

3rd Year (Odd Semester)

Prerequisite: CSE1221: Object Oriented Programming, CSE2121: Data Structure, CSE2221: Design and Analysis of Algorithms

Course Type Theory Laboratory work Project work Viva Voce

Motivation To show the skills and processes needed to complement technical understanding of software products in order to make you a more effective software developer in an engineering team.

Course Objective: This course provides an in-depth study of the process of developing software systems, including the use of software processes in actual product development, techniques used to ensure quality of the software products and maintenance tasks performed as software evolves. By the end of the course, students will understand the role of software processes in the development of software and will have experienced several types of processes, from rigid to agile. Students will also become familiar with a variety of modern technologies and development techniques and understand their connection to software processes.

Course Outcomes (COs), Program Outcomes (POs) and Assessment:

CO No.	CO Statement	Corresponding PO	Domain / level of learning taxonomy	Delivery methods and activities	Assessment tools
CO1	To describe different theories of how software can be developed	Engineering knowledge: (PO1)	Cognitive domain – level 2	<input checked="" type="checkbox"/> Lecture Note <input checked="" type="checkbox"/> Text Book <input checked="" type="checkbox"/> Audio/Video <input checked="" type="checkbox"/> Web Material <input type="checkbox"/> Journal paper	<input checked="" type="checkbox"/> Class Test <input checked="" type="checkbox"/> Final Exam <input type="checkbox"/> Assignment <input type="checkbox"/> Participation <input type="checkbox"/> Presentation
CO2	To apply appropriate methods for the design and implementation of modern software systems	Design/development of solutions (PO3)	Cognitive domain – level 3	<input checked="" type="checkbox"/> Lecture Note <input type="checkbox"/> Text Book <input checked="" type="checkbox"/> Audio/Video <input checked="" type="checkbox"/> Web Material <input type="checkbox"/> Journal paper	<input type="checkbox"/> Class Test <input type="checkbox"/> Final Exam <input checked="" type="checkbox"/> Assignment <input checked="" type="checkbox"/> Participation <input type="checkbox"/> Presentation
CO3	To construct and work in large development groups, with different individual roles in order to be prepared to participate in large scale IT projects.	Individual work and teamwork: (PO9)	Cognitive domain – level 6	<input checked="" type="checkbox"/> Lecture Note <input type="checkbox"/> Text Book <input checked="" type="checkbox"/> Audio/Video <input checked="" type="checkbox"/> Web Material <input type="checkbox"/> Journal paper	<input type="checkbox"/> Class Test <input type="checkbox"/> Final Exam <input type="checkbox"/> Assignment <input checked="" type="checkbox"/> Participation <input checked="" type="checkbox"/> Presentation

Assessment and Marks Distribution:

Students will be assessed on the basis of their overall performance in all the exams, class tests, assignments, and class participation. Final numeric reward will be the compilation of:

Class tests + Assignments due in different times of the semester (20%)

A comprehensive final exam (70%), Total Time: 3 hours.

A class participation mark (10%).

Course Contents:

Introduction: Introduction to software engineering, Importance of software, The Software evolution, Software characteristics, Software components, Software applications, Crisis-Problem and causes.

Software development life-cycle: Requirement Engineering, Design, Coding, Testing, Deployment and Maintenance etc.

Software Process Model: Waterfall Process, Spiral Process, Evolutionary Prototyping Process, Rational Unified Process, Agile Process, Unified Software Process, Choosing a Model, Lifecycle Documents

Requirement Engineering: General Definition, Software Intensive Systems, Functional and Nonfunctional Requirements, User and System Requirements, Problem analysis, requirement specification, validation,

matrices, monitoring and control, Gathering Requirements: The agile way, User Stories: The currency of agile development, Characteristics of good user stories, Generating User Stories, Modeling Requirements, Analyzing Requirements, Requirements Prioritization, Requirements Engineering Process, Agile Estimation and Planning, Estimation Styles and Process, Velocity, Release Planning, Release Tracking

