

Course Content

T.Y.B.B.A.(C.A.) Sem-V (NEP 2024 Pattern)

Course Code: 24BaBbcU5101
Examination Scheme: CIA: 20 Marks
Total Hours: 30

Course Name: Advanced Java
End-Sem: 30 Marks
Total Credits: 02

Prerequisite: Students should know basic java programming concepts.

Course Objectives:

1. To know the concept of Advanced Java Programming.
2. To understand how to use programming in day to day applications.
3. To develop programming logic.

Course Outcomes:

1. Students will know the concepts of JDBC Programming.
2. Students will know the concepts of Multithreading.
3. Students will develop the project by using JSP and JDBC.
4. Students will know the concepts of spring.

Sr. No.	Topics	Number of Lectures
1	UNIT 1: JDBC (Java Database Connectivity) 1.1 Introduction 1.2 JDBC Architecture. 1.3 JDBC Process 1.4 Working with ResultSet Interface.	08
2	UNIT 2: Multithreading: 2.1 Introduction to Multithreading. 2.2 Thread creation: Thread Class, Runnable Interface. 2.3 Life cycle of Thread. 2.4 Thread Priority. 2.5 Execution of Thread Application. 2.6 Synchronization and Interthread communication.	08
3	UNIT 3: Networking: 3.1 Overview of Networking. 3.2 Networking Basics: Port Number, Protocols and classes. 3.3 Sockets, Reading from and Writing to a Socket.	04
4	UNIT 4: Java Server Pages(JSP) 4.1 Introduction to JSP.	08

	4.2 JSP Life Cycle. 4.3 Components of JSP. 4.4 JSP scripting elements 4.4.1 JSP scriptlet tag 4.4.2 JSP expression tag 4.4.3 JSP declaration tag 4.6 JSP Implicit Objects. 4.6.1 JSP Request 4.6.2 JSP Response 4.6.3 JSP Config 4.6.4 JSP Application 4.6.5 JSP Session 4.6.6 JSP PageContext 4.6.7 JSP PageJSP Exception 4.7 JSP Directive Elements. 4.7.1 JSP page directive 4.7.2 JSP include directive 4.7.3 JSP taglib directive 4.8 JSP with Database.	
5	UNIT 5: Spring. 5.1 Introduction Spring MVC. 5.2 Basic Introduction to Spring. 5.3 Spring Environment Setup. 5.4 Hello World Example in Spring.	02
	Total	30

Reference Books:

1. The Complete Reference – JAVA Herbert Schildt
2. Professional Hibernate, by Eric Pugh, Joseph D. Gradecki by Wiley Publishing, Inc., ISBN: 0- 7645-7677-1
3. Spring in Action, Craig Walls, Ryan Breidenbach, Manning Publishing Co., ISBN: 1-932394- 35-4
4. Head First Servlets and JSP: Passing the Sun Certified Web Component Developer Exam -2nd Edition-Bryan Basham, Kathy Sierra, Bert Bates- O'REILLY.

Web Links:

1. <https://www.tutorialspoint.com/spring/index.htm>
2. <https://www.geeksforgeeks.org/spring/>
3. <https://www.tpointtech.com/spring-tutorial>

Course Contents

Course Name: B.B.A. (CA)
Subject Code: 24BaBbcU5102
Subject Name: Web Technology

Semester: V
credits: 2

Prerequisites:

1. This course is technical in nature and would require the student to be comfortable with coding. To prepare for the class all students MUST HAVE:
 - Understanding of basic programming language like HTML, CSS, JavaScript.
 - Basic knowledge of database languages, web server knowledge.

Course Objectives -:

1. Start learning web development today to become a web developer tomorrow.
2. To know & understand concepts of internet programming.
3. To acquire knowledge and skills for creation of web site considering both client and server side programming.
4. To understand how to develop web based applications using PHP.

Course Outcomes-:

1. This course covers basic programming and Object oriented techniques used in PHP.
2. It teaches them the fundamentals of Php language and syntax, introduces them to web development with most used web development language.
3. It will help them to develop web /mobile applications with different technologies and database driven applications.

Chapter 1	Introduction to PHP	Lecture s
	1.1 Introduction to PHP 1.2 Lexical structure 1.3 Variable, constant, keywords, Data Types 1.4 Control Structures and Variables variable 1.5 Type casting, Type Juggling 1.6 \$_GET, \$_POST, \$_REQUEST Variables	06
Chapter 2	Function and String and Arrays in PHP	Lecture s
	2.1 Defining and calling a function 2.2 Default parameters 2.3 Variable parameters, Missing parameters 2.4 Variable function, Anonymous function 2.5 Types of strings in PHP 2.6 String Printing functions 2.7 Encoding and escaping 2.8 Comparing strings 2.9 Indexed Vs Associative arrays 2.10 Storing data in arrays 2.11 Multidimensional arrays	08

	3.14 Extracting multiple values	
Chapter 3	Introduction to Object Oriented Programming in PHP	Lectures
	3.1 Classes and Objects 3.2 Introspection 3.3 Serialization 3.4 Inheritance 3.5 Interfaces 3.6 Web Variables 3.7 Server information and Self Processing forms 3.8 Maintaining state (Cookies and Sessions)	07
Chapter 4	PHP Databases	Lectures
	4.1 Using PHP to access a databases 4.2 Mysql Database functions 4.3 Relational databases and SQL 4.4 Advanced database techniques 4.5 Introduction to JSON	09
	Total:	30

Recommended Books:

1. Programming PHP - Rasmus Lerdorf and Kevin Tatroe, O'Reilly publication
2. PHP for Beginners, SPD publication
3. PHP Cookbook, David Sklar and Adam Trachtenberg, 3rd Edition, O'Reilly publication
4. Beginning PHP 5.3, Matt Doyle, Wrox publication

Web Links:

1. www.php.net.in
2. <https://www.w3schools.com>
3. www.wrox.com
4. <https://www.geeksforgeeks.org>
4. <https://www.tutorialspoint.com/>
5. <https://www.tutorialspoint.com/json/>
5. <https://www.tutorialrepublic.com/twitter-bootstrap-tutorial/bootstrap-grid-system.php>

Course Contents

Course Name: TY B.B.A. (CA) Semester: V (NEP 2024 Pattern)

Subject Code: 24BaBbcU5103

Subject Name: Computer Networks

CIA: 40 Marks

ESE: 60 Marks

Total Hours: 45

Credits: 04

Prerequisites:

Students should be comfortable with an operating system and understand general hardware components like RAM, CPU, and storage.

Understanding these number systems is crucial, as they are the basis for IP addressing and sub netting.

Course Objectives:

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

1. Build an understanding of the fundamental concepts of computer networking.
2. Familiarize the student with the basic taxonomy and terminology of the computer networking area.
3. Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
4. Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

Course Outcomes:

After completing this course the student must demonstrate the knowledge and ability to:

1. Independently understand basic computer network technology.
2. Understand and explain Data Communications System and its components.
3. Identify the different types of network topologies and protocols.
4. Identify the different types of network devices and their functions within a network.
5. Understand and building the skills of sub-netting and routing mechanisms.
6. Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

Sr. No.	Topics	Number of
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		Lectures
1	Chapter 1: Basics of Computer Networks 1.1 Computer Network 1.1.1 Definition 1.1.2 Goals 1.1.3 Applications 1.1.4 Structure 1.1.5 Components 1.2 Topology 1.2.1 Bus 1.2.2 Star 1.2.3 Ring 1.2.4 Mesh 1.3 Types of Networks 1.3.1 LAN, MAN, WAN, Internet 1.3.2 Broadcast & Point-To-Point Networks 1.4 Communication Types 1.4.1 Serial 1.4.2 Parallel 1.5 Modes of Communication : 1.5.1 Simplex 1.5.2 Half Duplex 1.5.3 Full Duplex 1.6 Server Based LANs & Peer-to-Peer LANs 1.6.1 Comparison of both 1.7 Protocols and Standards	08
2	Chapter 2:Network Models 2.1 Design issues of the layer 2.2 Protocol Hierarchy 2.3 ISO-OSI Reference Model : 2.3.1 Layers in the OSI Model 2.3.2 Functions of each layer 2.4 Terminology 2.4.1 SAP 2.4.2 Connection Oriented services 2.4.3 connectionless services 2.4.4 Peer Entities 2.5 Internet Model (TCP/IP) 2.6 Comparison of ISO-OSI & TCP/IP Model 2.7 Addressing 2.7.1 Physical Addresses 2.7.2 Logical Addresses 2.7.3 Port Addresses 2.8 IP Addressing 2.8.1 Classful addressing 2.8.2 Classless addressing	08

