DEPARTMENT OF COMPUTER SCIENCE & APPLICATIONS
KURUKSHETRA UNIVERSITY, KURUKSHETRA

<table>
<tr><th colspan="5">Scheme: 2023-24, Syllabus: 2024-25</th></tr>
<tr><th colspan="5">Part A - Introduction</th></tr>
<tr><td>Subject</td><td colspan="4">BCA</td></tr>
<tr><td>Semester</td><td colspan="4">V</td></tr>
<tr><td>Name of the Course</td><td colspan="4">Software Engineering</td></tr>
<tr><td>Course Code</td><td colspan="4">B23-CAP-501</td></tr>
<tr><td>Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/ VAC)</td><td colspan="4">CC-A5</td></tr>
<tr><td>Level of the course (As per Annexure-I</td><td colspan="4">300-399</td></tr>
<tr><td>Pre-requisite for the course (if any)</td><td colspan="4">Knowledge of any Programming language</td></tr>
<tr><td>Course Learning Outcomes(CLO):</td><td colspan="4">After completing this course, the learner will be able to:
1. learn the various models for software development.
2. understand how to analyze software.
3. plan a software design and the risks associated with software.
4. test and validate software
5*. Implement the various tools and techniques used in software engineering.</td></tr>
<tr><td rowspan="2">Credits</td><td>Theory</td><td>Practical</td><td>Total</td></tr>
<tr><td>3</td><td>1</td><td>4</td></tr>
<tr><td>Contact Hours</td><td>3</td><td>2</td><td>5</td></tr>
<tr><td colspan="2">Max. Marks:100(70(T)+30(P))
Internal Assessment Marks:30(20(T)+10(P))
End Term Exam Marks: 70(50(T)+20(P))</td><td colspan="3">Time: 3 Hrs.(T), 3Hrs.(P)</td></tr>
<tr><th colspan="5">Part B- Contents of the Course</th></tr>
<tr><td colspan="5"><u>Instructions for Paper-Setter</u>
The examiner will set a total of nine questions. Out of which first question will be compulsory. Remaining eight questions will be set from four unit selecting two questions from each unit. The examination will be of three-hour duration. All questions will carry equal marks. The first question will comprise short answer-type questions covering the entire syllabus.
Candidate will have to attempt five questions in all, selecting one question from each unit. First question will be compulsory.
The practicum will be evaluated by an external and an internal examiner. The examination will be of</td></tr>
</table>

three-hour duration.		
Unit	**Topics**	**Contact Hours**
I	Introduction: Program vs. Software, Software Engineering, Programming paradigms, Software Crisis – problem and causes, Phases in Software development: Requirement Analysis, Software Design, Coding, Testing, Maintenance, Software Development Process Models: Waterfall, Prototype, Evolutionary and Spiral models, Role of Metrics.	11
II	Feasibility Study, Software Requirement Analysis and Specifications: SRS**,** Need for SRS, Characteristics of an SRS, Components of an SRS**,** Problem Analysis**,** Information gathering tools, Requirement specification, validation and metrics. Structured Analysis and Tools: Data Flow Diagram, Data Dictionary, Decision table, Decision trees, Structured English, Entity-Relationship diagrams	11
III	Software Project Planning: Cost estimation: COCOMO model, Project scheduling, Staffing, and personnel planning, team structure, Software configuration management, Quality assurance plans, Project monitoring plans, Risk Management. Software Design: Design fundamentals, problem partitioning, and abstraction, design methodology, Cohesion & Coupling.	12
IV	Software testing strategies: unit testing, integration testing, Validation testing, System testing, Alpha and Beta testing. Software Maintenance: Type of maintenance, Management of Maintenance, Maintenance Process, maintenance characteristics.	11

V*	Practicum:
	Students are advised to do laboratory/practical practice not limited to but including the following types of problems:
	• Development of 0-level DFD
	• Development of 1 level DFD
	• Development of 2-level DFD
	• data dictionary,
	• E-R diagram for Student Teacher Relationship
	• E-R diagram for Library Management,
	• Draw an ER Diagram for the Hospital Management System.
	• ER diagram for (ANY 5)
	  • Student Result Management System
	  • Library management system
	  • Inventory control system
	  • Accounting system
	  • Fast food billing system
	  • Bank loan system
	  • Blood bank system
	  • Railway reservation system
	  • Automatic teller machine
	  • Video library management system
	  • Hotel management system
	  • Hostel management system
		30