System Design: Problem partitioning, abstraction, Cohesiveness, coupling, structured approach, functional versus object-oriented approach, UML Structural Diagrams: Class Diagrams, Component Diagram, Deployment Diagram, UML Behavioral Diagram: Use Case, Sequence, and State Transition Diagram, Software Architecture, Prescriptive vs. Descriptive Architecture, Architectural Evolution, Architectural Degradation, Architectural Recovery, Architectural Elements, Components, Connectors, and Configuration, Deployment Architectural Perspective, Analyzing Requirements, Refining Classes and Attributes, Adding Attributes, Identifying Operations, Refining the Class Diagram

Coding: TOP-DOWN and BOTTOM-UP structure programming, information hiding, programming style, and internal documentation, verification, metrics, monitoring and control, Software Refactoring: Reasons to Refactor, Refactoring Risks, Cost of Refactoring, When Not to Refactor.

Software Testing: Failure, Fault and Error, Verification Approaches, Pros and Cons of Approaches, Testing Granularity Levels, Alpha and Beta Testing, Black and White Box Testing Introduction, Black-Box Testing: Systematic Functional Testing Approach, Test Data Selection, Category Partition Method, Produce and Evaluate Test Case Specifications, Generate Test Cases from Test Case Specifications, Model Based Testing, Finite State Machines, White-Box Testing: Coverage Criteria, Statement Coverage, Control Flow Graphs, Test Criteria Sub-Sumption, MC/DC Coverage, test plan, test case specification, Software testing strategies, Verification and validation, Unit and Integration Testing, Alpha and Beta testing, System testing and debugging.

Deployment and maintenance: What is deployment? Is deployment the problem? Key issues around deployment, Deployment itself, Continuous Integration and Deployment, Maintenance, Maintenance challenges, Software evolution and release management, Re-engineering.

Text Book:

- | | | |
|----------------------|---|--|
| 1. Roger S. Pressman | : | Software Engineering, A practitioner's Approach, McGraw-Hill |
| 2. Ian Sommerville | : | Software Engineering, Pearson Education. |

Books Recommended:

- | | | |
|---|---|--|
| 3. Richard Fairley | : | Software Engineering Concepts, McGraw-Hill. |
| 4. Robert N. Charette | : | Software Engineering Environments, McGraw-Hill. |
| 5. S. L. Pfleeger and J.M. Atlee | : | Software Engineering Theory and Practice, Pearson Education. |
| 3. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran | : | Fundamentals of Computer Algorithms, Galgotia Publications |

CSE 3112: Software Engineering Lab

Credits: 1 Contact Hours: 26

Year: Third Semester: Even

Prerequisite: CSE1222: Object Oriented Programming Lab, CSE2122: Data Structure Lab, CSE2222: Design and Analysis of Algorithms Lab

Course Type
Motivation Theory Laboratory work Project work Viva Voce
To Demonstrate the skills and processes needed to complement technical understanding of software products in order to make you a more effective software developer in an engineering team.

Course Objective:
This Laboratory course provides an in-depth study of the process of developing software systems, including the use of software processes in actual product development, techniques used to ensure quality of the software products and maintenance tasks performed as software evolves. By the end of the course, students will be able to demonstrate the role of software processes in the development of software and will have experienced several types of processes, from rigid to agile. Students will also become familiar with a variety of modern technologies and development techniques and understand their connection to software processes.

