implicit Intents, Creating the Implicit Intent Example Project, Explicit Intents, Creating the Explicit Intent Example Application, Intents with Activities, Intents with Broadcast Receivers	3	6
UNIT-IV	9	A Basic Overview of Android Threads and Thread handlers: Using Worker thread write Android code for a click listener that downloads an image from a separate thread and displays it in an ImageView.	2	4
	10	Messaging and Location-Based Services: Develop an application for working with location based services. Develop an application for creating a proximity sensor.	2	4
	11	Multimedia: Audio, Video, Camera: Develop an application for working with device camera. Develop an application for working with graphics and animation.	2	4
TOTAL			25	50

Text Books:

1. Lauren Darcey and Shane Conder, "Android Wireless Application Development", Pearson Education, 2nd ed. (2011)

Reference Books:

1. Reto Meier, "Professional Android 2 Application Development", Wiley India Pvt Ltd
2. Mark L Murphy, "Beginning Android", Wiley India Pvt Ltd
3. Android Application Development All in one for Dummies by Barry Burd, Edition: I

Branch: B.Sc.(IT)	Semester-V
Subject Code: 5102	Lecture: 02 Credit: 02
Course Opted	Core Course – 16
Subject Title	INTERNET OF THINGS

Course objectives:

- To understand general concepts of Internet of Things (IoT)
- To learn and understand the Sensing, Actuation, Networking basics, Communication Protocols
- To understand applications of Internet of Things

Course Outcomes:

After successful completion of this course, student will be able to

- Understand general concepts of Internet of Things (IoT)
- Recognize various devices, sensors and applications
- Analyze various M2M and IoT architectures (Analyze)
- Understand various IOT applications

Modules	Sr. No.	Topic and Details	No of Lectures Assigned	Marks Weightage %
UNIT-I	1	Introduction to IoT Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs	5	10
UNIT-II	2	M2M to IoT – A Basic Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.	10	20
UNIT-III	3	Network & Communication aspects Wireless medium access issues, MAC protocol survey, Survey routing protocols, Sensor deployment & Node discovery, Dataaggregation & dissemination	10	20
	4	Challenges in IoT Design challenges, Development challenges, Security challenges, Other challenges	5	10
UNIT-IV	5	Internet of Things Privacy, Security and Governance: Introduction, Overview of Governance, Privacy and Security Issues, Contribution from FP7 Projects, Security, Privacy and Trust in IoT-	10	20

		Data-Platforms for Smart Cities, First Steps Towards a Secure Platform, Smartie Approach. Data Aggregation for the IoT in Smart Cities, Security		
	6	Case Studies/ Assignments: Domain specific applications of IoT Home automation, Industry applications, Surveillance applications, Other IoT applications.	10	20
TOTAL			50	100

Text Book:

1. Vijay Madiseti and Arshdeep Bahga, "Internet of Things (A Hands-on Approach)", 1st Edition, VPT, 2014

Reference Books:

1. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013
2. Cuno Pfister, Getting Started with the Internet of Things, O'Reilly Media, 2011, ISBN: 978-1-4493-9357-1

Web References:

1. <https://www.udemy.com/internet-of-things-iot-for-beginners-getting-started/>
2. <http://playground.arduino.cc/Projects/Ideas>
3. <http://runtimeprojects.com>
4. <http://www.megunolink.com/articles/arduino-garage-door-opener>
5. <http://www.willward1.com/arduino-wifi-tutorial> Syllabus for Bachelor of Technology Computer Engineering
6. <http://www.makeuseof.com/tag/pi-overdose-heres-5-raspberry-pi-alternatives>
7. <http://www.electronicshub.org/arduino-project-ideas>
8. <http://homeautomationserver.com> i) <http://www.toptechboy.com/arduino-lessons> j) <https://www.eprolabs.com>
9. <https://www.youtube.com/watch?v=dC2GdEWHRxQ&list=PLy6JR9IR8VKOZBpDcETsH9Tb6B4bcaTXf> b) https://www.youtube.com/watch?v=kLd_JyvKV4Y c) <https://www.youtube.com/watch?v=TkA2LJctU1>

Branch: B.Sc.(IT)	Semester-V
Subject Code: 5103	Lecture: 04 Credit: 04
Course Opted	Core Course - 17
Subject Title	INTERNET SECURITY

Course Objectives:

- Introducing the arena of Internet security & related concepts to the students.
- To understand various concepts related to data confidentiality.
- To expertise the art of Cryptography & various related techniques.
- To learn implementation of digital signature & digital signature certificate.
- To learn various authentication mechanism.
- To learn about various internet security protocols.
- Learning about firewall, its various configurations & implementation.
- Real world case studies.