	• E-ticking • Share online trading • Hostel management system • Resource management system • Court case management system	

Suggested Evaluation Methods

Internal Assessment: ➢ **Theory** • Class Participation: 5 • Seminar/presentation/assignment/quiz/class test etc.: 5 • Mid-Term Exam: 10 ➢ **Practicum** • Class Participation: NA • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 • Mid-Term Exam: NA	**End-Term Examination:** A three-hour exam for both theory and practicum. **End Term Exam Marks: 70(50(T)+20(P))**

Part C-Learning Resources

Recommended Books/e-resources/LMS:

- Pressman R. S., "Software Engineering – A Practitioner's Approach", Tata McGraw Hill.
- Jalote P., "An Integrated Approach to Software Engineering", Narosa.
- Sommerville, "Software Engineering", Addison Wesley.
- Fairley R., "Software Engineering Concepts", Tata McGraw Hill.
- James Peter, W Pedrycz, "Software Engineering", John Wiley & Sons.

*Applicable for courses having practical components.

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<tr><th colspan="4">Part A - Introduction</th></tr>
<tr><td>Subject</td><td colspan="3">BCA</td></tr>
<tr><td>Semester</td><td colspan="3">V</td></tr>
<tr><td>Name of the Course</td><td colspan="3">Back-end Development</td></tr>
<tr><td>Course Code</td><td colspan="3">B23-CAP-502</td></tr>
<tr><td>Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/ VAC)</td><td colspan="3">CC-B5</td></tr>
<tr><td>Level of the course (As per Annexure-I</td><td colspan="3">300-399</td></tr>
<tr><td>Pre-requisite for the course (if any)</td><td colspan="3">B23-CAP-202</td></tr>
<tr><td>Course Learning Outcomes(CLO):</td><td colspan="3">After completing this course, the learner will be able to:
1. Understand the principles of back-end development.
2. Gain proficiency in back-end programming languages and frameworks.
3. Learn to design and manage databases.
4. Develop skills to create and use back-end applications.
_____
5*. to equip with the knowledge of back-end programming.</td></tr>
<tr><td rowspan="2">Credits</td><td>Theory</td><td>Practical</td><td>Total</td></tr>
<tr><td>3</td><td>1</td><td>4</td></tr>
<tr><td>Contact Hours</td><td>3</td><td>2</td><td>5</td></tr>
<tr><td colspan="2">Max. Marks:75(50(T)+25(P))
Internal Assessment Marks:20(15(T)+5(P))
End Term Exam Marks: 55(35(T)+20(P))</td><td colspan="2">Time: 3 Hrs.(T), 3Hrs.(P)</td></tr>
<tr><th colspan="4">Part B- Contents of the Course</th></tr>
<tr><td colspan="4"><u>Instructions for Paper-Setter</u>
The examiner will set a total of nine questions. Out of which first question will be compulsory. The remaining eight questions will be set from four units selecting two questions from each unit. The examination will be of three-hour duration. All questions will carry equal marks. The first question will comprise short answer-type questions covering the entire syllabus.
The candidate must attempt five questions, selecting one from each unit. The first question will be compulsory.</td></tr>
</table>