Course Outcomes (COs), Program Outcomes (POs) and Assessment:

CO No.	CO Statement	Corresponding PO	Domain / level of learning taxonomy	Delivery methods and activities	Assessment tools
CO1	To combine all SDLC Phases and produce a quality software and deploy.	Design/development of solutions: (PO3)	Cognitive domain – level 6	<input type="checkbox"/> Lecture Note <input checked="" type="checkbox"/> Text Book <input type="checkbox"/> Audio/Video <input checked="" type="checkbox"/> Web Material <input checked="" type="checkbox"/> Lab Manual	<input type="checkbox"/> CA <input type="checkbox"/> Final Exam <input checked="" type="checkbox"/> Assignment <input checked="" type="checkbox"/> Note book <input checked="" type="checkbox"/> Presentation
CO2	To apply different tools on each SDLC Phases to promote rapid development	Modern tool usage: (PO5)	Cognitive domain – level 4	<input type="checkbox"/> Lecture Note <input checked="" type="checkbox"/> Text Book <input type="checkbox"/> Audio/Video <input checked="" type="checkbox"/> Web Material <input checked="" type="checkbox"/> Lab Manual	<input type="checkbox"/> CA <input type="checkbox"/> Final Exam <input checked="" type="checkbox"/> Assignment <input checked="" type="checkbox"/> Note book <input checked="" type="checkbox"/> Presentation

Assessment and Marks Distribution:

Continuous Assessments (CA) (20%)

A comprehensive final exam + Lab note book (70%)

A class participation mark (10%).

Lab Course Contents/List of Experiments:

1. Analyze requirements on a specific problem and produce SRS
2. Produce architectural design for the produces SRS document
3. Create UML diagram and detail design
4. Write Unit Test for each and every module
5. Write Code in predefined object-oriented programming language
6. Deploy code on server and maintain for further changes

CSE3121: Database Management Systems

Credits: 3 Contact Hours: 39

Year: Third Semester: Odd

Prerequisite: CSE2131 Discrete Mathematics

Course Type Theory Laboratory work Project work Viva Voce

Motivation To know basic of database design and implementation, database security, integrity and concurrency.

Course Objective:

The main objective of this course is to provides a solid technical overview of database management systems, using a current database product as a case study. In addition to technical concerns, more general issues are emphasized. These include data independence, integrity, security, recovery, performance, database design principles, and database administration.

Course Outcomes (COs), Program Outcomes (POs) and Assessment:

CO No.	CO Statement	Corresponding PO	Domain / level of learning taxonomy	Delivery methods and activities	Assessment tools
CO1	To understand the primary concepts of database management systems.	Engineering knowledge (PO1)	Cognitive domain – level 2	<input checked="" type="checkbox"/> Lecture Note <input checked="" type="checkbox"/> Text Book <input type="checkbox"/> Audio/Video <input type="checkbox"/> Web Material <input checked="" type="checkbox"/> Journal paper	<input checked="" type="checkbox"/> Class Test <input checked="" type="checkbox"/> Final Exam <input checked="" type="checkbox"/> Assignment <input type="checkbox"/> Participation <input checked="" type="checkbox"/> Presentation

CO2	To construct E-R diagram for real-world application scenarios, convert into relational tables, normalize it, populate and formulate SQL queries on the data.	Engineering knowledge (PO1)	Cognitive domain – level 5	<input checked="" type="checkbox"/> Lecture Note <input checked="" type="checkbox"/> Text Book <input type="checkbox"/> Audio/Video <input checked="" type="checkbox"/> Web Material <input type="checkbox"/> Journal paper	<input checked="" type="checkbox"/> Class Test <input checked="" type="checkbox"/> Final Exam <input checked="" type="checkbox"/> Assignment <input type="checkbox"/> Participation <input type="checkbox"/> Presentation
CO3	To criticize a database design and improve the design by normalization.	Problem analysis: (PO2)	Cognitive domain – level 5	<input checked="" type="checkbox"/> Lecture Note <input checked="" type="checkbox"/> Text Book <input type="checkbox"/> Audio/Video <input checked="" type="checkbox"/> Web Material <input type="checkbox"/> Journal paper	<input type="checkbox"/> Class Test <input type="checkbox"/> Final Exam <input checked="" type="checkbox"/> Assignment <input type="checkbox"/> Participation <input type="checkbox"/> Presentation

Assessment and Marks Distribution:

Students will be assessed on the basis of their overall performance in all the exams, class tests, assignments, and class participation. Final numeric reward will be the compilation of:

Class tests + Assignments due in different times of the semester (20%)

A comprehensive final exam (70%), Total Time: 3 hours.