Course Outcomes:

- Complete understanding of various threats faced by the Internet and related services.
- Protection against cyber-attacks by implementing various security protocols.
- Understanding nature of various cyber-attacks & developing defences against such attacks.

Modules	Sr. No.	Topic and Details	No of Lectures Assigned	Marks Weightage %
UNIT - I	1	Introduction: Need for security, security approaches, principles of security, Types of attacks, types of attacks on cipher text, cryptanalyst	5	10
	2	Cryptographic techniques: Plain text and Cipher text, Substitution Techniques, Transposition Techniques, Encryption, decryption, Symmetric, Asymmetric Key Cryptography, Data Encryption Standard (DES), IDEA,RC5, Blowfish, AES	5	10
	3	Asymmetric Key Cryptography, The RSA algorithm, Symmetric and Asymmetric Key Cryptography together, Digital signatures and related algorithms, Modular Arithmetic (addition, multiplication, inverse, exponentiation)	5	10
UNIT-II	4	Public Key Infrastructure (PKI): Digital Signatures, Digital Certificates, Private key management, the PKIX model, PKCS, XML, PKI and security	5	10
	5	Internet Security Protocols: Basic concepts, SSL, SHTTP,TSP, SET, SSL versus SET,3D secure protocol, Electronic Money, Email security, WAP security	5	10
	6	Authentication: Password Based, Address Based, Cryptographic Authentication, Passwords,	5	10

		Cryptographic Authentication: passwords as keys, protocols, KDC's, Certification Authorities, Authentication of People: Verification techniques, passwords, length of passwords, password distribution, smart cards, biometric authentication		
UNIT-III	7	Network Security: Brief introduction to Network Security, Firewalls, IP security, Virtual Private Network (VPN), system security: Intruders and Viruses, Firewalls, Intrusion Detection	5	10
	8	Case Studies on Cryptography and security: Cryptographic Solutions, SSO, Secure inter-branch Payment Transactions, Denial Of Service (DOS) attacks, IP Spoofing attacks, CSSV, Secrete splitting, Contract signing	5	10
UNIT-IV	9	Study of real attacks on computer systems and networks of the following kind: Hacking attack, Denial Of Service (DOS) attacks, IP Spoofing attacks, CSSV	5	10
	10	Example System: Kerberos: purpose, authentication, Security in GSM, server and ticket granting, server, keys and tickets, use of AS and TGS, replicated servers, Kerberos V4: names, inter-realm , authentication, key version numbers , Kerberos V5: names, realms, delegation, forwarding and proxies, ticket lifetimes, revoking tickets, multiple Realms	5	10
TOTAL			50	100

Text Book:

1. Atul Kahate, Cryptography and Network Security, McGraw Hill

Reference Books:

1. Kaufman, C., Perlman, R., & Speciner, M., .Network Security, Private Communication in a Public world, 2nd ed., Prentice Hall PTR, 2002
2. Stallings, W., .Cryptography and Network Security: Principles and Practice, 3rd ed., Prentice Hall PTR., 2003
3. Stallings, W., .Network Security Essentials: Applications and Standards, Prentice Hall, 2000

Branch: B.Sc.(IT)	Semester-V
Subject Code: 5104	Lecture: 02 Credit: 02
Course Opted	Skill Enhancement Course - 3
Subject Title	GREEN COMPUTING

Course Objectives:

- At the end of the course, the students will be able to
- Understand concept of Green IT.
- Necessity of Go Green
- Comprehend Green IT from the perspective of hardware, software, storage, and networking

Course Outcomes:

At the end of the course, the students will be able to

- Create awareness among stakeholders and promote green initiatives in their environments leading to a green movement.
- Acquire knowledge about energy efficiency, IT assets disposal, carbon footprint
- Contribute to eco-friendly environment.

