PRAHLADRAI DALMIA LIONS COLLEGE OF COMMERCE & ECONOMICS
ISO 9001: 2015 Certified

NOTICE

25th September, 2025

ATKT Internal and Practical Examination
B.Sc.I.T. (SEMESTER-V)

INSTRUCTIONS FOR THE STUDENTS HAVING ATKT IN INTERNALS

1. Date of Submission of the Assignments-03 October, 2025
2. Timings 11:00 AM to 12:00 Noon. Reporting time for students: at least 10 minutes before the mentioned time. Venue: Computer Lab.
3. Students have to be present in person for the submission.
4. Submission of assignments to be done on proper A4 size paper, handwritten by the candidate himself only. The Front page should contain details of Roll no, Name of the student, Semester, Subject.
5. Print out of the questions uploaded and **respective practical outputs (applicable for practical subjects)** should be attached along with the assignment.
6. Students should enclose a photocopy of the ATKT fee paid receipt along with each of his projects.
7. On the date of submission there will be a viva voce on the given questions/topics.
8. If the student fails to present himself on the given date and time he will be marked ABSENT for the said subject.
9. Any Submissions after the above mentioned date and time will not be accepted and entertained under any circumstances.

NOTE - Student who has paid ATKT fees for internal components but has not been allotted questions or has any query is requested to contact Dr. Rupali Mishra on or before, 28th September 2025 by mailing on bscit@dalmialionscollege.ac.in

Dr. Rupali Mishra	CA. Durgesh Kenkre	Ms. Subhashini Naikar	Prof. (Dr.) D. N. Ganjewar
(Coordinator - BSc.IT)	Exam Convener	Vice- Principal, SFC	(Principal)

DI/N-STD/GEN/00

SOFTWARE PROJECT DEVELOPMENT (USIT501)

306	Dayama Pramodkumar Navalkishor

1. Explain the concept of the "Triple Constraint" in project management. Describe a scenario where a change in the project scope would directly impact the other two constraints. (5 marks)
2. Compare and contrast the Waterfall and Agile project management methodologies. Which methodology would you recommend for a project with highly volatile requirements and why? (5 marks)
3. What is a Work Breakdown Structure (WBS)? Create a simple two-level WBS for the project "Developing a College Library Management System". (5 marks)
4. Describe the purpose of the Step Wise project planning framework (Steps 0-10). Briefly explain any three of these steps. (5 marks)
5. Differentiate between Risk Identification and Risk Assessment in the context of software project risk management. List any three common categories of risks a software project might face. (5 marks)

INTERNET OF THINGS: THEORY AND PRACTICE (USIT502)

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1. Describe the core design principle of "Calm and Ambient Technology" for connected devices. Provide a real-world example of an IoT device that exemplifies this principle. (5 marks)
2. Explain the role of DNS (Domain Name System) in the context of IoT. How does it facilitate communication between a connected device and a cloud service? (5 marks)
3. Compare the Arduino and Raspberry Pi platforms for prototyping IoT devices. List one key advantage of each platform. (5 marks)
4. What is the MQTT protocol and why is it considered more suitable for constrained IoT devices compared to traditional HTTP? (5 marks)
5. Explain the concept of "crowdfunding" as a method for funding an IoT startup. Discuss one advantage and one challenge associated with this approach. (5 marks)

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1. The concept of "Web Thinking for Connected Devices" advocates for small pieces, loosely joined. Explain this principle and contrast it with the traditional approach of building large, monolithic systems for IoT. (5 marks)
2. Explain the difference between Static and Dynamic IP address assignment. In a typical home IoT device setup (like a smart bulb), which method is more likely to be used and why? (5 marks)
3. Describe the process of "Laser Cutting" for prototyping the physical design of an IoT device. What is one key advantage and one limitation of using this technique compared to 3D printing? (5 marks)
4. What is the primary purpose of an API in prototyping online components for IoT? Write a simple curl command to test a GET request to a hypothetical API endpoint http://api.example.com/device/status. (5 marks)

5. Discuss the ethical concern of "Privacy" in the Internet of Things. As a designer, what are two specific strategies you could implement in a connected device to address user privacy concerns? (5 marks)

ADVANCED WEB DEVELOPMENT (USIT503)