A class participation mark (10%).

Course Contents:

Introduction: Database system concept; Purpose of database system; View of data; Data models; Conventional file processing; Transaction management; Storage management; Database administrator.

Database Model: Entity-relationship model; Relational model, Network model; Hierarchical model, Database languages, Relational algebra, Integrity constraint, Generalization and Specialization, Developing an ER Diagram.

Structured Query Language: Basic Structure of SQL, String operations, Different set operations, Aggregate functions, Handling NULL values, Nested Subqueries, View definition, Modification of the Database: Deletion, Insertion and Update operations, Domain Types in SQL, Alteration of Table Structure.

Database Design: Functional dependencies and normal forms; Object-oriented databases; Distributed database; multimedia database, object-relational database, Intelligent database.

File System Structure & Data Warehouse: File organization and retrieval; File indexing; Hashing. Basic concepts of data warehouse and data mart.

Transactions: Introduction to transaction, ACID Properties, Transaction State, Schedule, Conflict Serializability and View Serializability.

Recovery System: Failure Classification, Recovery and Atomicity, Recovery Algorithm , Buffer Management, Failure with Loss of Nonvolatile Storage, Remote Backup Systems.

OLTP and NoSQL Systems: Basic Concepts of OLAP, Comparison between OLAP and OLTP, Introduction to NoSQL Systems.

Text Book:

1. A. Silberschatz
2. James Martin

: **Database System Concepts, McGraw-Hill.**
 : **Principles of Database Management, Prentice-hall Of India Pvt Ltd**

Books Recommended:

1. Ullman
2. Abey

: **Database Management systems, Prentice-Hall Publication.**
 : **Oracle 8i a Beginners Guide, McGraw Hill.**

Prerequisite: CSE2131 Discrete Mathematics

Course Type Theory Laboratory work Project work Viva Voce

Motivation To develop ability to design, develop/create, and manipulate a relational database using a DBMS.

Course Objective:

This lab course is designed for the students to achieve a hands-on experience in using DBMSs (e.g., MySQL, Oracle, etc.). The idea is to give them practical experience in retrieving information from a database system efficiently and effectively. Theoretical lectures are completed by lab practice where theoretical knowledge is applied.

Course Outcomes (COs), Program Outcomes (POs) and Assessment:

CO No.	CO Statement	Corresponding PO	Domain / level of learning taxonomy	Delivery methods and activities	Assessment tools
CO1	To Design and implement a database schema and populate the database.	Modern tool usage: (PO5)	Cognitive domain – level 5	<input checked="" type="checkbox"/> Lecture Note <input type="checkbox"/> Text Book <input type="checkbox"/> Audio/Video <input checked="" type="checkbox"/> Web Material <input checked="" type="checkbox"/> Lab Manual	<input checked="" type="checkbox"/> CA <input checked="" type="checkbox"/> Final Exam <input type="checkbox"/> Assignment <input checked="" type="checkbox"/> Note book <input type="checkbox"/> Presentation
CO2	To Formulate queries using SQL statements /commands.	Modern tool usage (PO5)	Cognitive domain – level 5	<input checked="" type="checkbox"/> Lecture Note <input type="checkbox"/> Text Book <input type="checkbox"/> Audio/Video <input checked="" type="checkbox"/> Web Material <input checked="" type="checkbox"/> Lab Manual	<input checked="" type="checkbox"/> CA <input type="checkbox"/> Final Exam <input type="checkbox"/> Assignment <input checked="" type="checkbox"/> Note book <input type="checkbox"/> Presentation

Assessment and Marks Distribution:

Continuous Assessments (CA) (20%)

A comprehensive final exam + Lab note book (70%)

A class participation mark (10%).

