

REFERENCES

1. George Coulouris, Jean Dollimore, Timo Kindberg, "Distributed Systems Concepts and Design", Fifth Edition, Pearson Education, 2012.
2. Pradeep L Sinha, "Distributed Operating Systems: Concepts and Design", Prentice Hall of India, 2007.
3. Tanenbaum A S, Van Steen M, "Distributed Systems: Principles and Paradigms", Pearson Education, 2007.
4. Liu M L, "Distributed Computing: Principles and Applications", Pearson Education, 2004.
5. Nancy A Lynch, "Distributed Algorithms", Morgan Kaufman Publishers, 2003.
6. Arshdeep Bagga, Vijay Madisetti, "Cloud Computing: A Hands-On Approach", Universities Press, 2014.

CO's-PO's & PSO's MAPPING

| CO's | PO's | | | | | | | | | | | | PSO's | | |
|------|------|-----|-----|-----|---|---|---|---|-----|-----|-----|-----|-------|-----|-----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| 1 | 2 | 2 | 3 | 3 | 1 | - | - | - | 2 | 1 | 3 | 3 | 2 | 1 | 1 |
| 2 | 1 | 3 | 2 | 1 | 2 | - | - | - | 2 | 2 | 2 | 2 | 1 | 3 | 2 |
| 3 | 2 | 2 | 1 | 3 | 3 | - | - | - | 3 | 2 | 1 | 1 | 1 | 2 | 1 |
| 4 | 1 | 2 | 2 | 3 | 1 | - | - | - | 3 | 3 | 2 | 1 | 3 | 1 | 1 |
| 5 | 3 | 3 | 1 | 2 | 3 | - | - | - | 3 | 3 | 3 | 1 | 3 | 2 | 3 |
| AVg. | 1.8 | 2.4 | 1.8 | 2.4 | 2 | - | - | - | 2.6 | 2.2 | 2.2 | 1.6 | 2 | 1.8 | 1.6 |

1 - low, 2 - medium, 3 - high, ‘-’ - no correlation

CCS356

OBJECT ORIENTED SOFTWARE ENGINEERING

L T P C
3 0 2 4

COURSE OBJECTIVES:

- To understand Software Engineering Lifecycle Models
- To Perform software requirements analysis
- To gain knowledge of the System Analysis and Design concepts using UML.
- To understand software testing and maintenance approaches
- To work on project management scheduling using DevOps

UNIT I SOFTWARE PROCESS AND AGILE DEVELOPMENT 9

Introduction to Software Engineering, Software Process, Perspective and Specialized Process Models –Introduction to Agility-Agile process-Extreme programming-XP Process-Case Study.

UNIT II REQUIREMENTS ANALYSIS AND SPECIFICATION 9

Requirement analysis and specification – Requirements gathering and analysis – Software Requirement Specification – Formal system specification – Finite State Machines – Petrinets – Object modelling using UML – Use case Model – Class diagrams – Interaction diagrams – Activity diagrams – State chart diagrams – Functional modelling – Data Flow Diagram- CASE TOOLS.

UNIT III SOFTWARE DESIGN 9

Software design – Design process – Design concepts – Coupling – Cohesion – Functional independence – Design patterns – Model-view-controller – Publish-subscribe – Adapter – Command – Strategy – Observer – Proxy – Facade – Architectural styles – Layered - Client Server - Tiered - Pipe and filter- User interface design-Case Study.

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| UNIT IV | SOFTWARE TESTING AND MAINTENANCE | 9 |
| Testing – Unit testing – Black box testing– White box testing – Integration and System testing– Regression testing – Debugging - Program analysis – Symbolic execution – Model Checking-Case Study | | |

| | | |
|---|---------------------------|----------|
| UNIT V | PROJECT MANAGEMENT | 9 |
| Software Project Management- Software Configuration Management - Project Scheduling- DevOps: Motivation-Cloud as a platform-Operations- Deployment Pipeline:Overall Architecture Building and Testing-Deployment- Tools- Case Study | | |

COURSE OUTCOMES:

CO1: Compare various Software Development Lifecycle Models

CO2: Evaluate project management approaches as well as cost and schedule estimation strategies.

CO3: Perform formal analysis on specifications.

CO4: Use UML diagrams for analysis and design.