3	Chapter 3: Transmission Media 3.1 Guided Media(Wired) : 3.1.1 Coaxial Cable:- Physical Structure, Standards, BNC Connector, Applications 3.1.2 Twisted Pair :- Physical Structure, UTP vs STP, Connectors, Applications 3.1.3 Fiber Optics Cable :- Physical Structure, Propagation Modes (Single Mode & Multimode), Connectors, Applications 3.2 Unguided Media (Wireless) 3.2.1 Electromagnetic Spectrum For Wireless Communication 3.2.2 Propagation Methods 3.2.2.1 Ground, 3.2.2.2 Sky, 3.2.2.3 Line-Of-Sight 3.3.3 Wireless Transmission 3.3.3.1 Radio Waves 3.3.3.2 Infra-Red, 3.3.3.3 Micro-Wave	08
4	Chapter 4: Wired and Wireless LANs 4.1 IEEE Standards 4.2 Standard Ethernet 4.2.1 MAC Sublayer 4.2.2 Physical layer 4.3 Fast Ethernet 4.3.1 MAC Sublayer 4.3.2 Physical layer 4.4 Gigabit Ethernet 4.4.1 MAC Sublayer 4.4.2 Physical layer 4.5 Network Interface Cards(NIC) 4.5.1 Components of NIC 4.5.2 Functions of NIC 4.5.3 Types of NIC 4.6 Wireless LAN 4.6.1 IEEE802.11 Architecture 4.6.2 MAC Sub layer 4.6.3 Frame Format 4.6.4 Frame Types 4.6.5 Addressing Mechanism 4.6.6 Bluetooth (Architecture, Piconet and Scatternet, Applications)	08
5	Chapter 5: Network Connectivity Devices	

	5.1 Categories of Connectivity Devices 5.1.1 Passive & Active Hubs 5.1.2 Repeaters 5.1.3 Bridges 5.1.3.1 Transparent Bridges (Loop Problem, Spanning Tree) 5.1.3.2 Source Routing Bridges 5.1.4 Switches 5.1.5 Router 5.1.6 Gateways 5.2 Network Security Devices 5.2.1 Firewalls 5.2.1.1 Packet-Filter firewall 5.2.1.2 Proxy firewall	08
6	Chapter 6: Internet Basics 6.1 Concept of Intranet & Extranet 6.2 Internet Information Server(IIS) 6.3 Web Server 6.4 World Wide Web(WWW) 6.4.1 Architecture, 6.4.2 Web Documents:- static, dynamic and active documents 6.5 Search Engines 6.6 Internet Service Providers(ISP) 6.7 HTTP 6.7.1 HTTP Transaction 6.7.2 Persistent and non-persistent connection 6.8 HTTPS	05
	Total:	45

Recommended Books:

- 1) Computer Networks by Andrew Tanenbaum (III Edition)
- 2) Data Communications & Networking by Behrouz Ferouzan (III Edition)
- 3) Complete Guide to Networking by Peter Norton

Web Links:

- 1) <http://intronetworks.cs.luc.edu/current/ComputerNetworks.pdf>
- 2) <https://www.pdfdrive.com/computer-networking-books.html>
- 3) <https://www.topfreebooks.org/free-books-on-computer-networking>

Course Contents

Course Name: B.B.A. (CA)
Subject Code: 24BaBbcU5104

Semester: V
credits: 2

Subject Name: Lab Course on 24BaBbcU5101 & 24BaBbcU5102

Section I

Prerequisite: Students should know basic java programming concepts.

Course Objectives:

1. To know the concept of Advanced Java Programming.
2. To understand how to use programming in day to day applications.
3. To develop programming logic.

Course Outcomes:

1. Students will know the concepts of JDBC Programming.
2. Students will know the concepts of Multithreading.
3. Students will develop the project by using JSP and JDBC.
4. Students will know the concepts of spring.

Sr. No.	Topics	Number of Lectures
1	JDBC : Statement, Prepared Statement, Result set	7
2	Multithreading : Thread,Thread Life Cycle,Runnable interface	8
3	Socket Programming: TCP ServerSocket, TCP Socket	7
4	JSP :JSP, Page directive, include directive, JSP with database	8
	Total	30

Reference Books:

1. The Complete Reference – JAVA Herbert Schildt
2. Professional Hibernate, by Eric Pugh, Joseph D. Gradecki by Wiley Publishing, Inc.,ISBN: 0- 7645-7677-1
3. Spring in Action, Craig Walls, Ryan Breidenbach, Manning Publishing Co.,

4. Head First Servlets and JSP: Passing the Sun Certified Web Component Developer Exam -2nd Edition-Bryan Basham, Kathy Sierra, Bert Bates- O'REILLY.

Web Links:

1. <https://www.tutorialspoint.com/spring/index.htm>
2. <https://www.geeksforgeeks.org/spring/>
3. <https://www.tpointtech.com/spring-tutorial>

Section II

Prerequisites:

2. This course is technical in nature and would require the student to be comfortable with coding. To prepare for the class all students MUST HAVE:
 - ☐ Understanding of basic programming language like HTML, CSS, JavaScript.
 - ☐ Basic knowledge of database languages, web server knowledge.

Course Objectives -:

5. Start learning web development today to become a web developer tomorrow.
6. To know & understand concepts of internet programming.
7. To acquire knowledge and skills for creation of web site considering both client and server side programming.
8. To understand how to develop web based applications using PHP.

Course Outcomes-:

6. This course covers basic programming and Object oriented techniques used in PHP.
7. It teaches them the fundamentals of Php language and syntax, introduces them to web development with most used web development language.
8. It will help them to develop web /mobile applications with different technologies and database driven applications.

SR NO	Exercise	Total Practicals
1.	CLASS	3
2.	INTERFACE and INTROSPECTION	3
3.	SELF PROCESSING FORMS	2
4.	STICKY FORM	3

5.	MULTIVALUED PARAMETER	2
6.	FILE	3
7.	COOKIE	3
8.	SESSION	3
9.	DATABASE	4
10.	XML and AJAX	2
11.	JSON	2
	Total:	30

Recommended Books:

- 1 Programming PHP - Rasmus Lerdorf and Kevin Tatroe, O'Reilly publication
- 2 PHP for Beginners, SPD publication
- 3 PHP Cookbook, David Sklar and Adam Trachtenberg, 3rd Edition, O'Reilly publication
- 4 Beginning PHP 5.3, Matt Doyle, Wrox publication

Web Links:

- 1 www.php.net.in
- 2 <https://www.w3schools.com>
- 3 www.wrox.com
- 4 <https://www.geeksforgeeks.org>
- 5 <https://www.tutorialrepublic.com/twitter-bootstrap-tutorial/bootstrap-grid-system.php>
- 6 <https://www.tutorialspoint.com/>
- 7 <https://www.tutorialspoint.com/json/>

Course Name: T.Y.B.B.A. (CA)

Semester: V

Subject Code: Lab course on 24BaBbcU5105

Subject Name: Lab course on Generative AI (Open AI)

No. of Credits: 2

Total Hours: 60

Pre-Requisites: foundational knowledge in Python programming, basic mathematics (linear algebra, probability, and statistics), and an understanding of core machine learning concepts like neural networks.