Modules	Sr. No.	Topics & Details	No. Of Lectures Assigned	Marks Weightage %
UNIT- I	1	Introduction: What is green computing? advantages of Green computing, where it is used? Present Problems: Toxins, Power Consumption, Equipment Disposal, Company's Carbon Footprint: Measuring, Details, reasons to bother, Plan for the Future, Cost Savings: Hardware, Power.	5	10
UNIT -II	2	Power Conservation: Power Problems, Monitoring Power Usage, Servers, Low-Cost Options, Reducing Power Use, Data De-Duplication, Virtualization, Management, Bigger Drives, Involving the Utility Company, Low Power Computers, PCs, Linux, Components, Servers, Computer Settings, Storage, Monitors, Power Supplies, Wireless Devices, Software.	5	10
	3	Green Computing and the Environment: Key Concepts, Environmental Drivers for Green Computing, Key Roots of Environmentalism, Environmentalism and IT, The New Imperative of Climate Change, A Brief History of the Climate, Climate Change and IT, What's Next with Climate Change? What It Means to "Go Green"	5	10

		Why IT Is a Climate Change Solution?		
UNIT-III	4	Going Paperless: User behavior- Preferring to go manual instead of automation, Paper Problems, The Environment, Costs: Paper and Office, Practicality, Storage, Destruction, Going Paperless, Organizational Realities, Changing Over, Paperless Billing, Handheld Computers vs. the Clipboard, Unified Communications, Intranets, What to Include, Building an Intranet, Microsoft Office SharePoint Server 2007, Electronic Data Interchange (EDI), Nuts and Bolts, Value Added Networks, Advantages, Obstacles.	5	10
UNIT-IV	5	Recycling: Problems, , Means of Disposal, Recycling, , Hard Drive Recycling, Consequences, cleaning a Hard Drive, Pros and cons of each method, CDs and DVDs, good and bad about CD and DVDs disposal	5	10
		TOTAL	25	50

Text Book:

1. 'Green IT', Toby Velte, Anthony Velte, Robert Elsenpeter, McGraw Hill,2008

Reference Books:

1. 'Green Data Center: Steps for the Journey',Alvin Galea, Michael Schaefer, Mike Ebbers,Shroff Publishers and Distributers,2011
2. 'Green Computing Tools and Techniques for Saving Energy, Money and Resources', Bud E. Smith, CRC Press,2014

Web References:

1. <http://www.carbonfootprint.com>
2. <https://www.energystar.gov/>

Branch: B.Sc.(IT)	Semester-V
Subject Code: 5105	Lecture: 04 Credit: 04
Course Opted	Discipline Specific Elective - 1
Subject Title	SOFTWARE TESTING

Course objectives:

- To learn objectives of Software Testing
- To understand verification and validation
- To understand different testing methods
- To design test plan and test cases
- To understand text execution with the help of tools

Course Outcome:

After successful course completion students will able to

- Understand software testing life cycle
- Understand defects and its life cycle
- Understand various testing strategies
- Design manual test cases for software
- Execute testing using tools

Modules	Sr. No.	Topic and Details	No of Lectures Assigned	Marks Weightage %
UNIT-I	1	Introduction to Software Testing Testing Fundamentals, QA and QC, SDLC (Water Fall, Agile, Interactive), SCRUM Model, STLC, V-Model, role of testers,	6	12
	2	Verification and Validation Definition of V & V , Different types of V & V Mechanisms, Concepts of Software Reviews, Inspection and Walkthrough	6	12
UNIT-II	3	Software Testing Methods & Strategy Testing Fundamentals, Testing Documentation, Test Case Design, White Box Testing and its types, Black Box Testing and its types.	6	12
	4	Software Testing Strategies Strategic Approach to Software Testing, Unit Testing, Integration Testing, Validation Testing, System Testing	6	12
UNIT-III	5	Software Metrics: Concept and Developing Metrics, Different types of Metrics,	6	12
	6	Defect Management: Definition of Defects, Defect Life Cycle, Defect Management Process, Defect Reporting, Metrics Related to Defects, Using Defects for Process Improvement	6	12
UNIT-IV	7	Testing Tools: Types of test Tools, Tool Selection and Introduction, Cost Effectiveness of	8	16

		Tool Introduction, Tools for test management and Control, Test Specification, Static Testing, Dynamic Testing, Nonfunctional and Functional testing, Selection and Introduction of Test Tools,		
	8	Test Management and Automation. Test Execution, GUI Testing. Case study: Web Application Testing	6	12
		TOTAL	50	100

Text Book:

1. The Art of Software Testing, 3rd Edition by Glenford J. Myers, Corey Sandler, Tom Badgett.

Reference Books:

1. Software Testing: A Craftsman's Approach, Fourth Edition by Paul C. Jorgensen
2. Software Testing, 2nd Edition by Ron Patton
3. Software Testing Techniques, 2nd edition by: Boris Beizer
4. Software testing by Yogesh Singh Cambridge publication

Branch: B.Sc.(IT)	Semester-V
Subject Code: 5106	Lecture: 04 Credit: 04
Course Opted	Discipline Specific Elective - 2
Subject Title	DIGITAL MARKETING

Course Objectives:

- To understand the concept of Digital Marketing.
- To familiarize students with the specific knowledge in the areas of Digital marketing.
- To understand the concept of E Commerce.
- To learn best practices, tools, and techniques of SEO.
- To understand how to use it for branding and sales.

Course Outcomes:

- Understand emerging trends in digital marketing.
- Understand the importance of conversion and working with digital relationship marketing.
- Explore different modes of Social Media marketing.
- Understand the tools of SEO and SEM.
- Become familiar with the elements of the digital marketing plan

Modules	Sr. No.	Topic and Details	No. of Lectures Assigned	Marks Weightage %
UNIT-I	1	Introduction to Digital Marketing: What is Digital Marketing? Difference between traditional marketing and digital marketing, Importance of digital marketing, Trends and scenario of the industry, Digital Marketing Channels, How to use digital marketing to increase sales?, Types of Digital Marketing(Overview)- Internet Marketing ,Social Media Marketing, Mobile Marketing	6	12
	2	Website Planning and Development: Types of websites , Website Planning and Development , Optimization of Web sites	5	10
UNIT-II	3	E-Commerce: Introduction, Understanding Internet Marketing Search Engine Optimization, Search Engine Marketing, Email Marketing, Digital Display Marketing	4	8
	4	Creating Initial Digital Marketing Plan Content management SWOT analysis: Strengths, Weaknesses, Opportunities, and Threats Target group analysis	5	10

UNIT-III	5	Search Engine Optimization (SEO): What is SEO?, History & Growth of SEO, On-Page Optimization, Off-Page Optimization Keywords, Google AdWords	5	10
	6	Search Engine Marketing (SEM): Introduction to SEM, Campaign Creation, Ad Creation, Approval & Extensions, Site Targeting Keyword Targeting, CPC, CPA & CPM Based Accounts, Demographic Targeting/ Bidding	5	10
	7	Web Analytics: Introduction to Web Analytics, Introduction to Audience Reports, Traffic & Content Report, Campaign Tagging & Reporting, Linking, Using Google Adwords, Data - Real-Time Data	6	12
UNIT-IV	8	Social Media Marketing Definition of Social Media Marketing & social media Blogging, Social Networking, Video Creation & Sharing, Use of Different Social Media Platforms Content Creation Modes of Social Media Marketing Creating a Facebook page Business opportunities and Instagram options Business tools on LinkedIn Creating business accounts on YouTube Email Marketing	9	18
	9	Digital Marketing Budgeting Resource planning, Cost estimating, Cost budgeting Cost control	5	10
TOTAL			50	100

Text Book:

1. Digital Marketing for Dummies By Ryan Deiss and Russ Henneberry , 2nd Edition, 2020,Wiley Publication

Reference Books:

1. Advertising Management: Rajeev Batra, John G. Myers, David A. Aaker, PEARSON INDIA Publication; 5th edition (1996)
2. Advertising & Promotions, George Belch and Michael Belch, (TMH), 7th edition (2009)
3. The Social Media Bible: Tactics, Tools, & Strategies for Business Success by Lon Safko, 3rd Edition (Wiley)
4. Web Analytics 2.0 – Avinash Kaushik, ,(Wiley),2009
5. Social Media marketing All-in -one Dummies- Jan Zimmerman ,(Wiley),2nd Edition,2008

Branch: B.Sc.(IT)	Semester-V
Subject Code: 5107	Lecture: 04 Credit: 04
Course Opted	Discipline Specific Elective - 3
Subject Title	NETWORK PROGRAMMING

Course Objectives:

- To explore protocols that underlie the Internet, such as TCP/IP and UDP/IP
- To learn how Java's core, I/O API handles network input and output
- Discover how the InetAddress class helps Java programs interact with DNS
- To write servers and network clients, using Java's low-level socket classes
- To manage many connections at the same time with the nonblocking I/O
- To locate, identify, and download network resources with Java's URI and URL classes
- Diving deep into the HTTP protocol, including REST, HTTP headers, and cookies

Course Outcomes:

- Understanding concept of establishing client & server connections.
- Learning methods of Locating, identifying, and downloading network resources with Java's URI and URL classes
- Understanding creation of network applications using Java Programming language.