CO5: Architect and design using architectural styles and design patterns, and test the system

45 PERIODS

PRACTICAL EXERCISES:

30 PERIODS

LIST OF EXPERIMENTS:

1. Identify a software system that needs to be developed.
2. Document the Software Requirements Specification (SRS) for the identified system.
3. Identify use cases and develop the Use Case model.
4. Identify the conceptual classes and develop a Domain Model and also derive a Class Diagram from that.
5. Using the identified scenarios, find the interaction between objects and represent them using UML Sequence and Collaboration Diagrams
6. Draw relevant State Chart and Activity Diagrams for the same system.
7. Implement the system as per the detailed design
8. Test the software system for all the scenarios identified as per the usecase diagram
9. Improve the reusability and maintainability of the software system by applying appropriate design patterns.
10. Implement the modified system and test it for various scenarios.

SUGGESTED DOMAINS FOR MINI-PROJECT:

1. Passport automation system.
2. Book bank
3. Exam registration
4. Stock maintenance system.
5. Online course reservation system
6. Airline/Railway reservation system
7. Software personnel management system
8. Credit card processing
9. e-book management system
10. Recruitment system
11. Foreign trading system
12. Conference management system

13. BPO management system
 14. Library management system
 15. Student information system

TOTAL:75 PERIODS

TEXT BOOKS

1. Bernd Bruegge and Allen H. Dutoit, "Object-Oriented Software Engineering: Using UML, Patterns and Java", Third Edition, Pearson Education, 2009.
2. Roger S. Pressman, Object-Oriented Software Engineering: An Agile Unified Methodology, First Edition, Mc Graw-Hill International Edition, 2014.

REFERENCES

1. Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli, Fundamentals of Software Engineering, 2nd edition, PHI Learning Pvt. Ltd., 2010.
2. Craig Larman, Applying UML and Patterns, 3rd ed, Pearson Education, 2005.
3. Len Bass, Ingo Weber and Liming Zhu, "DevOps: A Software Architect's Perspective", Pearson Education, 2016
4. Rajib Mall, Fundamentals of Software Engineering, 3rd edition, PHI Learning Pvt. Ltd., 2009.
5. Stephen Schach, Object-Oriented and Classical Software Engineering, 8th ed, McGraw-Hill, 2010.

CO's-PO's & PSO's MAPPING

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| 1 | 2 | 2 | 1 | 2 | 2 | - | - | - | - | 1 | 1 | 2 | 2 | 2 | 1 |
| 2 | 2 | 3 | 2 | 3 | 2 | - | - | - | 2 | 2 | 3 | 2 | 3 | 2 | 1 |
| 3 | 2 | 3 | 2 | 1 | 1 | - | - | - | 2 | 2 | 3 | 2 | 2 | 3 | 1 |
| 4 | 2 | 3 | 2 | 2 | 3 | - | - | - | 2 | 2 | 3 | 2 | 2 | 3 | 1 |
| 5 | 2 | 3 | 1 | 2 | 2 | - | - | - | - | - | - | 1 | 3 | 2 | 2 |
| Avg. | 2 | 2 | 1 | 2 | 2 | - | - | - | - | 1 | 1 | 2 | 2 | 2 | 1 |

1 - low, 2 - medium, 3 - high, '-' - no correlation

CS3691

EMBEDDED SYSTEMS AND IOT

L T P C
 3 0 2 4

COURSE OBJECTIVES:

- To learn the internal architecture and programming of an embedded processor.
- To introduce interfacing I/O devices to the processor.
- To introduce the evolution of the Internet of Things (IoT).
- To build a small low-cost embedded and IoT system using Arduino/Raspberry Pi/ open platform.
- To apply the concept of Internet of Things in real world scenario.

UNIT I

8-BIT EMBEDDED PROCESSOR

9

8-Bit Microcontroller – Architecture – Instruction Set and Programming – Programming Parallel Ports – Timers and Serial Port – Interrupt Handling.

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| UNIT II | EMBEDDED C PROGRAMMING | 9 |
|----------------|-------------------------------|----------|

Memory And I/O Devices Interfacing – Programming Embedded Systems in C – Need For RTOS – Multiple Tasks and Processes – Context Switching – Priority Based Scheduling Policies.

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| UNIT III | IOT AND ARDUINO PROGRAMMING | 9 |
|-----------------|------------------------------------|----------|

Introduction to the Concept of IoT Devices – IoT Devices Versus Computers – IoT Configurations – Basic Components – Introduction to Arduino – Types of Arduino – Arduino Toolchain – Arduino Programming Structure – Sketches – Pins – Input/Output From Pins Using Sketches – Introduction to Arduino Shields – Integration of Sensors and Actuators with Arduino.