Course Objectives:

Students will gain

1. Practical exposure to Generative AI systems
2. Develop the ability to design effective prompts
3. Evaluate AI-generated outputs and automate workflows
4. Apply AI tools for programming, data analysis, documentation, and creative media generation while understanding ethical and responsible AI practices.

Course Outcomes:

1. Student can use AI tools and understand response behavior.
2. Student can design effective prompts.
3. Student can use AI as coding assistant.
4. Student can create academic and technical content using AI.
5. Student can use AI for basic data analysis.
6. Student can create visuals using AI prompts.
7. Student understands AI automation use.
8. Student uses AI responsibly.

Sr. No.	Topics	No. of hours
1	Unit: 1 Introduction to Generative AI 1. Explore different Generative AI tools (ChatGPT, Gemini, Claude, etc.) 2. Creating AI accounts and dashboard overview 3. Understanding prompts, responses and tokens 4. Compare outputs from different AI tools 5. Identify use cases in education and software development	6
2	Unit 2: Prompt Engineering Basics 1. Zero-shot prompting	8

	2. Few-shot prompting 3. Chain-of-thought prompting 4. Role-based prompting 5. Structured prompt templates 6. Temperature in AI.	
3	Unit 3: AI for Programming Support 1. Generate simple programs using AI (C, Java, Python) 2. Debugging code using AI 3. Code explanation using AI 4. Code optimization using prompts 5. Unit test generation using AI	8
4	Unit 4: AI for Content & Documentation 1. Generate technical documentation 2. Create project reports using AI 3. Convert text to summary 4. Generate MCQs and question papers 5. Create email and formal letters using AI	6
5	Unit 5: AI for Data Handling 1. Upload dataset and analyze using AI 2. Generate charts and summaries 3. CSV data interpretation 4. AI assisted Excel formula generation 5. Data cleaning, profiling suggestions using AI 6. Using AI generate Python data analysis code, create visualizations, Interpret machine learning results	8
6	Unit 6: Image & Media Generation 1. AI image generation from prompts 2. Logo design using AI 3. Poster generation	8

	4. Diagram generation prompts 5. Image editing using AI tools	
7	Unit 7: AI Automation Basics 1. AI + Google Forms creation 2. AI based resume builder 3. AI chatbots basics 4. No-code AI workflow tools overview 5. Simple AI workflow design	8
8	Unit 8: AI Ethics & Responsible Use 1. Detect AI hallucinations 2. Fact checking AI output 3. Bias testing in AI responses 4. Academic integrity exercise 5. AI plagiarism checking	8
Total	-----	60

Course Contents

Semester: V

Subject Code: 24BaBbcU5201

Credits:4

Subject Name: Operating System Concepts

Total lectures=45

Prerequisites:

Students must know the computer fundamental concepts

Course Objectives:

1. To know the services provided by Operating System
2. To know the scheduling concept
3. To understand design issues related to memory management and various related algorithms.
4. To understand design issues related to File management and various related algorithms

Course Outcomes:

1. Understand the basic concepts of an operating system.
2. Describe, contrast and compare differing structures for operating systems.
3. Understand and analyze theory of processes, resource control (concurrency etc.), physical and virtual memory, scheduling, deadlock, I/O and files.

Chapter 1	Introduction to Operating System & System Structure	Lectures
	1.1 What is operating system 1.2 Computer system architecture 1.3 Services provided by OS 1.4 Types of OS 1.5 Operating System Structure 1.6 User operating system Interface 1.7 System Calls 1.8 System Program	06
Chapter 2	Process Management	
	2.1 What is Process 2.2 Process State 2.3 Process Control Block 2.4 Context Switch 2.5 Operation on Process 2.5.1 Process Creation 2.5.2 Process Termination	04
Chapter 3	CPU Scheduling	
	3.1 What is scheduling 3.2 Scheduling Concepts 3.2.1 CPU- I/O Burst Cycle 3.2.2 CPU Scheduler 3.2.3 Preemptive and Non-preemptive scheduling 3.2.4 Dispatcher	07

	3.3 Scheduling criteria (Terminologies used in scheduling) 3.4 Scheduling Algorithms 3.4.1 FCFS 3.4.2 SJF (Preemptive & non-preemptive) 3.4.3 Priority Scheduling (Preemptive & Non-preemptive) 3.4.4 Round Robin Scheduling 3.5 Multilevel Queues 3.6 Multilevel Feedback queues	
Chapter 4	Process Synchronization	
	4.1 Introduction 4.2 Critical section problem 4.3 Semaphores 4.3.1 Concept 4.3.2 Implementation 4.3.3 Deadlock & Starvation 4.3.4 Binary Semaphores 4.4 Critical Sections 4.5 Classical Problems of synchronization 4.6 Bounded buffer problem 4.7 Readers & writers problem 4.8 Dining Philosophers problem	06
Chapter 5	Deadlock	
	5.1 Introduction 5.2 Deadlock Characterization 5.3 Necessary Condition 5.4 Resource allocation graph 5.5 Deadlock Prevention 5.6 Deadlock Avoidance 5.6.1 Safe State 5.6.2 Resource allocation graph algorithm 5.6.3 Bankers algorithm 5.7 Deadlock Detection 5.8 Recovery from deadlock 5.8.1 Process Termination 5.8.2 Resource Preemption	07
Chapter 6	Memory Management	
	6.1 Introduction to memory management 6.2 Address Binding 6.3 Dynamic Loading 6.4 Dynamic Linking 6.5 Overlays 6.6 Logical vs. physical addresses 6.7 Swapping 6.8 Contiguous memory allocation 6.8.1 Single Partition Allocation 6.8.2 Multiple Partition Allocation	09

	6.8.3 External and Internal Fragmentation 6.9 Paging 6.10 Segmentation 6.11 Segmentation with paging 6.12 Virtual memory 6.13 Demand paging 6.14 Page replacement algorithms: FIFO, MRU, LRU, LRU (approximation using reference bit) MFU, LFU, Second Chance algorithm	
Chapter 7	I/O System	
	7.1 Introduction 7.2 I/O Hardware 7.3 Application of I/O Interface 7.4 Kernel I/O Subsystem 7.5 Disk Scheduling FCFS, Shortest Seek time first, SCAN, C- SCAN, C- Look.	06
	Total:	45

Recommended Books:

- 1) System Programming and Operating System by D. M. Dhamdhere, 3rd Edition, Tata McGraw- Hill, 2012.
- 2) Operating System Concepts by Silberschatz, Galvin, Gagne, 5th edition, Addison-Wesley.
- 3) Operating System by A. Godbole, Tata McGraw-Hill Education, 2005.
- 4) Modern Operating Systems by A. Tanenbaum, Herbert Bos, 4th Edition, Pearson Education, 2016.
- 5) Introduction to Operating Systems Concepts and Practice by P.C.P. Bhatt, 3rd Edition, PHI, 2010.

Web Links:

- 1) <http://www.freebookcentre.net/CompuScience/Free-Operating-Systems-Books-Download.html>
- 2) <https://www.topfreebooks.org/free-operating-systems-books>
- 3) <https://www.geeksforgeeks.org/operating-systems/operating-systems>
- 4) <https://www.tutorialspoint.com>

TYBBA CA Sem V
Subject Code: 24BaBbcU5202
Subject: Information Security Systems

Total Hours:- 45

Total Credits: 04

Pre-requisites: Knowledge of operating systems, Computer Fundamentals, Computer Networks, Internet and Web Technologies

Course Objectives:

1. To understand the necessity of protecting information and systems that supports the operations and assets of agency.
2. To understand and study cryptography and key encryption techniques used today.
3. Comprehend relevant security parameters in the internet, web, database systems and applications.
4. To understand what cyber-crime is and what are acts associated with it in order to avoid problems with data security.

Course Outcomes:

1. Understand the requirement of information security and a clear understanding of its importance.
2. Be familiar with information security threats and countermeasures, and familiar with information security designs using available secure solutions.
3. Use the database security mechanisms, intrusion detection systems, formal models of security, cryptography, network, web security.