The practicum will be evaluated by an external and an internal examiner. The examination will be of three-hour duration.		
Unit	**Topics**	**Contact Hours**
I	**Introduction to back-end Development:** Overview of backend, Client-server architecture, Introduction to web servers and database **Programming Languages and Tools:** Introduction to server-side languages (e.g., Node.js), Syntax and semantics of chosen server-side language	11
II	**Programming Languages:** Version control with Git, Introduction to IDEs (Integrated Development Environments) of chosen language, Writing and executing basic server-side scripts **Performance Optimization and Security:** Caching strategies, Query optimization	11
III	**Database Management:** Introduction to databases and DBMS (SQL and NoSQL), Designing a database schema, CRUD operations (Create, Read, Update, Delete), Connecting applications to a database	11
IV	**Server-Side Frameworks:** Overview of popular server-side frameworks (e.g., Express.js), Building a simple application using a framework. **API Development:** RESTful API concepts, Designing and documenting APIs, Authentication and authorization basics Web security best practices (SQL injection, XSS, CSRF)	12
V*	The following activities be carried out/ discussed in the lab during the initial period of the semester. Programming Lab: • Introduction to Backend Technologies: Objective: Familiarize students with backend technologies and tools. o Setup development environment (e.g., IDE, Git). o Create a simple "Hello World" backend application in Node.js. • Working with Databases (SQL): Objective: Learn basic SQL operations and database interactions. o Set up MySQL/PostgreSQL database. o Perform CRUD operations using SQL queries (Create, Read, Update, Delete). • Working with NoSQL Databases: Objective: Introduce students to NoSQL databases. o Set up MongoDB database. o Implement CRUD operations using NoSQL commands. • Building RESTful APIs: Objective: Develop skills in designing and implementing RESTful APIs. o Create endpoints for CRUD operations.	30

	○ Implement basic authentication and authorization. • Web Frameworks (Choose one: Node.js or Express.js): Objective: Gain practical experience with backend frameworks. ○ Setup Node.js/Express.js project. ○ Implement a simple web application (Express.js or Node.js). • Integrating Frontend and Backend: Objective: Understand frontend-backend interaction. ○ Create API endpoints to serve JSON data. ○ Develop a frontend (HTML/CSS/JavaScript) to consume backend API. • Data Validation and Error Handling: Objective: Learn techniques for validating input data and handling errors. ○ Implement input validation using middleware (Express.js) or Node.js forms. ○ Handle errors and exceptions gracefully. • Security Best Practices: Objective: Implement security measures in backend applications. ○ Implement HTTPS/SSL configuration. ○ Prevent common security vulnerabilities (e.g., SQL injection, XSS).	
Suggested Evaluation Methods		
Internal Assessment: ➢ **Theory** • Class Participation: 5 • Seminar/presentation/assignment/quiz/class test etc.:5 • Mid-Term Exam: 10 ➢ **Practicum** • Class Participation: NA • Seminar/Demonstration/Viva-voce/Lab records etc.:10 • Mid-Term Exam: NA		**End Term Examination:** **A three-hour exam for both theory and practicum.**
Part C-Learning Resources		
Recommended Books/e-resources/LMS: • "Node.js Design Patterns" by Mario Casciaro and Luciano Mammino • "Learning PHP, MySQL & JavaScript" by Robin Nixon • Online documentation and tutorials for the chosen programming language and frameworks • "Clean Code: A Handbook of Agile Software Craftsmanship" by Robert C. Martin • "Designing Data-Intensive Applications: The Big Ideas Behind Reliable, Scalable, and • Maintainable Systems" by Martin Kleppmann • "SQL Cookbook: Query Solutions and Techniques for Database Developers" by Anthony Molinaro • "High-Performance Browser Networking: What every web developer should know about networking and web performance" by Ilya Grigorik		

*Applicable for courses having practical component.

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<table>
<tr><th colspan="4">Scheme: 2023-24, Syllabus: 2024-25</th></tr>
<tr><th colspan="4">Part A - Introduction</th></tr>
<tr><td>Subject</td><td colspan="3">BCA</td></tr>
<tr><td>Semester</td><td colspan="3">V</td></tr>
<tr><td>Name of the Course</td><td colspan="3">Network Infrastructure and Data Communication Technologies</td></tr>
<tr><td>Course Code</td><td colspan="3">B23-CAP-503</td></tr>
<tr><td>Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/ VAC)</td><td colspan="3">CC-C5</td></tr>
<tr><td>Level of the course (As per Annexure-I</td><td colspan="3">300-399</td></tr>
<tr><td>Pre-requisite for the course (if any)</td><td colspan="3">Basic Knowledge of computer</td></tr>
<tr><td>Course Learning Outcomes(CLO):</td><td colspan="3">After completing this course, the learner will be able to:
1. Understand the basic concepts and principles of computer networks.
2. Describe the analog and digital communication concepts.
3. Evaluate different data link layer designs and LAN technologies.
4. Analyze the various routing algorithms and know about the application layer.