Lab Course Contents/List of Experiments:

1. Create database and table.
2. Alter/Drop Table
3. Create table with integrated constraints (Primary key, Foreign Key)
4. Insert delete update SQL query (with condition)
5. Select query with multiple conditions
6. String operation using SQL
7. Nested subquery
8. Joining
9. Create a simple trigger
10. Create a simple function/procedure

Prerequisite:

Course Type Theory Laboratory work Project work Viva Voce

Motivation

To provide students with conceptual and practical knowledge, and skills required to develop web applications and web services.

Course Objective:

The course introduces students to the discipline of web Engineering including the methods and techniques used in web-based system development. This course draws upon student's previous programming and computing experience to develop practical web development and maintenance skills.

Course Outcomes (COs), Program Outcomes (POs) and Assessment:					
CO No.	CO Statement	Corresponding PO	Domain / level of learning taxonomy	Delivery methods and activities	Assessment tools
CO1	To describe the basic concepts and techniques of web engineering.	Engineering knowledge: (PO1)	Cognitive domain – level 5	<input checked="" type="checkbox"/> Lecture Note <input checked="" type="checkbox"/> Text Book <input type="checkbox"/> Audio/Video <input type="checkbox"/> Web Material <input type="checkbox"/> Journal paper	<input checked="" type="checkbox"/> Class Test <input checked="" type="checkbox"/> Final Exam <input type="checkbox"/> Assignment <input type="checkbox"/> Participation <input type="checkbox"/> Presentation
CO2	To apply the web engineering methodologies for Web application development.	Problem Analysis (PO2),	Cognitive domain – level 4	<input checked="" type="checkbox"/> Lecture Note <input checked="" type="checkbox"/> Text Book <input type="checkbox"/> Audio/Video <input type="checkbox"/> Web Material <input type="checkbox"/> Journal paper	<input checked="" type="checkbox"/> Class Test <input checked="" type="checkbox"/> Final Exam <input type="checkbox"/> Assignment <input type="checkbox"/> Participation <input type="checkbox"/> Presentation
CO3	To Identify and discuss the security risk of a Web application.	Investigation (PO4)	Cognitive domain – level 5	<input checked="" type="checkbox"/> Lecture Note <input checked="" type="checkbox"/> Text Book <input type="checkbox"/> Audio/Video <input type="checkbox"/> Web Material <input type="checkbox"/> Journal paper	<input checked="" type="checkbox"/> Class Test <input checked="" type="checkbox"/> Final Exam <input type="checkbox"/> Assignment <input type="checkbox"/> Participation <input type="checkbox"/> Presentation

Assessment and Marks Distribution:

Students will be assessed on the basis of their overall performance in all the exams, class tests, assignments, and class participation. Final numeric reward will be the compilation of:

Class tests + Assignments due in different times of the semester (20%)

A comprehensive final exam (70%), Total Time: 3 hours.

A class participation mark (10%).

Course Contents:

Web Engineering: Attributes of Web based system and Application, Web App Engineering Layers, Web Engineering Process

Web App Project: Formulation Web based Systems, Planning for Web Engineering Project, Building Web Engineering Team, Web App Project Management, Metrics for web engineering and Apps.

Web Apps Analysis: Requirement Analysis, Analysis Model, Web Apps Estimation, Content Model.

Web Apps design: Design issues of Web Apps, Interface Design, Typography, Layout design, Aesthetic Design, Content Design, Architecture Design, Navigation Design, Object Oriented Hypermedia Design, Design Metrics for web Apps.

Web Apps Implementation: Client side scripting: Java Script, AJAX, JQuery; Server Side Scripting: ASP.NET, PHP; Framework: PHP MVC frameworks (Code Igniter, Symfony, Zend, CakePHP) ASP.NET MVC Framework, Web Service.