Chapter 1	Introduction to Information Security	Lectures
	1.1 Introduction to Information Security 1.2 The Need for Security 1.3 Legal, Ethical, and Professional Issues in Information Security 1.4 Security Goals 1.5 Security Attacks, Security Services 1.5 Security Mechanisms - Integrity check - Digital Signature - Authentication	08
Chapter 2	Cryptography	Lectures

	2.1 Cryptography: Applications of cryptography, Terminology, Evolution of cryptography 2.2 Symmetric Key Cryptography 2.3 Asymmetric Key Cryptography 2.4 Data Encryption standard 2.5 Private Key Cryptography: - Caesar ciphers - One-time pads, - DES Algorithm - AES Algorithm Problems with DES - Variations of DES 2.6 Public Key Encryption: - RSA Algorithm	10
Chapter 3	Authentication and Internet Security	Lectures
	3.1 Types of Authentication- Password-based authentication, address-based authentication, cryptographic authentication, smart cards, biometrics, mutual authentications, Message Digest: MD5, SHA, Digital Certificate process 3.2 Transport Layer Security: SSL, SET Email Security: PGP, S/MIME IP security: IPSec	07
Chapter 4	Intrusion Prevention and Detection:	Lectures
	4.1 Introduction, Intrusion Detection Systems, Prevention versus Detection 4.2 Types of Intrusion Detection systems, DOS attacks, Flooding Attacks, DdoS Attack Prevention/Detection, Defenses Against Denial-of-Service Attacks, MalwareDetection and Types.	07
Chapter 5	An overview on Firewall	Lectures
	5.1 Firewalls – Firewall Architectures, Design and Types of Firewalls, Personal Firewalls 5.2 Characteristics, Packet filters, 5.3 Application-Level Gateways, Circuit Level Gateways, Trusted System	05
Chapter 6	Cyber Security	Lectures
	6.1 Cyber Crime – Cyber Crime Introduction, Email Tracing and Tracking, Email Spoofing, Data Recovery, Cyber Fraud Detection, Security	08

	Policy 6.2 Cyber Law & IT Act - Fundamentals of Cyber Law, Introduction to Indian Cyber Law: Information Technology Act 2000, Main features of the IT Act 2000, Information Technology Amendment Act 2008 and its major strengths.	
	Total:	45

Recommended Books:

1. Cryptography and Network Security- Atul Kahate
2. Kaufman C., Perlman R., and Speciner, "Network Security", Private Communication in a public world, 2nd ed., Prentice Hall PTR.,2002
3. Cyber Crime – Bansal S. K.
4. Cyber Law – Ecommerce and M-Commerce- Ahmand Tabrez.
5. Godbole, "Information Systems Security", Willey.00
6. 1Merkov, Breithaupt, "Information Security", Pearson Education
7. Schou, Shoemaker, "Information Assurance for the Enterprise", Tata McGraw Hill
8. Furnell, "Computer Insecurity", Springer 7. IT Act 2000

Web Links:

1. National Institute of Standards and Technology (**NIST**)
<https://www.nist.gov>
(Security standards, cryptographic guidelines)
2. Computer Emergency Response Team India (**CERT-In**)
<https://www.cert-in.org.in>
(Indian cyber security alerts and guidelines)
3. OWASP Foundation
<https://owasp.org>
(Web application security resources)
4. International Organization for Standardization (**ISO**)
<https://www.iso.org>
(Information Security Standards – ISO 27001)
5. Ministry of Electronics and Information Technology (**MeitY**)
<https://www.meity.gov.in>
(Indian IT Act and cyber law updates)

Course Name: T.Y.B.B.A. (CA)

Subject Code: 24BaBbcU5501

Sem: V

Total Hours: - 60

Total Credit: 02

Subject Name: Lab Course on Software Testing Tools

Prerequisites:

Students should have basic knowledge of Software Testing concepts.

Students should have basic knowledge of Manual Testing.

Students should have basic knowledge of Core Java programming, HTML, Java Script.

Student should Familiarity with IDE tools, browser inspection tools.

Course Objectives:

1. To understand the basics of automation testing.
2. To install and configure Selenium IDE.
3. To create and execute automated test cases.
4. To handle web elements using Selenium IDE commands.
5. To generate test reports and export test cases.

Course Outcomes:

After successful completion of this practical course, students will be able to:

1. Install and configure Selenium IDE.
2. Create automated test scripts.
3. Handle web elements and dynamic components.
4. Debug and manage test suites.
5. Perform basic automation testing tasks independently.

Unit 1	Introduction to Automation & Selenium IDE	Practical Hrs
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	Practical 1 Introduction to Software Testing and Automation Testing (Manual vs Automation). Practical 2 Introduction to Selenium Suite – Overview of • Selenium IDE • Selenium WebDriver • Selenium Grid Practical 3 Installation of Selenium IDE Extension in Google Chrome Mozilla Firefox Practical 4 Exploring Selenium IDE Interface (Menu, Toolbar, Test Case Pane, Log Panel). Practical 5 Recording First Test Case on any Demo Website. Practical 6 Executing and Debugging Recorded Test Case.	12
Unit 2	Selenium IDE Commands & Web Elements	16
	****Simple Exercise you can try in Selenium IDE ****	
	Practical 7 Understanding Selenium IDE Commands: • Open • Click • Type • Assert • Verify Practical 8 Locating Elements using: • ID • Name • CSS Selector • XPath Practical 9 Automation of Login Page (Valid & Invalid Inputs).	

	Practical 10 Handling TextBox, Button and Link. Practical 11 Handling Radio Buttons and Checkboxes. Practical 12 Handling Drop-down List (select command). Practical 13 Handling Alerts and Confirmation Popups. Practical 14 Using Wait Commands and Pause Command.	
Unit 3	Control Flow & Advanced Features	16
	Practical 15 Using If-Else Condition in Selenium IDE. Practical 16 Using Loops (while command). Practical 17 Working with Variables (store command). Practical 18 Data-Driven Testing using CSV file. Practical 19 Using Run Command and Run All. Practical 20 Using Breakpoints and Debugging. Practical 21 Handling Multiple Windows/Tabs. Practical 22 Handling Frames and iFrames.	
Unit IV	Test Suite & Reporting	16

	Practical 23 Creating and Managing Test Suite. Practical 24 Running Multiple Test Cases in Suite. Practical 25 Generating Test Execution Report. Practical 26 Exporting Test Case to • Java (WebDriver format) • TestNG Practical 27 Basic Introduction to WebDriver Code Structure. Practical 28 Integration of Selenium IDE with simple CI concept. Practical 29 Mini Project – Automate Complete Registration Form. Practical 30 Short Assignments	
	Total:	60

TYBBA CA Sem V
Subject Code: 24BaBbcU5301
Subject: Computer Technology – V (Cloud Computing)

Total Hours :- 30

Total Credits: 02

Pre-requisites: Knowledge of operating systems, Networking, Databases & Basics of Security and Privacy

Course Objectives:

To enable the students to:

1. Understand the fundamental concepts of cloud computing
2. Acquire knowledge of various cloud technologies.
3. Learn different types of Virtualization Techniques.
4. Evaluate the cloud services offered by major cloud players
5. Understand the different types of cloud storage and cloud security.

