

Semester: I
Credit Hr: 4

Full Marks: 100
Internal: 40
Final Exam: 60

General Objectives:

- This course aims to give students both a theoretical and a practical foundation in software engineering including current and emerging software engineering practices and support tools.
- In the practical part, students will become familiar with the development of software products from an industry perspective.

Specific Objectives:

- To make students aware with software requirement and design issues,
- To make students learn about the software reuse, distributed s/w engineering and embedded s/w,
- To make students learn about the detailed verification and validation technique

Course Contents:

1. Introduction	8 Hrs
Introduction to software engineering, Software processes, Agile software development, Project management.	
2. Software requirements	8 Hrs
Requirements engineering processes, System modeling, Software prototyping, Formal specification.	
3. Software Design	10 Hrs
Architectural design, Distributed systems architectures, Object-oriented design, Real time software design, Design with reuse, User interface design.	
4. Advanced Software Engineering	10 Hrs
Software reuse, Components -based software engineering, Distributed software engineering, Embedded software.	
5. Verification and Validation	10 Hrs
Verification and validation planning, Software inspections, Clean room software development, Defect Testing, Integrating Testing, Object -Oriented testing, Testing workbenches, Critical system validation.	
6. Software Quality and Quality Assurance	8 Hrs
Software cost estimation, Software Quality assurance planning, Software quality assurance process, Software quality attributes, Guidelines and checklists, Software safety	
7. Evolution	6 Hrs
Software Change, Software re-engineering, Configuration management.	

Reference Books:

1. Software Engineering, Ian Sommerville, Ninth Edition
2. Software Engineering Fundamentals, Ali Behforooz & Frederick J. Hudson
3. Software Engineering: A Practitioner's Approach, Roger S. Pressman

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Object Oriented System



Semester: I
Credit Hr: 4

Full Marks: 100
Internal: 40
Final Exam: 60

General Objectives:

- Visualize the concept of object oriented technology in designing the new system.
- Conceptualize the importance UML, AUML and other object oriented tools for developing or reengineering the system.

Specific Objectives

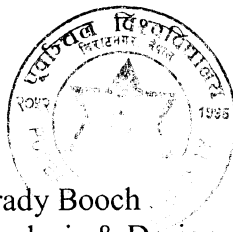
Specific objectives of this unit are:

- to make the student realize the importance of object oriented methods,
- to clarify the various object oriented tools
- to familiarize the students with the techniques of developing new system using the various object oriented tools.
- to involve the students in designing a project based on the object oriented concepts.

Course Contents:

- 1. Introduction** 5 Hrs
Introducing the course, General Concepts and need of object oriented system, Defining complex system, Various attributes of complex system, The general Concepts of OOA & OOD.
- 2. Object Oriented Design** 10 Hrs
Defining Object Oriented Design, General characteristics of OOD, Benefits of Object Model, Detail concept of Class, Object, Inheritance, Polymorphism etc.
- 3. UML** 10 Hrs
Definitions and Concepts, UML Diagrams: Class & Object Diagram, Use Case Modelling & Diagram, Sequence Diagram, State Diagram, Package Diagram, Activity Diagram, Component Diagram, Deployment Diagram.
- 4. Domain Analysis** 10 Hrs
Concepts & Definition, Domain Class Model, Finding Classes, Association, Keeping Right Class & Association, Finding Methods, Data Dictionary Preparation, Finding Attributes, Refining with Inheritance, Testing the Access Path, Iterating Class Model Group class into Package, Application Analysis.
- 5. Agent UML** 5 Hrs
Defining Agent, Agent Orientation, Agent Oriented Programming, Common feature of agents and its representation.
- 6. Object Oriented Metrics** 5 Hrs
Internal quality of Design, Principles of Object Oriented Design, Software Quality, Metrics for Object Oriented Systems.
- 7. Object Oriented System Development Life Cycle** 5 Hrs
Software Development Process, Building High Quality Software, Approaches to System Testing, Verification & Validation, Object Oriented Approach for software development, Prototyping.
- 8. Project Design** 10 Hrs
A detailed project design must be done using the above concepts.