Web Apps Security: Encryption techniques (digital signatures, certificates, PKI), Security threats, Securing client/server interactions, Vulnerabilities at the client (desktop security, phishing, etc.) and the server (cross-site scripting, SQL injections, etc.), Building Secure Web Apps.

Testing Web Apps: Content Testing, User Interface Testing, Navigation Testing, Configuration Testing, Security Testing, Performance Testing.

Maintenance of Web Applications: Web Server and Database server load balancing, web apps performance assessment, Application usage monitoring and report generation

Text Book:

1. Roger Pressman and David Lowe : *Web Engineering, Tata McGraw Hill Edition, 2008*

Books Recommended:

- | | |
|--|--|
| 1. Imar Spaanjaars | : Beginning ASP.NET 4.5.1: in C# and VB, Wrox |
| 2. Branko Ajzele | : Mastering PHP 7, Packt Publishing |
| 3. Holovaty, Adrian,
Kaplan-Moss, Jacob | : The Definitive Guide to Django: Web Development Done Right, Apress |

CSE 3132: Web Engineering Lab

Credits: 1 Contact Hours: 26

Year: Fourth Semester: Even

Prerequisite: CSE2252 Web Application Development Lab**Course Type** Theory Laboratory work Project work Viva Voce**Motivation**
Web Engineering Lab is an introduction to the design, creation, and maintenance of web pages and websites which will help the students to evaluate website quality, learn how to create and maintain quality web pages, learn about web design standards**Course Objective:**

This course is an introduction to programming for the World Wide Web. We will cover all the major pieces of how websites work. This will include the relationship between clients and servers, how web pages are constructed, and how the internet works. Several web technologies will be examined in depth

Course Outcomes (COs), Program Outcomes (POs) and Assessment:

CO No.	CO Statement	Corresponding PO	Domain / level of learning taxonomy	Delivery methods and activities	Assessment tools
CO1	To understand Detail knowledge of the relationship between client and server and client-side and server-side programming	Modern tool usages (PO5)	Cognitive domain – level 5	<input type="checkbox"/> Lecture Note <input checked="" type="checkbox"/> Text Book <input type="checkbox"/> Audio/Video <input checked="" type="checkbox"/> Web Material <input checked="" type="checkbox"/> Lab Manual	<input checked="" type="checkbox"/> CA <input checked="" type="checkbox"/> Final Exam <input checked="" type="checkbox"/> Assignment <input checked="" type="checkbox"/> Note book <input checked="" type="checkbox"/> Presentation
CO2	To apply Practical knowledge of languages of HTML, CSS, Java Scripts, Ajax, and PHP/C# to develop web application	Life-long learning: (PO12)	Cognitive domain – level 4	<input type="checkbox"/> Lecture Note <input checked="" type="checkbox"/> Text Book <input type="checkbox"/> Audio/Video <input checked="" type="checkbox"/> Web Material <input checked="" type="checkbox"/> Lab Manual	<input checked="" type="checkbox"/> CA <input checked="" type="checkbox"/> Final Exam <input checked="" type="checkbox"/> Assignment <input checked="" type="checkbox"/> Note book <input checked="" type="checkbox"/> Presentation

Assessment and Marks Distribution:

Continuous Assessments (CA) (20%)

A comprehensive final exam + Lab note book (70%)

A class participation mark (10%).

Lab Course Contents/ List of Experiments:

1. Creating form with HTML
2. Web page design with CSS
3. Java Script Programming
4. Asynchronous Programming with AJAX
5. Programming with PHP
6. Web Database connectivity and data manipulation
7. AngularJS/ NodeJS/ ExpressJS with PHP
8. Programming C#.NET and ASP.NET with Visual Studio

Text Book:

1. Roger Pressman and David Lowe : **Web Engineering, Tata McGraw Hill Edition, 2008**

Books Recommended:

- | | |
|--|--|
| 1. Imar Spaanjaars | : Beginning ASP.NET 4.5.1: in C# and VB, Wrox |
| 2. Branko Ajzele | : Mastering PHP 7, Packt Publishing |
| 3. Holovaty, Adrian,
Kaplan-Moss, Jacob | : The Definitive Guide to Django: Web Development Done Right, Apress |

Prerequisite: CSE2211 Theory of Computation, CSE2221 Design and Analysis of Algorithms, CSE2121 Data Structure

Course Type Theory Laboratory work Project work Viva Voce

Motivation To know basic structure of compiler and design of phases of compiler such as lexical analyzer, parser etc.