306	Dayama Pramodkumar Navalkishor

1. Explain the role of the Common Language Runtime (CLR) in the .NET framework. How does it enable language interoperability? (5 marks)
2. Differentiate between Web Server Controls and HTML Server Controls in ASP.NET. Provide an example of a scenario where you would prefer using a Web Server Control. (5 marks)
3. What is the purpose of Validation Controls in ASP.NET? Name any three different validation controls and state their specific use. (5 marks)
4. Explain the concept of View State in ASP.NET. What is its primary purpose, and what is a potential drawback of using it excessively? (5 marks)
5. Describe the difference between Connected and Disconnected data access in ADO.NET. Which approach would you use for reading a large set of data for display and why? (5 marks)

ARTIFICIAL INTELLIGENCE AND APPLICATIONS (USIT504)

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1. Define an Intelligent Agent. Compare the performance of a Simple Reflex Agent versus a Model-Based Reflex Agent in a partially observable environment. (5 marks)
2. Solve the Water Jug problem (3L and 4L jugs to get exactly 2L) using the State Space Search approach. Represent the initial state, goal state, and any two intermediate states. (5 marks)
3. Explain the minimax algorithm used in adversarial search for a two-player game. What is the role of alpha-beta pruning in optimizing this algorithm? (5 marks)
4. Differentiate between Propositional Logic and First-Order Logic. Why is First-Order Logic more expressive for knowledge representation? (5 marks)
5. What is Generative AI? Provide one example of a Generative AI model and briefly describe its application. (5 marks)

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1. Define the "Nature of Environment" for an intelligent agent along the dimensions of Observable, Deterministic, and Static. Classify the environment of a self-driving car for each dimension. (5 marks)
2. The Wumpus World is a classic AI problem. Explain how a logical agent uses inference in this partially observable environment to deduce the location of pits and the Wumpus. (5 marks)
3. Apply Bayes' Theorem to a simple medical diagnosis scenario. Given the probability of a disease (P(D)), the probability of a positive test given the disease (P(T|D)), and the probability of a positive test given no

disease ($P(T|\neg D)$), calculate the probability that a patient actually has the disease after testing positive ($P(D|T)$). (5 marks)

4. Explain the process of "Unification" in First-Order Logic inference. Provide an example of two predicates that can be unified and state the resulting substitution. (5 marks)
5. What is a "Planning Graph" in the context of classical planning? How does it help in making planning algorithms more efficient compared to a simple state space search? (5 marks)

ENTERPRISE JAVA / ADVANCED JAVA TECHNOLOGIES (USIT506)

306	Dayama Pramodkumar Navalkishor

1. Describe the lifecycle of a Java Servlet, naming the key methods (init, service, destroy) and the purpose of each. (5 marks)
2. Differentiate between cookies and sessions for state management in web applications. List one advantage of using sessions over cookies. (5 marks)
3. What is the purpose of the Java Server Pages (JSP) jsp:useBean standard action? Write a simple code snippet demonstrating its use. (5 marks)
4. Compare Stateful and Stateless Session Beans in EJB. Provide an example scenario where a Stateful Session Bean would be necessary. (5 marks)
5. Explain the concept of Object-Relational Mapping (ORM). How does the Java Persistence API (JPA) simplify database operations in a Java application? (5 marks)

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1. Explain the fundamental difference between a Java Servlet and a Java Server Page (JSP). Despite the disadvantages of JSP, why is it still widely used in web development? (5 marks)
2. Describe the life cycle of an HttpSession object. Write a code snippet to demonstrate how you would invalidate a user's session upon clicking a "Logout" button in a servlet. (5 marks)
3. What is the purpose of the RequestDispatcher interface? Differentiate between the forward() and include() methods, providing a suitable use case for each. (5 marks)
4. Explain the concept of "Container-Managed Transactions" in the context of Enterprise JavaBeans (EJB). How does this simplify the development of robust enterprise applications? (5 marks)
5. Contrast the "Bean-Managed Persistence (BMP)" and "Container-Managed Persistence (CMP)" approaches of Entity Beans (from EJB 2.x). Which one gives the developer more control, and which one is less cumbersome to implement? (5 marks)

PROJECT DISSERTATION (PRACTICAL)

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Kindly bring your hard copy of the project dissertation.