Course Outcomes:

Upon completing this course, the student will be able to:

- 1 - Explain concepts, features of cloud delivery model, Service Model, and advantages and disadvantages of cloud computing as well as determine the cloud computing architecture and infrastructure.
- 2 - Differentiate the different types of Cloud Services, their advantage and disadvantages, needs of cloud scalability and redundancy.
- 3 - Differentiate the different types of cloud's deployment model, different types of virtualization techniques, Cloud managements tools.
- 4 - Analyze cloud storage systems, cloud security, as well as the associated risks, cloud operations and their challenges in the cloud computing, different types of cloud computing technologies

I	1. Introduction of Cloud Computing 1.1. What is cloud computing? 1.2. Characteristics of cloud computing 1.3. Advantages of cloud computing 1.4. Disadvantages of cloud computing 1.5. Cloud Architecture and Applications 1.5.1. Cloud architecture 1.5.2. Components of cloud computing architecture 1.5.3. Working of cloud computing 1.6. Applications of cloud computing	7
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II	2. Advancements in Cloud Computing: 2.1. Scalability, and Redundancy 2.1.1. Meaning of scalability 2.1.2. Key features of cloud scalability 2.1.3. Types of scalability 2.1.4. Ways to scale cloud 2.1.5. Concept of redundancy 2.1.6. Benefits of redundancy 2.2. Cloud Services 2.2.1. Cloud services 2.2.2. Benefits of cloud services 2.2.3. Types of cloud service models 2.2.3.1. Software as a Service (SaaS) 2.2.3.2. Platform as a Service (PaaS) 2.2.3.3. Infrastructure as a Service (IaaS)	8
III	3. Cloud Architecture: Deployment, Virtualization, and Security Management 3.1. Cloud Deployment Models 3.1.1. Public Cloud architecture 3.1.2. Private cloud deployment model 3.1.3. Comparison between private and public cloud 3.1.4. Community cloud deployment model 3.1.5. Hybrid cloud deployment model 3.1.6. Multi cloud 3.2. Virtualization 3.2.1. Features of virtualization 3.2.2. How does virtualization work? 3.2.3. Difference between cloud computing and virtualization 3.2.4. Types of virtualization 3.2.4.1. Hardware virtualization 3.2.4.2. Software virtualization 3.2.4.3. Server virtualization 3.3. Cloud Management 3.3.1. Cloud provisioning 3.3.2. Cloud management benefits 3.3.3. Components of cloud computing management 3.3.4. Cloud management security Challenges faced during cloud management	10
IV	4. Cloud Storage and Security 4.1. Data Storage and Security 4.1.1. Cloud storage basics 4.1.2. Key Features of Cloud Storage 4.1.3. Types of cloud storage 4.1.4. Advantages and risks of cloud storage 4.1.5. Infrastructure Data protection process Cloud	5

	security Measures and controls in cloud security 4.1.6. Encryption 4.2. Cloud Operations and Challenges 4.2.1. Defining cloud operations 4.2.2. Cloud operations objective 4.2.3. Cloud operations management 4.2.4. Challenges related to cloud computing 4.3 MeghRaj	
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Total 30

Reference Books:

1. Cloud Computing Simplified Explore Application of Cloud, Cloud Deployment Models, Service Models and Mobile Cloud Computing by Surbhi Rastogi ,1st edition BPB Publications, India
2. Cloud Computing - Master the Concepts, Architecture and Applications with Real-world examples and Case studies by Kamal Kant Hiran Ruchi Doshi Dr. Temitayo Fagbola Mehul Mahrishi,1st edition, BPB Publications, India
3. Cloud Computing, Sandeep Bhowmik by 1st edition Cambridge University Press
4. Cloud Computing For Dummies®, by Daniel Kirsch & Judith Hurwitz, 2nd Edition John Wiley & Sons, Inc

Web Links:

1. **National Institute of Standards and Technology (NIST)**
<https://www.nist.gov>
 (Official cloud computing definition and standards – NIST SP 800-145)
2. **Amazon Web Services (AWS)**
<https://aws.amazon.com>
 (Cloud services models – IaaS, PaaS, SaaS examples)
3. **Microsoft Azure**
<https://azure.microsoft.com>
 (Cloud architecture, deployment, and security documentation)
4. **Google Cloud**
<https://cloud.google.com>
 (Cloud storage, virtualization, and operations management resources)
5. **MeghRaj (GI Cloud – India)**
<https://www.meity.gov.in>
 (Government of India cloud initiative under Digital India)

Course Name: T.Y.B.B.A. (CA)

Semester: VI

Subject Code: 24BaBbcU6101

Subject Name: Mobile Application Development (Android)

No. of Credits: 4

Total Hours: 45

Pre-requisites:

1. Concepts of OOPs.
2. Basic Knowledge about JAVA Programming

Course Objectives:

1. To cover the fundamentals of Android programming using the Android SDK.
2. Understand the fundamental concepts in Android programming activities and intents.
3. How to design,a user interface using different layouts.
4. Explore to add various views/components to design an activity.
5. Learn about data storage using SQLite.

Course Outcomes:

1. Understand the process of developing mobile applications.
2. How to create mobile applications on the Android Platform.
3. Students will be able to write simple GUI applications, use built-in widgets and components, work with the database to store data locally, and much more

Chapter 1	Introduction to Android Programming	Lectures
	1.1 What is Android? 1.2 History and Versions 1.3 Architecture of Android	06

	1.4 Basic Building Blocks 1.5 Android API Levels 1.6 First Hello World Program	
Chapter 2	Activity, Intent And Layout	Lectures
	2.1 Introduction to Activity 2.2 Activity Lifecycle, Creating Activities 2.3 Introduction to Intent 2.4 Types of Intent(implicit and Explicit Intent) 2.5 Layout Manager 2.5.1 View and View Group 2.5.2 Linear Layout 2.5.3 Relative Layout 2.5.4 Table Layout 2.5.5 Grid Layout 2.5.6 Constraint Layout 2.5.7 Frame Layout 2.5.8 Scroll Layout	09
Chapter 3	Basic UI Design	Lectures
	3.1 Button(Push Button, Check Box, Radio Button, Toggle Button, Image Button) 3.2. Text Fields 3.3 Spinner 3.4 List View 3.5. Toast 3.6. Scroll View 3.7. Progress Bar View 3.8. Auto Complete Text View	12

	3.9. Dialog Box 3.9.1 Alert Dialog 3.9.2 Date Picker Dialog 3.9.3 Time Picker Dialog 3.9.4 Custom Dialog	
Chapter 4	Adapter and Menu	Lectures
	4.1 Base Adapter 4.2 Array Adapter 4.3 List view using Adapter 4.4 Grid View using Adapter 4.5 Photo Gallery using Adapter 4.6 Using Menu with Views 4.6.1 Option Menu 4.6.2 Context Menu 4.6.3 Popup Menu	09
Chapter 5	Databases – SQLite	Lectures
	5.1. Introduction to SQLite 5.2. SQLiteOpenHelper and SQLite Database 5.3. Creating , opening and closing database 5.4. Working with cursors, Insert, Update, Delete 5.5. Building and executing queries	09
	Total:	45

Recommended Books:

1. [Android Programming: The Big Nerd Ranch Guide- By Chris Stewart , Kristin Marsicano](#)
2. [Headfirst Android Development: By Dawn Griffiths, David Griffiths.](#)
3. Android Programming for Beginners: By John Horton
4. Beginning Android4 Application Development, By Wei-Meng Lee WILEY India Edition WROX Publication

Web Links:

- **The official website for Android developers -**
<https://developer.android.com>
- <https://www.abhiandroid.com>
- <https://www.geeksforgeeks.org/android/introduction-to-android-development/>

T.Y.B.B.A.(C.A.) Semester – VI

Subject: Angular JS

Subject Code: 24BaBbcU6102

Credits:02

Total No. of Lectures: 30

Prerequisites

1. HTML – Basic tags, forms, page structure
2. CSS – Basic styling
3. JavaScript – Variables, functions, arrays, objects
4. Basic Web Concepts – Client–Server, HTTP
5. Basic use of editor like Visual Studio Code

Course Objectives:

By the end of this course,

1. The students should be able to Understand Client Side MVC and SPA
2. Explore AngularJS Component
3. Develop an AngularJS Single Page Application
4. Create and bind controllers with Javascript
5. Apply filter in AngularJS application

Course Outcomes:

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

1. **Understand and Implement Client-Side MVC and SPA** – Gain a deep understanding of the AngularJS framework, MVC architecture, and Single Page Application (SPA) development.

2. **Develop and Manage AngularJS Applications** – Create dynamic and interactive web applications using AngularJS components, controllers, directives, and data binding.
3. **Apply Filters, Forms, and AJAX in AngularJS** – Utilize built-in and custom filters, manage form validation, and implement AJAX functionality using the \$http service.
4. **Implement Dependency Injection and Services** – Understand and apply dependency injection principles, use built-in services, and create custom services for modular application development.

