VIT®

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

CHENNAI

Reg. No

**Final Assessment Test(FAT) - NOV/DEC 2025**

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|---|---|---|---|
| Programme | B.Tech. | Semester | Fall Semester 2025-26 |
| Course Code | BCSE301L | Faculty Name | Prof. Sathyarajasekaran K |
| Course Title | Software Engineering | Slot | E1+TE1 |
| | | Class Nbr | CH2025260102452 |
| Time | 3 hours | Max. Marks | 100 |

**Instructions To Candidates**

- Write only your registration number in the designated box on the question paper. Writing anything elsewhere on the question paper will be considered a violation.

**Course Outcomes**

CO1: Apply and assess the principles of various process models for software development.

CO2: Demonstrate various software project management activities that include planning, estimations, risk assessment, and configuration management.

CO3: Perform requirements modelling and apply appropriate design and testing heuristics to produce quality software systems.

CO4: Demonstrate the complete software life cycle activities from requirements analysis to maintenance using modern tools and techniques.

CO5: Escalate the use of various standards and metrics in evaluating the process and product.

## Section - I

**Answer all Questions (1 × 10 Marks)**

01. Zen Pvt. Ltd., a software development company, has been assigned the task of developing a mobile application to manage student attendance in small schools. The system requires basic functionalities such as user login, attendance tracking, and report generation. The project duration is short (2–3 months), the requirements are well-defined, the system can be modularized into independent components, and the technical risks are minimal. Hence, an appropriate software development model must be chosen to ensure successful project delivery.

(a) Compare the major software development models and analyze which one is most suitable for the given project. (3 Marks )

(b) Analyze the influence of specific software engineering skills on the effectiveness of the development team at Zen Pvt. Ltd. (2 Marks)

(c) Justify the selected software development model by explaining the major phases that satisfy the project constraints, with a neat labeled diagram. (5 Marks)

**[10] (CO1/K4)**

## Section - II

**Answer all Questions (5 × 12 Marks)**

02. The Smart Campus Management System (SCMS) project aims to automate key university operations like enrollment, attendance, fee management, and performance tracking through an integrated web and mobile platform. Due to its complexity and reliance on multiple technologies, risks such as scope creep, budget overruns, technical issues, and data privacy concerns may arise from changing requirements or project delays.

(a) Examine the key risk management activities followed throughout the SCMS project lifecycle and analyze how each activity contributes to identifying, assessing, and mitigating potential project risks. (6 Marks)

(b) Analyze the Sprint Planning process for the SCMS project and evaluate the influence of factors such as changing requirements, team capacity, and technical challenges on the overall effectiveness of the Sprint Plan. (6 Marks)

**[12] (CO2/K4)**

03. For a Library Management System (LMS) consisting of 25,000 Lines of Code (LOC), calculate the total effort (in person-months) and development time (in months) using the COCOMO I model for the following three project classifications:

| Mode | a | b | c | d |
|---|---|---|---|---|
| Organic | 2.4 | 1.05 | 2.5 | 0.38 |
| Semi-Detached | 3.0 | 1.12 | 2.5 | 0.35 |
| Embedded | 3.6 | 1.20 | 2.5 | 0.32 |

(a) Calculate the total effort and development time for the LMS under each project mode. (9 Marks )
(b) Enumerate any three practical advantages and limitations of the Functional Point Analysis (FPA) technique with respect to real-world software estimation scenarios. (3 Marks)

**[12] (CO2/K3)**

04. A software company is developing EduSmart, an Online Learning Management System (OLMS) for virtual education, course access, assignment submission, performance tracking, and online payments.
(a) Construct a Level 0 Data Flow Diagram (DFD) for the EduSmart OLMS. (4 Marks)
(b) Explain coupling and cohesion with examples related to EduSmart. (8 Marks)

**[12] (CO3/K3)**

05. The following code segment reads two integers, X and Y, and computes the power of X raised to Y.

```
begin
  int x, y, power;
  float z;
  input(x, y);
  if(y < 0)
     power = -y;
  else
     power = y;
  z = 1;
  while(power != 0)
  {
     z = z * x;
     power = power - 1;
  }
  if(y < 0)
     z = 1 / z;
  output(z);

end
```

(a) Construct a Control Flow Graph (CFG) representing the execution logic of the above program. (6 Marks)
(b) Calculate the Cyclomatic Complexity of the program using the derived CFG. (6 Marks)

**[12] (CO3/K3)**

06. A financial software company faces high errors and delayed releases in its tax-filing software, leading to customer dissatisfaction. Six Sigma is being introduced to improve performance.
(a) Explain Six Sigma principles in software development and their role in improving quality and delivery timelines. (7 Marks)
(b) Identify the key factors that indicate the need for process improvement and their impact on recurring defects and delayed releases. (5 Marks)

**[12] (CO5/K4)**

## Section - III
## Answer all Questions (2 × 15 Marks)

07. Mr. David works as a project manager in a healthcare organization, overseeing the development and implementation of a Patient Appointment Management System (PAMS). The system aims to streamline appointment scheduling, reduce patient waiting times, and optimize doctors' availability through automated booking and real-time updates.
(a) Identify and explain the types of software requirements that would be most useful for the successful development of the PAMS. (3 Marks)

(b) Demonstrate, using suitable examples, how functional and non-functional requirements can be defined for the PAMS to ensure system reliability and usability. (6 Marks)
(c) Critically evaluate the Requirements Engineering process for PAMS and construct a precise flow diagram that models its phases. (6 Marks)

[15] (CO3/K3)

08. A software company's 12-year-old enterprise system, developed in an obsolete programming language, has become increasingly difficult to maintain and enhance. The development team is debating whether to completely reengineer the system using modern technologies or to continuously refactor the existing code to improve its structure and maintainability.
(a) Demonstrate, with suitable justification, the application of reengineering and refactoring approaches to the enterprise system in terms of cost, implementation risk, and long-term sustainability. (5 Marks)
(b) Illustrate the application of Total Quality Management (TQM) principles to improve the structure, maintainability, and overall quality of the enterprise system. (5 Marks)
(c) Analyze the role of Software Configuration Management (SCM) in improving workflow efficiency and maintaining system stability in the enterprise system. (5 Marks)

[15] (CO5/K3)

**BL-Bloom's Taxonomy Levels - (K1-Remembering,K2-Understanding,K3-Applying,K4-Analysing,K5-Evaluating,K6-Creating)**