Modules	Sr. No.	Topic and Details	No of Lectures Assigned	Marks Weight age %
UNIT-I	1	Basic Network Concepts: Networks, The Layers of a Network, IP, TCP, and UDP, The Internet, The Client/Server Model, Internet Standards: IETF RFCs, W3C Recommendations	3	6
	2	Streams: Output Streams, Input Streams, Filter Streams, Readers and Writers	3	6
	3	Threads: Running Threads, Returning Information from a Thread, Synchronization, Deadlock, Thread Scheduling, Thread Pools and Executors	4	8
UNIT-II	4	Internet Addresses: The InetAddress Class, Inet4Address and Inet6Address, The NetworkInterface Class	3	6
	5	Sockets for Clients: Using Sockets, Investigating Protocols with Telnet, Reading from Servers with Sockets, Writing to Servers with Sockets, Half-closed sockets, Constructing and Connecting Sockets, Getting Information About a Socket, Setting Socket Options, Socket Exceptions	4	8
	6	Sockets for Servers: Using ServerSockets, Logging, Constructing Server Sockets, Constructing Without Binding, Getting Information About a Server Socket,	4	8

		Socket Options		
UNIT-III	7	Secure Sockets: Secure Communications, Creating Secure Client Sockets, Choosing the Cipher Suites, Event Handlers, Session Management, Client Mode, Creating Secure Server Sockets, Configuring SSLServerSockets	3	6
	8	Nonblocking I/O: Buffers, Creating Buffers, Allocation, Direct allocation, Wrapping, Filling and Draining, Bulk Methods, Data Conversion, View Buffers, Compacting Buffers, Duplicating Buffers, Slicing Buffers, Marking and Resetting, Object Methods	4	8
	9	Channels: SocketChannel, ServerSocketChannel, The Channels Class, Asynchronous Channels, Socket Options, Readiness Selection, The Selector Class, The SelectionKey Class,	2	4
UNIT-IV	10	UDP: The UDP Protocol, UDP Clients, UDP Servers, The DatagramPacket Class, The Constructors, The get Methods, The setter Methods, The DatagramSocket Class, The Constructors, Sending and Receiving Datagrams, Managing Connections, Socket Options, Simple UDP Clients, UDPServer, DatagramChannel, Using DatagramChannel, Socket Options	5	10
	11	IP Multicast: Multicasting, Multicast Addresses and Groups, Clients and Servers, Routers and Routing Working with Multicast Sockets, The Constructors, Communicating with a Multicast Group, Joining groups, Leaving groups and closing the connection, Sending multicast data, Loopback mode, Network interfaces	4	8
	12	URLs and URIs: URIs, The URL Class, Splitting a URL into Pieces, The URI Class, x-www-form-urlencoded, Proxies, Communicating with Server-Side Programs Through GET, Accessing Password-Protected Sites	5	10
	13	HTTP: The Protocol, HTTP Methods, The Request Body, Cookies, URLConnections, Opening URLConnections, Reading Data from a Server, Reading the Header, Caches, Configuring the Connection, Configuring the Client Request HTTP Header, Writing Data to a Server, Security Considerations for URLConnections, Guessing MIME Media Types, HttpURLConnection	6	12
TOTAL			50	100

Text Book:

1. Java Network Programming, 4th Edition by Elliotte Rusty Harold

Reference Books:

1. An Introduction to Network Programming with Java, Third Edition, by Jan Graba, 3rd Edition, 2013, Springer
2. Advanced Network Programming – Principles and Techniques, by Jan Graba., 2013, Springer
3. The Complete Reference JAVA, by Herbert Schildt, 9th Edition (McGraw-Hill)
4. Java Networking and Communications, by Todd Courtois (Prentice-Hall), 1997
5. Java Network Programming, by Merlin and Conrad Hughes, Michael Shoffner, and Maria Winslow (Manning, an imprint of Prentice-Hall), 2nd Edition, 1999
6. Advanced Java Networking, by Prashant Sridharan (Prentice-Hall), 1997