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Reference Books:

1. Object Oriented System, Grady Booch .
2. Object Oriented Systems Analysis & Design using UML, Simon Bennett, Steve McRobb, Ray Farmer
3. Object Oriented Systems Analysis & Design, Joey F. George, Dinesh Batra, Jeffrey A. Hoffer

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Communication System Engineering

Semester: I
Credit Hr: 4

Full Marks: 100
Internal: 40
Final Exam: 60

General Objective:

- To make students familiarize with the detailed concept of communication system engineering so that they will be able analyze and design such systems.

Specific Objectives:

The specific objectives of this unit are:

- to understand the key theoretical concepts in communications system engineering.
- to be familiar with the working of the various types of commonly used communication systems.
- to be able to design some of the communication systems.

Course Contents:

1. Theoretical Concepts in Communications Systems Engineering 25 Hrs

Elements of a generic communications system/digital communication system and various issues associated with each element, Comparison between analog and digital communications systems, Nyquist sampling theorem for analog to digital conversion, Waveform Coding Techniques: PCM, DPCM, ADPCM, DM, ADM, Baseband Shaping for Data Transmission: Unipolar, Polar, Bipolar signals - NRZ, RZ, Manchester and AMI format, Analog Modulation Techniques-time domain and frequency domain analysis, Digital Modulation Techniques, Evaluation of System performance: SNR and BER, Information and Entropy, Source Coding theorem, Huffman coding, Shannon's Channel Capacity Theorem, Error-Control Coding: rational for coding and types of codes, linear, block codes, error detection and correction, convolutional codes, Multiplexing, Emerging Trends in Modulation, Error control coding and multiplexing.

2. Communications Systems 20 Hrs

Terrestrial Microwave and Satellite communication systems, Cellular Mobile Communication Systems; GSM, CDMA, WiMax, Optical Fiber Communication System.

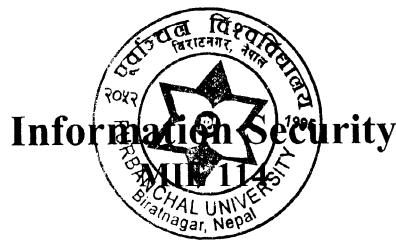
3. Designing a Communication System. 15 Hrs

Design of a terrestrial microwave system, Design of an optical fiber communications system, Design of a cellular communications network.

Reference Books:

1. Simon Haykin, Communication Systems, McGraw Hill
2. Proakis & Sallehi, Communication Systems Engineering, PHI
3. B. P. Lathi, Analog & Digital Communication System, PHI

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Semester: I
Credit Hr: 3

Full Marks: 75
Internal: 30
Final Exam: 45

General Objective:

- Upon completion of this course, participants will have gained knowledge of information security concepts, basic components and applications.

Specific Objectives:

- to make students aware with basic fundamentals of information security.
- to know the various codes and attacks.
- to know the detailed principles of cryptography and other security techniques.

Course Contents:

1. Introduction to Information Security

4 Hrs

The History of Information Security, What Is Information Security, Critical Characteristics of Information, Information security concepts and practices (CIA and other practices), Balancing Security and Access.

2. Malicious Code and Application Attacks

8 Hrs

Malicious code, Password attacks, DOS Attack, Application attacks, Web application security, Reconnaissance attack, Masquerading attack.

3. Cryptography and Key Management

8 Hrs

Basics of cryptography, Symmetric Cryptography (DES, Triple DES, AES, Key distribution), Asymmetric cryptography, Public and private keys, RSA, Elliptic curve, Hash function, Digital signatures, PKI, Applied cryptography.

4. Authentication and Access Control

5 Hrs

Overview of access control, Authentication and Authorization, Identification and authentication techniques, Access control techniques, Access control methodologies, implementations and administration.