Unit	Topics	No. of Lectures
1	AngularJS Core Concepts: 1.1 What is AngularJS? 1.2 Difference between Javascript and Angular JS 1.3 Advantages of Angular 1.4 AngularJS MVC Architecture 1.5 Introduction to SPA 1.6 Setting up the environment 1.7 First App using MVC architecture	4
2	AngularJS Directives and Expressions: 2.1 Understanding ng attributes ng-app, ng-init, ng-model, ng-controller, ng-bind, ng-repeat, ng-show, ng-readonly, ng-disabled, ng-if, ng-click 2.2 Expression and Data Bindings 2.3 Working with directives	6
3	AngularJS Modules, Controller, View and Scope: 3.1 Angular Modules 3.2 Angular Controller 3.3 Angular View 3.4 Scope hierarchy	7
4	Filter, Forms and Ajax Filters 1.1 Built-in filters - upper case and lower case filters, date ,currency and number formatting ,orderBy, filter ,custom filter, 1.2 Angular JS Forms – Working with AngularJS forms, model binding, form controller ,Using CSS classes, form events , custom model update triggers ,custom validation, \$http service , 4.3 Ajax implementation using \$http	9

5	Dependency Injection, Services 5.1 What is dependency injection? 5.2 Understanding services 5.3 Using built-in service 5.4 Creating custom service, 5.5 Injecting dependency in service	4
Total	-----	30

Reference Books:

1. Beginning Angular with Typescript (updated to Angular 5) by Greg Lim
2. Mastering Web Application Development with AngularJS by Pawel Kozlowski, Peter Bacon Darwin

Web References:

1. <https://www.w3schools.com/angularjs/default.asp>
2. <https://www.geeksforgeeks.org/angular-js/angularjs/>
3. <https://docs.angularjs.org/tutorial>

Course Name: T.Y.B.B.A. (CA)

Semester: VI

Subject Code: 24BaBbcU6103

Subject Name: Lab course on 24BaBbcU6101

No. of Credits: 2

Total Hours : 60

Pre-requisites:

1. Concepts of OOPs.
2. Basic Knowledge about JAVA Programming

Course Objectives:

6. To cover the fundamentals of Android programming using the Android SDK.
7. Understand the fundamental concepts in Android programming activities and intents.

8. How to design, a user interface using different layouts.
9. Explore to add various views/components to design an activity.
10. Learn about data storage using SQLite.

Course Outcomes:

4. Understand the process of developing mobile applications.
5. How to create mobile applications on the Android Platform.
6. Students will be able to write simple GUI applications, use built-in widgets and components, work with the database to store data locally, and much more.

Assignment no	Assignment Name	No of Practical Hrs
1	Topic: Installation of Android studio Execution of Hello world application	2
2	Topic :Layout 1.Constraint Layout 2.Linear Layout 3.Relative Layout 4.Table Layout 5.Absolute Layout	10
3.	Topic: Basic UI components 1.Textview,EditText 2.Image Button,Button 3.Radio Button,RadioGroup 4.Check box,ToggleButton,Switch Button 5.Autocomplete Textview	12
4.	Topic:Toast,AlertDialog,Rating Bar	6
5.	Topic:Adapter view Listview,Gridview,Spinner	6
6.	Topic:Menus 1.Options Menu 2.Context Menu 3.Popup Menu	6
7.	Topic:Dialogs DatePicker,TimePicker	4
8.	Implicit Intent	4
9.	Explicit Intent	4
10.	Topic: SQLite Database CRUD operations	8

Recommended Books:

5. **Android Programming: The Big Nerd Ranch Guide-** By Chris Stewart , Kristin Marsicano
6. **Headfirst Android Development:** By Dawn Griffiths, David Griffiths.

7. Android Programming for Beginners: By John Horton
8. Beginning Android4 Application Development, By Wei-Meng Lee WILEY India Edition WROX Publication

Web Links:

- **The official website for Android developers -**
<https://developer.android.com>
- <https://www.abhiandroid.com>
- <https://www.geeksforgeeks.org/android/introduction-to-android-development/>

T.Y.B.B.A.(C.A.) Semester – VI
Subject: Lab Course on 24BaBbcU6102
Subject Code: 24BaBbcU6104

Credits:02

Total No. of Lectures: 60

Prerequisite

1. HTML – Basic tags, forms, page structure
2. CSS – Basic styling
3. JavaScript – Variables, functions, arrays, objects
4. Basic Web Concepts – Client–Server, HTTP
5. Basic use of editor like Visual Studio Code

Course Objectives:

By the end of this course, the students should be able to Understand Client Side MVC and SPA

1. Explore AngularJS Component
2. Develop an AngularJS Single Page Application
3. Create and bind controllers with Javascript
4. Apply filter in AngularJS application

Course Outcomes:

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

1. **Understand and Implement Client-Side MVC and SPA** – Gain a deep understanding of the AngularJS framework, MVC architecture, and Single Page Application (SPA) development.

2. **Develop and Manage AngularJS Applications** – Create dynamic and interactive web applications using AngularJS components, controllers, directives, and data binding.
3. **Apply Filters, Forms, and AJAX in AngularJS** – Utilize built-in and custom filters, manage form validation, and implement AJAX functionality using the \$http service.
4. **Implement Dependency Injection and Services** – Understand and apply dependency injection principles, use built-in services, and create custom services for modular application development.

Unit	Topics	No. of hours
1	Introduction to Angular JS	4
2	Angular JS Directives	8
3	Expressions	4
4	Events	8
5	Angular JS Modules, Controller, View and Scope	8
6	Filters in Angular JS	6
7	Forms Validation	6
8	Angular JS Services	8
9	Angular JS (Creation of forms, small case study to create a Website using HTML and all of the above learnt Angular JS techniques).	8
Total	-----	60

Reference Books:

3. Beginning Angular with Typescript (updated to Angular 5) by Greg Lim
4. Mastering Web Application Development with AngularJS by Pawel Kozlowski, Peter Bacon Darwin

Web References:

4. <https://www.w3schools.com/angularjs/default.asp>
5. <https://www.geeksforgeeks.org/angular-js/angularjs/>
6. <https://docs.angularjs.org/tutorial>

Subject Name: Lab course on Generative AI (Hugging Face)**No. of Credits: 2****Total Hours: 60**

Pre-Requisites: Basic knowledge of **Python programming**, including working with libraries such as NumPy and Pandas, is required.

Course Objectives:

1. To understand the fundamentals of **Generative AI** and the Hugging Face ecosystem.
2. To learn the working principles of **transformer architecture** and attention mechanisms.
3. To use **pretrained models** like BERT, GPT, and T5 for various NLP tasks.
4. To implement NLP tasks such as text generation, sentiment analysis, and question answering using Hugging Face Transformers.
5. To understand tokenization techniques and data preprocessing methods.
6. To perform **fine-tuning of models** using custom datasets.
7. To work with datasets using the Hugging Face Datasets library.
8. To deploy machine learning models using tools like Hugging Face Spaces.
9. To explore **diffusion models** for image generation.
10. To understand basic concepts of **LLM training and model optimization**.

Course Outcomes:

1. Understand the fundamentals of Generative AI and the Hugging Face ecosystem.
2. Explain the working of transformer models and attention mechanisms.
3. Apply pretrained models like BERT, GPT, and T5 for solving NLP tasks.
4. Implement tasks such as text generation, sentiment analysis, and question answering using Hugging Face Transformers.
5. Perform tokenization and preprocess text data effectively.
6. Fine-tune pretrained models using custom datasets.
7. Use the Hugging Face Datasets library for loading and managing data.
8. Deploy AI models using platforms like Hugging Face Spaces.
9. Generate images using diffusion models.
10. Understand basic techniques for LLM training and model optimization.