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| UNIT IV | IOT COMMUNICATION AND OPEN PLATFORMS | 9 |
|----------------|---|----------|

IoT Communication Models and APIs – IoT Communication Protocols – Bluetooth – WiFi – ZigBee – GPS – GSM modules – Open Platform (like Raspberry Pi) – Architecture – Programming – Interfacing – Accessing GPIO Pins – Sending and Receiving Signals Using GPIO Pins – Connecting to the Cloud.

| | | |
|---------------|---------------------------------|----------|
| UNIT V | APPLICATIONS DEVELOPMENT | 9 |
|---------------|---------------------------------|----------|

Complete Design of Embedded Systems – Development of IoT Applications – Home Automation – Smart Agriculture – Smart Cities – Smart Healthcare.

45 PERIODS

30 PERIODS

PRACTICAL EXERCISES:

1. Write 8051 Assembly Language experiments using simulator.
2. Test data transfer between registers and memory.
3. Perform ALU operations.
4. Write Basic and arithmetic Programs Using Embedded C.
5. Introduction to Arduino platform and programming
6. Explore different communication methods with IoT devices (Zigbee, GSM, Bluetooth)
7. Introduction to Raspberry PI platform and python programming
8. Interfacing sensors with Raspberry PI
9. Communicate between Arduino and Raspberry PI using any wireless medium
10. Setup a cloud platform to log the data
11. Log Data using Raspberry PI and upload to the cloud platform
12. Design an IOT based system

COURSE OUTCOMES:

CO1: Explain the architecture of embedded processors.

CO2: Write embedded C programs.

CO3: Design simple embedded applications.

CO4: Compare the communication models in IOT

CO5: Design IoT applications using Arduino/Raspberry Pi /open platform.

TOTAL :75 PERIODS

TEXTBOOKS

1. Muhammed Ali Mazidi, Janice Gillispie Mazidi, Rolin D. McKinlay, "The 8051 Microcontroller and Embedded Systems", Pearson Education, Second Edition, 2014

2. Robert Barton, Patrick Grossetete, David Hanes, Jerome Henry, Gonzalo Salgueiro, "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", CISCO Press, 2017.

REFERENCES

1. Michael J. Pont, "Embedded C", Pearson Education, 2007.
2. Wayne Wolf, "Computers as Components: Principles of Embedded Computer System Design", Elsevier, 2006.
3. Andrew N Sloss, D. Symes, C. Wright, "Arm System Developer's Guide", Morgan Kauffman/ Elsevier, 2006.
4. Arshdeep Bahga, Vijay Madisetti, "Internet of Things – A hands-on approach", Universities Press, 2015

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| 2 | 2 | 1 | 3 | 2 | 2 | - | - | - | 1 | 2 | 2 | 3 | 3 | 1 | 3 |
| 3 | 3 | 1 | 3 | 3 | 1 | - | - | - | 1 | 2 | 1 | 1 | 1 | 3 | 3 |
| 4 | 3 | 2 | 3 | 2 | 1 | - | - | - | 1 | 2 | 2 | 3 | 2 | 2 | 1 |
| 5 | 2 | 3 | 3 | 2 | 2 | - | - | - | 1 | 3 | 3 | 2 | 3 | 1 | 3 |
| Avg. | 2.6 | 2 | 3 | 2.4 | 1.5 | - | - | - | 1 | 2.2 | 2.2 | 2.4 | 2.2 | 1.6 | 2.6 |

1 - low, 2 - medium, 3 - high, -- no correlation

| NCC Credit Course Level 3* | | |
|-------------------------------------|---|-------|
| (ARMY WING) NCC Credit Course - III | | |
| | L | T |
| | 3 | 0 0 3 |
| PERSONALITY DEVELOPMENT | | |
| PD 3 | Group Discussion: Team Work | 2 |
| PD 4 | Career Counselling, SSB Procedure & Interview Skills | 3 |
| PD 5 | Public Speaking | 4 |
| BORDER & COASTAL AREAS | | |
| BCA 2 | Security Setup and Border/Coastal management in the area | 2 |
| BCA 3 | Security Challenges & Role of cadets in Border management | 2 |
| ARMED FORCES | | |
| AF 2 | Modes of Entry to Army, CAPF, Police | 3 |
| COMMUNICATION | | |
| C 1 | Introduction to Communication & Latest Trends | 3 |
| INFANTRY | | |
| INF 1 | Organisation of Infantry Battalion & its weapons | 3 |

| | |
|--|-----------|
| MILITARY HISTORY | 23 |
| MH 1 Biographies of Renowned Generals | 4 |
| MH 2 War Heroes - PVC Awardees | 4 |
| MH 3 Study of Battles - Indo Pak War 1965, 1971 & Kargil | 9 |
| MH 4 War Movies | 6 |