5. Network Security

5 Hr

LAN security, Wireless security threats and mitigation, Internet threats and security, Remote access security management, Network attack and countermeasures.

6. Auditing and Monitoring

4 Hrs

Auditing, Monitoring, Penetration-testing techniques, Inappropriate activities, Indistinct threats and counter measures.

7. Legal, Ethical and Professional issues in Information Security

6 Hrs

Types of Law, Relevant Laws (Computer Crime, IP, Licensing, Privacy), International Laws and Legal Bodies, Ethical Concepts in Information Security, Codes of Ethics, Certifications, and Professional Organizations.

8. Disaster Recovery and Business Continuity

5 Hrs

Business continuity planning, Business impact assessment, BCP documentation, Nature of disaster, Disaster recovery planning.

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Semester: I
Credit Hr: 3

Full Marks: 75
Internal: 30
Final Exam: 45

General Objectives:

- State and explain the concept of research methods which can be applied to any research studies.
- Develop an important dimension involving to research that of research methodology.

Specific Objectives:

Specific objectives of this unit are:

- to provide knowledge to the students about different type of research, their process and applications.
- to familiarize the students with different types of data collection techniques and their applications.
- to develop an understanding of ethical issues and required consideration for their research studies.
- to provide skills for the selection of sampling technique, errors and proper planning different sampling methods.
- to enable the research students in developing the most appropriate methodology for their research study.

Course Contents:

1. Introduction

4 hrs

Meaning and Importance of Research, Classification of Research, Research in Engineering Functions, The Research Process, Research as a Scientific Process, Issues Governing Research Function, Listing and Description of Steps of Research

2. Research Design

4 hrs

Meaning and Importance of Research Design, Classification of Research Design, The Research Process, Variables, Hypothesis, Errors Affecting Research Design, Measurements and Scaling, Reliability and validity test of Research, Pilot Test, Field Study, Issues Governing Research Design

3. Development of Research

9 hrs

Selection of Research topics, Research Problem vs Research Question, Meaning and Importance of Research Proposal, Classification of Research Proposals, Components of a Research Proposal, Manager-Researcher Contribution in Developing a Research Proposal, Evaluation a Research Proposal, The Development of Research Issues Governing Proposal

4. Sampling Decisions

4 hrs

Sampling vs Census, Sampling Techniques, Issues Governing Sampling Decisions

5. Data Collection Methods

8 hrs

Meaning, Importance and Types of Data, Methods of Data Collection, Steps of Data Processing and Presentation, Various Methods of Data collection

6. Data Reduction and Analysis

5 hrs

Meaning and Importance of Data Reduction, Data Reduction Process, Selected Techniques of Data Analysis

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7. Formatting the Report

4 hrs

Formatting a Report, Developing the Final Draft, Preparing for Citation and Referencing, Making an Oral Presentation of a Report

8. Development of Research Proposal

3 hrs

Meaning and Importance of Research Proposal ; the Development of Research Issues Governing Proposal; Writing a Research Report- Developing an Outline; Key elements of Research Proposal- Objective, Introduction, Design or Rationale of Work, Experimental Methods, Procedures, Measurements, Results, Discussion, Conclusion, Referencing and various formats for Reference Writing of Books and Research Papers; Publications in Research Journals

9. Socio-Ethical Issues in Research

4 hrs

Issues governing Research Function, Incorporating Socio-Ethical Issues in Research Impact of Social Issues in Research

.Reference Books:

1. Cooper & Schindler (2004), Business Research Methods, New Delhi, Tata McGraw Hill Publishing Co.
2. Best, John W., Research in Education, Prentice Hall of India, New Delhi
3. Wolf Howard K. & P. R Pant, Social Science Research & Thesis Writing, Research Division, Kirtipur
4. Goode William J. & Paul K. Hatt, Methods in Social Research, McGraw Hill Kogakusha Ltd.
5. Kothari C. R, Research Methodology, 2nd Revised Edition, New International Publisher

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