Sr. No.	Topics	No. of hours
1	Unit: 1 Introduction to Hugging Face 1. Hugging Face 2. Transformers 3. Hugging Face Hub	4
2	Unit 2: Transformer Architecture 1. Basics of transformers	7

	2. Attention mechanism 3. Encoder vs Decoder models	
3	Unit 3: Pretrained Models 1. Using models like: BERT, GPT, T5 2. Model loading and inference	6
4	Unit 4: Pipelines 1. Text generation 2. Sentiment analysis 3. Translation 4. Question answering	6
5	Unit 5: Tokenization 7. Tokenization 8. Types of tokenizers 9. Working with tokenizers	5
6	Unit 6: Fine-Tuning Models 6. Dataset preparation 7. Training models 8. Transfer learning 9. Evaluation metrics	8
7	Unit 7: Working with Datasets 1. Using Hugging Face datasets library 2. Data preprocessing	4
8	Unit 8: Deployment 1. Model deployment using Spaces 2. APIs for models	6
9	Unit 9: Diffusion models (image generation) 1. Stable Diffusion 2. Diffusers	6

	3. Automatic1111 WebUI	
10	Unit 10: LLM training basics & Model optimization 1. PyTorch 2. DeepSpeed 3. BitsAndBytes 4. Accelerate	8
Total	-----	60

Course Contents

Course Name: T.Y.B.B.A. (CA)

Semester: VI (NEP 2024 Pattern)

Subject Code: 24BaBbcU6201

Subject Name: Recent Trends in Information Technology

CIA: 40 Marks

ESE: 60 Marks

Total Hours: 45

Credits: 04

Prerequisites:

Students should have foundational knowledge in programming (especially Python), networking basics, and data structures.

Understanding of cloud computing, database management, security principles, and AI/ML concepts. Proficiency in coding and a strong grasp of operating systems are essential for emerging technologies like IoT and AI

Course Objectives:

1. To identify the different technologies.
2. To understand the importance of IT enabled services and challenges for the same.
3. To learn different applications indifferent technologies.
4. To enable students to have skills that will help them to solve complex real-world problems for decision support.

Course Outcomes:

1. Describe the importance of IT enabled services and challenges.
2. Identify strategic IT planning for software development.
3. Recognize enterprise IT architecture for Information technology.

4. Use their skills to find out various current IT trends in IT.

Sr. No.	Topics	Number of Lectures
1	Chapter 1: Big Data 1.1 Introduction to Big Data 1.2 Types of Digital Data 1.3 Why it's Important, Risks of Big Data, Need of Big Data 1.4 Structure of Big Data, Exploring Big Data, 1.5 Filtering Big Data, the Need for Standard 1.6 Big Data Analytics 1.7 Application of Big data	08
2	Chapter 2: Internet of Things (IoT) 2.1 IOT concepts 2.2 Components of IOT System/ IoT architecture. 2.3 IOT ecosystem 2.4 IOT in Indian Scenario 2.5 Advantages, disadvantages of IOT 2.6 Challenges in IOT implementation. 2.7 Relevance of IOT for the future. 2.8 IOT Applications, IOT Case study	08
3	Chapter 3: Blockchain 3.1 Introduction and Definition of Blockchain 3.2 Blockchain Architecture	08

	3.3 How Blockchain Transaction Works, Need of Blockchain 3.4 Blockchain versions, Variants 3.5 Bitcoin cryptocurrency 3.6 Blockchain vs. Shared Database 3.7 Advantages and Limitations of Blockchain	
4	Chapter 4: Introduction to Fuzzy Logic 4.1 Concept of computing systems. 4.2 "Soft" computing versus "Hard" computing 4.3 Characteristics of Soft computing 4.4 Some applications of Soft computing techniques 4.5 Introduction to Fuzzy logic. 4.6 Fuzzy sets, crisp set and membership functions. 4.7 Operations on Fuzzy sets. fuzzy complements, fuzzy intersections, and fuzzy union 4.8 Definition of Fuzzification and Defuzzification, crisp sets 4.9 Some applications of Fuzzy logic.	08
5	Chapter 5: Machine Learning 5.1 An introduction with machine learning 5.2 Types of machine learning. 5.3 Learning process, Data set 5.4 Model Learning and Model testing 5.5 Types of machine learning problems 1) Supervised 2) Unsupervised 3) Reinforcement 5.6 Regression and classification 5.7 Stages for problem solving in machine learning 5.8 Applications and benefits of Machine learning 5.9 Real world case studies based on Machine Learning	08
6	Chapter 6: Search Engine Optimization (SEO) 6.1 Introduction to SEO	05

	6.2 Types of SEO Techniques - Black Hat, White Hat, etc. 6.3 How it works CRAWLING, INDEXING and RANKING 6.4 Search Engine Optimization - 1) On Page 2) Off Page 6.5 Some SEO Tools	
	Total:	45

Recommended Books:

1. Machine Learning Pocket Reference: by Matt Harrison
2. Fuzzy Logic with Engineering Application by Timothy J. Ross
3. Blockchain Basics By Daniel Drescher
4. Internet of Things: A Hands-On Approach by Arsheep Bahga, Vijay Madisetti
5. Seema Acharya, Subhashini Chellappan, "Big Data Analytics" Wiley 2015.

Web Links:

1. <https://www.geeksforgeeks.org/big-data/what-is-big-data-analytics/>
2. <https://www.geeksforgeeks.org/computer-networks/introduction-to-internet-of-things-iot-set-1/>
3. <https://www.coresite.com/blog/what-is-blockchain>
4. <https://www.geeksforgeeks.org/artificial-intelligence/fuzzy-logic-introduction/>
5. <https://www.oracle.com/in/artificial-intelligence/machine-learning/what-is-machine-learning/>
6. <https://www.geeksforgeeks.org/techtips/search-engine-optimization-seo-basics/>

Course Name: T.Y.B.B.A. (CA)

Subject Code: 24BaBbcU6202 Sem: VI Total Hours: - 45 Total Credit: 04

Subject Name: Software Project Management [Major Elective]

Prerequisites:

1. Students should have a good understanding of how software is developed [SDLC]
2. Students should have Familiarity with programming concepts [C, C++, Java, etc.]
3. Students should have Basic Statical & Analytical Skills.
4. Student should know basic management concepts.

Course Objectives:

1. To learn the process of software project management.
2. Cost estimation, use of project Management Tools.
3. Configuration Management.
4. People roles and Software Teams.

Course Outcomes:

On completion of the course students will be able to:

1. Recognize evolving role of software project management.
2. Apply project management concepts and techniques to an IT project.
3. Identify issues that could lead to IT project success or failure.
4. Explain project management in terms of the software development process.
5. Describe the responsibilities of IT project managers.
6. Evaluate the role of user and software teams.

Chapter 1	Introduction to Software Project Management and Project Planning	Lectures
	1.1 Introduction 1.1.1. Important of SPM. 1.1.2 What is a Project? 1.1.3 Software Projects versus Other Types of Project. 1.2 Management and Technical Project Management 1.3 Activities Covered by Software Contract Project Management 1.4 Plans, Methods and Methodologies 1.5 Categorizing Software Project 1.6 Project Charter and Stakeholders 1.7 Setting Objectives 1.8 The Business Case, Project Success and Failure. 1.9 Management Introduction 1. Management Control 2. Project Management Life Cycle, 3. Traditional versus Modern Project Management Practices. 1.2 Project Evaluation: 1. Introduction, Business Case, Cost–benefit Evaluation Techniques, Risk Evaluation, Programme Management. 2. Managing the Allocation of Resources within Programme, Strategic Management. 1.3 An Overview of Project Planning: 1. Introduction to Step Wise Project Planning 1. Step 0: Select Project, Step 1: Identify Project Scope and Objectives, Step 2: Identify Project Infrastructure, Step 3: Analyze Project Characteristics, Step 4: Identify Project Products and Activities, Step 5: Estimate Effort for Each Activity, Step 6: Identify Activity Risks, Step 7: Allocate Resources, Step 8: Review/Publicize Plan, Steps 9 and 10: Execute Plan/Lower Levels of Planning, Work Breakdown Structure.	12
Chapter 2	Selection of an Appropriate Project Approach and Estimation	07
	2.1 Selection of an Appropriate Project Approach and Estimation: 2.1.1 Introduction, Build or Buy? Choosing Methodologies and Technologies, 2.1.2 Software Processes and Process Models, Choice of Process Models, Structure versus Speed of Delivery, The Waterfall Model, The Spiral Model, Software Prototyping, Incremental Delivery, Rapid Application Development, Agile Methods, Extreme Programming (XP), Scrum, Lean Software Development, Managing Iterative Processes, Selecting the Most Appropriate Process Model. 2.2 Software Effort Estimation: Introduction and Software Effort Estimation Techniques.	
Chapter 3	Activity Planning and Risk Management	10
	3.1 Activity Planning:	