INTERNET OF THINGS: THEORY AND PRACTICE PRACTICAL (USITSP2)

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1. Write a Python program on Raspberry Pi to interface an LED and a push button. The LED should turn ON only when the button is pressed and held, and turn OFF when released. Explain the logic and connections with a diagram. (5 marks)
2. A 4-digit 7-segment display is connected to your Raspberry Pi. Write a program to make it act as a countdown timer from 9 to 0, with a 1-second delay between each number. List the GPIO pins used for the connection. (5 marks)
3. Write a program to read temperature and humidity data from a DHT11 sensor connected to the Raspberry Pi and display the values clearly on a 16x2 LCD screen. What libraries are required for this task? (5 marks)
4. Your Raspberry Pi is to be used for home automation to control a fan (simulated with an LED) based on room temperature (from DHT11). Write a program to turn the fan ON if the temperature exceeds 30°C and turn it OFF otherwise. (5 marks)
5. Explain the process of setting up your Raspberry Pi to send you a WhatsApp message. Which library/service would you use? Write a code snippet to send a message "System Started" upon boot. (5 marks)

ADVANCED WEB DEVELOPMENT PRACTICAL (USITSP3)

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1. **Create an ASP.NET Web Form with two TextBoxes for numbers and four Button controls (+, -, *, /). Write the C# code-behind to perform the respective arithmetic operation and display the result in a Label when a button is clicked. (5 marks)**
2. Design a user registration form with fields for Name, Email, Password, and Confirm Password. Implement validation using ASP.NET validation controls to ensure all fields are filled, email format is correct, and passwords match. (5 marks)
3. Create an ASP.NET application with a Master Page that has a navigation menu (Home, About, Contact). Create two Content Pages (Home and About) that use this master page. (5 marks)
4. Write the necessary C# ADO.NET code to connect to a MySQL database named "Students" and populate a GridView control with all records from a table named "StudentMaster". (Assume connection string is known). (5 marks)
5. Create a web application that uses Cookies to store the user's name. The first page should have a TextBox to enter the name and a button to submit. The second page should retrieve the cookie and display a welcome message like "Hello, [Name]". (5 marks)

ARTIFICIAL INTELLIGENCE AND APPLICATIONS PRACTICAL (USIT5P4)

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1. Implement the Breadth-First Search (BFS) algorithm to traverse a graph represented as an adjacency list. Your Python function should take the graph and a starting node as input and print the BFS traversal order. (5 marks)
2. Write a Python program to solve the Tower of Hanoi problem for 3 disks. The program should print the step-by-step instructions (e.g., "Move disk 1 from A to C"). (5 marks)
3. *Implement the A search algorithm to find the path from a start node to a goal node on a simple 4x4 grid. Assume each step has a cost of 1 and use Manhattan distance as the heuristic. (5 marks)**
4. Write a Python program to simulate a 4-Queen problem solution using a backtracking approach. The output should be one valid board configuration where no two queens threaten each other. (5 marks)
5. Create a knowledge base of family relations (father, mother, sibling) using Prolog-like facts and rules in Python. Write a function sibling(X, Y) that returns true if X and Y share the same mother and father. (5 marks)

ENTERPRISE JAVA / ADVANCED JAVA TECHNOLOGIES PRACTICAL (USITSP6)

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1. Create a Servlet-based login application. The servlet should check if the username is "admin" and the password is "password". On success, forward to a "Welcome" servlet; on failure, redirect back to the login page with an error parameter. (5 marks)
2. Write a JSP page that displays a list of products (e.g., Name, Price) retrieved from a database. Use JSTL SQL tags to establish the connection and execute the query. (5 marks)
3. Create a Servlet that uses HttpSession to count and display the number of times a user has visited the page. The page should show a message: "You have visited this page [count] times." (5 marks)
4. Develop a simple JSP page that uses Expression Language (EL) to display attributes set by a servlet. The servlet should set a String message and an Integer value and forward the request to this JSP. (5 marks)
5. Write the code for a Stateless Session EJB (CalculatorEJB) with a remote interface containing a single method add(int a, int b). Create a simple servlet client that invokes this method. (5 marks)