TOTAL: 45 PERIODS

| NCC Credit Course Level 3* | | |
|---|--|----------------|
| (NAVAL WING) NCC Credit Course - III | | L T P C |
| | | 3 0 0 3 |
| PERSONALITY DEVELOPMENT | | |
| PD 3 Group Discussion: Team Work | | 2 |
| PD 4 Career Counselling, SSB Procedure & Interview Skills | | 3 |
| PD 5 Public Speaking | | 4 |
| BORDER & COASTAL AREAS | | |
| BCA 2 Security Setup and Border/Coastal management in the area | | 2 |
| BCA 3 Security Challenges & Role of cadets in Border management | | 2 |
| NAVAL ORIENTATION | | |
| NO 3 Modes of Entry - IN, ICG, Merchant Navy | | 3 |
| AF 2 Naval Expeditions & Campaigns | | 3 |
| NAVAL COMMUNICATION | | |
| NC 1 Introduction to Naval Communications | | 1 |
| NC 2 Semaphore | | 1 |
| NAVIGATION | | |
| N 1 Navigation of Ship - Basic Requirements | | 1 |
| N 2 Chart Work | | 1 |
| SEAMANSHIP | | |
| MH 1 Introduction to Anchor Work | | 2 |
| MH 2 Rigging Capsule | | 6 |
| MH 3 Boatwork - Parts of Boat | | 2 |
| MH 4 Boat Pulling Instructions | | 2 |
| MH 5 Whaler Sailing Instructions | | 3 |
| FIRE FIGHTING FLOODING & DAMAGE CONTROL | | |
| FFDC 1 Fire Fighting | | 2 |
| FFDC 2 Damage Control | | 2 |
| SHIP MODELLING | | |
| SM Ship Modelling Capsule | | 3 |

TOTAL : 45 PERIODS

NCC Credit Course Level 3*

| | | |
|--|---|----------------|
| NX3653 | (AIR FORCE WING) NCC Credit Course Level - III | L T P C |
| | | 3 0 0 3 |
| PERSONALITY DEVELOPMENT 9 | | |
| PD 3 | Group Discussion: Team Work | 2 |
| PD 4 | Career Counselling, SSB Procedure & Interview Skills | 3 |
| PD 5 | Public Speaking | 4 |
| BORDER & COASTAL AREAS 4 | | |
| BCA 2 | Security Setup and Border/Coastal management in the area | 2 |
| BCA 3 | Security Challenges & Role of cadets in Border management | 2 |
| AIRMANSHIP 1 | | |
| A 1 | Airmanship | 1 |
| BASIC FLIGHT INSTRUMENTS 3 | | |
| FI 1 | Basic Flight Instruments | 3 |
| AERO MODELLING 3 | | |
| AM 1 | Aero Modelling Capsule | 3 |
| GENERAL SERVICE KNOWLEDGE 2 | | |
| GSK 4 | Latest Trends & Acquisitions | 2 |
| AIR CAMPAIGNS 6 | | |
| AC 1 | Air Campaigns | 6 |
| PRINCIPLES OF FLIGHT 6 | | |
| PF 1 | Principles of Flight | 3 |
| PF 2 | Forces acting on Aircraft | 3 |
| NAVIGATION 5 | | |
| NM 1 | Navigation | 2 |
| NM 2 | Introduction to Met and Atmosphere | 3 |
| AERO ENGINES 6 | | |
| E 1 | Introduction and types of Aero Engine | 3 |
| E 2 | Aircraft Controls | 3 |

TOTAL : 45 PERIODS

| | | |
|---------------|--------------------------------|----------------|
| GE3791 | HUMAN VALUES AND ETHICS | L T P C |
| | | 2 0 0 2 |

COURSE DESCRIPTION

This course aims to provide a broad understanding about the modern values and ethical principles that have evolved and are enshrined in the Constitution of India with regard to the democratic, secular and scientific aspects. The course is designed for undergraduate students so that they could study, understand and apply these values in their day to day life.