5*. Use networking infrastructure and its applications.</td></tr>
<tr><td rowspan="2">Credits</td><td>Theory</td><td>Practical</td><td>Total</td></tr>
<tr><td>3</td><td>1</td><td>4</td></tr>
<tr><td>Contact Hours</td><td>3</td><td>2</td><td>5</td></tr>
<tr><td colspan="2">Max. Marks:100(70(T)+30(P))
Internal Assessment Marks:30(20(T)+10(P))
End Term Exam Marks: 70(50(T)+20(P))</td><td colspan="2">Time: 3 Hrs.(T), 3Hrs.(P)</td></tr>
<tr><td colspan="4"><u>Instructions for Paper-Setter</u>
The examiner will set a total of nine questions. Out of which first question will be compulsory. Remaining eight questions will be set from four unit selecting two questions from each unit. The examination will be of three-hour duration. All questions will carry equal marks. The first question will comprise short answer-type questions covering the entire syllabus.
The candidate must attempt five questions in all, selecting one question from each unit. The first question will be compulsory.
The practicum will be evaluated by an external and an internal examiner. The examination will be of three-hour duration.</td></tr>
</table>

Part B- Contents of the Course		
Unit	**Topics**	**Contact Hours**
I	Introduction to Data Communication and Computer Networks; Uses of Computer Networks; Types of Computer Networks and their Topologies; Network Hardware Components: Connectors, Transceivers, Repeaters, Hubs, Network Interface Cards and PC Cards, Bridges, Switches, Routers, Gateways; Network Software: Network Design issues and Protocols; Connection-Oriented and Connectionless Services; OSI Reference Model; TCP/IP Model	11
II	Analog and Digital Communications Concepts: Analog and Digital data and signals; Bandwidth and Data Rate, Capacity, Baud Rate; Guided and Wireless Transmission Media; Communication Satellites; Switching and Multiplexing; Modems and modulation techniques	11
III	Data Link Layer Design issues; Error Detection and Correction methods; Sliding Window Protocols: One-bit, Go Back N, and Selective Repeat; Media Access Control: ALOHA, Slotted ALOHA, CSMA, Collision free protocols; Introduction to LAN technologies: Ethernet, Switched Ethernet, Fast Ethernet, Gigabit Ethernet; Token Ring; Introduction to Wireless LANs and Bluetooth;	11
IV	Routing Algorithms: Flooding, Shortest Path Routing, Distance Vector Routing; Link State Routing, Hierarchical Routing; Congestion Control; Traffic shaping; Choke packets; Load shedding; Application Layer: Introduction to DNS, E-Mail, and WWW services; Network Security Issues: Security attacks; Encryption methods; Firewalls; Digital Signatures;	12
V*	The following activities be carried out/ discussed in the labduring the semester. Programming Lab: • Experiment Study of different types of Network cables and Practically implement the cross-wired cable and straight-through cable using a clamping tool. • Study of Network Devices in Detail. • Study of network IP. • Connect the computers to the Local Area Network. • Performing an Initial Switch Configuration Performing an Initial Router Configuration • To study about components and specifications of Laptops and Desktop. • Familiarization with networking components and devices LAN adapter, Hub, Switches, Routers, etc. • Familiarization with Transmission media and tools: Co-axial cable, UTP cable, Crimping tool, Connectors, etc. • Introduction to various interior and exterior routing protocols. • Study of various LAN topologies and their creation using network devices, cables, and Computer. • Configuration of TCP/IP protocols in Window/LINUX.	30

Suggested Evaluation Methods	
Internal Assessment: ➢ **Theory** • Class Participation: 5 • Seminar/presentation/assignment/quiz/class test etc.: 5 • Mid-Term Exam: 10 ➢ **Practicum** • Class Participation: NA • Seminar/Demonstration/Viva-voce/Lab records etc.: 10 • Mid-Term Exam: NA	**End Term Examination: A three-hour exam for both theory and practicum. End Term Exam Marks: 70(50(T)+20(P))**

Part C-Learning Resources

Recommended Books/e-resources/LMS:

- Andrew S. Tanenbaum, "Computer Networks", Pearson Education.
- Michael A. Gallo, William M. Hancock, "Computer Communications and Networking Technologies", CENGAGE Learning.
- Behrouz A Forouzan, "Data Communications and Networking", McGraw Hill.