	3.1.1 Introduction, Objectives of Activity Planning, When to Plan, Project Schedules, Projects and Activities, Sequencing and Scheduling Activities, Backward Pass. 3.1.2 Identifying the Critical Path, Activity Float, Shortening the Project Duration, Critical path chain, Identifying Critical Activities. 3.2 Risk Management: 3.1.3 Introduction, Risk, Categories of Risk, Risk Management Approaches, A Framework for Dealing with Risk, Risk Identification, Risk Assessment, Risk Planning, Risk Management. 3.1.4 Evaluating Risks to the Schedule, PERT Technique, Gantt Chart. 3.3 Resource Allocation: 3.3.1 Introduction, Nature of Resources, Identifying Resource Requirements, Scheduling Resources. 3.3.2 Creating Critical Paths, Counting the Cost, Being Specific, Publishing the Resource Schedule, Cost Schedules, Scheduling Sequence.	
Chapter 4	Monitoring and Control	07
	4.1 Monitoring and Control: 4.1.1 Introduction, Creating the Framework, Collecting the Data, Review, Visualizing Progress, Cost Monitoring, Earned Value Analysis, Prioritizing Monitoring. 4.1.2 Getting the Project Back to Target, Change Control, Software Configuration Management (SCM). 4.2 Managing Contracts: 4.2.1 Introduction, Types of Contract, Stages in Contract Placement 4.2.2 Typical Terms of a Contract, Contract Management, Acceptance. 4.3 Managing People in Software Environments: 4.3.1 Introduction, Understanding Behavior, Organizational Behaviors. 4.3.2 Stress, Stress Management, Health and Safety, Some Ethical and Professional Concerns.	
Chapter 5	Managing People in Software Environments and Software Quality	09
	5.1 Working in Teams: 5.1.1 Introduction, becoming a Team, Decision Making, Organization and Team Structures, Coordination Dependencies, Dispersed and Virtual Teams, Communication Genres, Communication Plans, Leadership. 5.2 Software Quality: 5.2.1 Introduction, The Place of Software Quality in Project Planning, Importance of Software Quality, Defining Software Quality, Software Quality Models, ISO-9126, Product and Process Metrics, Product versus Process Quality Management.	

	5.2.2 Quality Management Systems, Process Capability Models, Techniques to Help Enhance Software Quality, Testing, Software Reliability, Quality Plans. 5.3 Project Closeout: Introduction, Reasons for Project Closure, Project Closure Process, Performing a Financial Closure, Project Closeout Report.	
	Total:	45

Recommended Books:

1. Schwalbe, Kathy (2016) “Information Technology Project Management” Edition: 8th, ISBN-13: 978-1285452340, ISBN-10: 1285452348
2. Bob Hughes and Mike Cotterell, “Software Project Management”, Tata McGraw Hill, 4th edition, 2006
3. Royce, “Software Project Management”, Pearson Education, 2005
4. Kieron Conway, “Software Project Management”, Dreamtech Press, 2001
5. S. A. Kelkar, “Software Project Management”, PHI Publication, 15th edition, 2013.
6. Roger S. Pressman, “Software Engineering -A Practitioner’s approach”, Tata McGraw Hill, 2009
7. Ramesh, “Managing Global software Projects”, Tata McGraw Hill, 2001
8. Pankaj Jalote, “Software Project Management in Practice”, Pearson Edn., 2002.
9. Robert K. Wysocki, “Effective software project management”, Willy India edition
10. Software engineering principles and practice, McGraw-Hill, Waman S. Javadekar

Web Links:

1. <https://www.pearsoned.co.in/prc/book/subramanian-chandramouli-software-project-management-1e-9789332542143>
2. <https://nvaeducation.com/books/VU/CS615/software-project-management/handouts>
3. <https://dokumen.pub/software-project-management-third-revised-edition.html>
4. <https://notes.e-next.in/bsc-it/sem5/software-project-management>

Subject Code: 24BaBbcU6501

Subject: Block Chain

Total Hours: - 30

Total Credits: 02

Prerequisites:

This course is highly technical in nature and would require the student to be comfortable with coding. To prepare for the class all students MUST HAVE:

- ☐ Understanding of basic programming language like Java, or JavaScript.
- ☐ Basic knowledge of computer security, cryptography, networking

Course Objectives:

1. Understand what and why of Blockchain
2. Explore the major components of Blockchain
3. Learn about Bitcoin, Cryptocurrency, Ethereum
4. Deploy and exercise example smart contracts
5. Identify a use case for a Blockchain application
6. Create your own Blockchain network application.

Course Outcomes: On completion of the course, students will be able:

1. Understand how blockchain systems (mainly Bitcoin and Ethereum) work
2. How To securely interact with them
3. Understand how to Design, build, and deploy smart contracts and distributed applications,
4. Integrate ideas from blockchain technology into their own projects.

Unit	Details	Lectures
I	Unit 1: Introduction to Blockchain 2.1 Introduction to Blockchain 2.2 Digital Trust 1.3 Asset 1.4 Transactions 1.5 Distributed Ledger Technology 1.6 Types of network 1.7 Components of blockchain or DLT 1.8 Ledger 1.8.1. Blocks 1.8.2. Blockchain 1.9 PKI and Cryptography 1.9.1. Private keys 1.9.2. Public keys 1.9.3. Hashing 1.9.4. Digital Signature 1.10. Consensus 1.10.1. Proof of Work 1.10.2. Poof of Stake 1.11 Crypto currency 1.12.Digital Token	10
II	Unit 2: How Blockchain Works 2.1 How Blockchain Works 2.2. Structure of Blockchain 2.3.Block 2.4. Hash 2.5. Distributed 2.6. Lifecycle of Blockchain 2.7. Smart Contract 2.8. Consensus Algorithm 2.9. Proof of Work 2.10 Proof of Stake	8

	2.11 Fault Tolerance 2.12 Actors of Blockchain 2.13 Blockchain developer 2.14 Blockchain operator 2.15 Blockchain regulator 2.16 Blockchain user 2.17 Membership service Provider 2.18 Building A Small Blockchain Application	
III	Unit 3: Introduction to Bitcoin 3.1 Currency 3.2 Double Spending 3.3 Cryptocurrency 3.4 P2P Payment Gateway 3.5 Wallet and Mining	5
IV	Unit 4: Ethereum 4.1.Ethereum network 4.2. EVM 4.3.Transaction fee 4.4.Mist 4.5.Ether, gas 4.6.Solidity - Smart contracts 4.7.Truffle 4.8.Web3 4.9.Design and issue Cryptocurrency 4.10. Mining 4.11. DApps 4.12. DAO	7

Web Link :

1. <https://www.geeksforgeeks.org/software-engineering/blockchain/>

Reference Books:

1. Antonopoulos, Mastering Bitcoin: Unlocking Digital Cryptocurrencies
2. Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System
3. DR. Gavin Wood, "ETHEREUM: A Secure Decentralized Transaction Ledger,"Yellow paper.2014.

4. Nicola Atzei, Massimo Bartoletti, and Tiziana Cimoli, A survey of attacks on Ethereum smart contracts