*Applicable for courses having practical components.

IT Return Filing

Session 2023-2024			
Part-A Introduction			
Subject	Commerce		
Semester	III & V		
Name of the Course	IT Return Filing		
Course Code	B23-VOC-108		
Course Type: (CC/MCC/MDC/ CCM/ DSEC/VOC/DSE/PC/AEC/ VAC	VOC		
Level of the course (As per Annexure-I)	200-299		
Pre-requisite for the course (if any)	NIL		
Course Learning Outcomes (CLO)	After completing this course, the learner will be able to: 1. understand the basic process of computing taxable income and tax liability, and know about various types of income tax return forms. 2. know the difference between e-filing and regular filing of Income tax returns and understand the circumstances when e-filling is mandatory. 3. understand the concept of advance payment of tax and tax deduction at source 4. Understand different types of returns and the procedure of e-filing of return		
	5*.practical knowledge about income tax return filing		
Credits	**Theory**	**Practical**	**Total**
	3	1	4
Internal Assessment Marks	20	10	30
End Term Exam Marks	50	20	70
Exam Time	3 Hrs.	3 Hrs	

Part-B Contents of the Course

Instructions for Paper Setters

1. The examiner will set 9 questions in all covering the course learning outcomes (CLOs). Question No. 1 will be compulsory and comprises of seven parts of 2 marks each. Question Nos. 2 to 9 will carry 09 marks each, having two questions from each unit.

2. Students are required to attempt 5 questions in all, selecting one question from each unit and the compulsory question.

Unit	Topics	Contact Hours
I	Introduction to Income Tax, Brief introduction to income under the heads "Salaries ; House Property , Capital Gains and Other Sources"	12
II	Clubbing of income and set-off and carry forward of Losses ; Deductions , Rebates and Relief under Income Tax Act, Computation of taxable income and tax liability under Old and New Tax Regimes.	11
III	Introduction to E-Filing of Income Tax Returns, introduction to recent IT Forms like ITR 01(SAHAJ), ITR 02, ITR 03, ITR 04, ITR 4S (SUGAM), ITR 05 and ITR 06. Due dates of submission of return; E-Verification of ITR, Late filing fees under section 234F, Registration of PAN	11
IV	Advance payment of tax; TDS: Basic concepts , Form 16, B, C,D, E	11
V*	Practical Exposure to Income Tax: Practical Exposure to Income Tax Portal: www.incometaxindiaefiling.gov.in portal; Preparation and filing of e-return; Payment of Tax online; Generate Challans online; Viewing Tax Credit through 26AS; Reconcile Form 26AS with Form 16.	30

Suggested Evaluation Methods	
Internal Assessment: ➢ **Theory 20** Class Participation 5 Seminar/Presentation/Assignment/Quiz/Class Test etc. 5 Mid Term Exam: 10 ➢ **Practicum 10** Class Participation 5 Seminar/Demonstration/Viva Voce/Lab Records etc. 5 Mid Term Exam:	**End Term Examination:** A three hour exam for both theory and practicum.

Part-C Learning Resources

Recommended Books/E-Resources/LMS:

- Jagdish Gupta, Mukta Jain, and Rakesh Jain Gaur and Narang, Income Tax , VK Global Publications , Faridabad.
- Gaur and Narang, Income Tax Law & Practice, Kalyani Publishers, Jalandhar.
- Girish Ahuja and Ravi Gupta, Systematic Approach, C.C.H. India Publications, New Delhi.
- Mehrotra H.C., Income Tax Law & Account, Sahitya Bhawan Publications, Agra.
- Prasad, Bhagwati, Income Tax Law & Practice, Wishwan Prakashan, Bhopal.
- Singhania V.K., Student's Guide to Income Tax, Taxmann Publications Pvt. Ltd., New Delhi.

* Applicable for courses having practical component.