Course Objective:

The main objective of this course is to make the student to understand the process involved in a compiler, create an overall view of various types of translators, linkers, loaders, and phases of a compiler, understand what is syntax analysis, various types of parsers especially the top down approach, awareness among students the various types of bottom up parsers, understand the syntax analysis and, intermediate code generation, the role of symbol table and its organization, code generation, machine independent code optimization and instruction scheduling.

Course Outcomes (COs), Program Outcomes (POs) and Assessment:

CO No.	CO Statement	Corresponding PO	Domain / level of learning taxonomy	Delivery methods and activities	Assessment tools
CO1	To know and analyze the various phases of compiler.	Engineering knowledge (PO1)	Cognitive domain – level 5	<input checked="" type="checkbox"/> Lecture Note <input checked="" type="checkbox"/> Text Book <input type="checkbox"/> Audio/Video <input type="checkbox"/> Web Material <input type="checkbox"/> Journal paper	<input checked="" type="checkbox"/> Class Test <input checked="" type="checkbox"/> Final Exam <input type="checkbox"/> Assignment <input type="checkbox"/> Participation <input type="checkbox"/> Presentation
CO2	To design and implement lexical analyzer, parser, and syntax directed translation scheme and optimize code generation.	Design/development of solutions (PO3), Modern tool usage (PO5)	Cognitive domain – level 4	<input checked="" type="checkbox"/> Lecture Note <input checked="" type="checkbox"/> Text Book <input type="checkbox"/> Audio/Video <input type="checkbox"/> Web Material <input type="checkbox"/> Journal paper	<input checked="" type="checkbox"/> Class Test <input checked="" type="checkbox"/> Final Exam <input type="checkbox"/> Assignment <input type="checkbox"/> Participation <input type="checkbox"/> Presentation

Assessment and Marks Distribution:

Students will be assessed on the basis of their overall performance in all the exams, class tests, assignments, and class participation. Final numeric reward will be the compilation of:

Class tests + Assignments due in different times of the semester (20%)

A comprehensive final exam (70%), Total Time: 3 hours.

A class participation mark (10%).

Course Contents:

Fundamentals: Strings, Alphabet, Language, Operations, Finite state machine, definitions, finite automaton model, Introduction: Introduction to compiler, compiler and translator, the structure of a compiler.

Grammars: Notation and concepts for languages and Grammars, sets and string, Discussion and classification of Grammars, Scanner regular expression, regular definition, finite automata, LL and LR Grammars, ambiguous grammar.

Parsing: Basic parsing technique, parsers, shift reduce parsing, operator-procedure parsing, top-down parsing, bottom up parsing, predictive parsing.

Syntax: Syntax directed translation, intermediate code generation, polish notation, parse tree and syntax trees, quadruples, triples, Boolean expression.

Symbol Table: Perspective and motivation of symbol table. Symbol table content, operation on symbol table, organization of symbol table.

Code Optimization: Code optimization, sources of optimization, basic blocks, folding, loop optimization, flowgraph, induction variable elimination, reduction in strength, code motion.

Error Handling: Compile time error handling, error detection, error recovery, error repair.

Coding: Code generation, object programs, problems in code generation, a machine model, a simple code generator, register allocation and assignment peephole optimization.

Text Book:

1. Alfred V. Aho and Jeffrey D. Ullman : **Principles of Compiler Design**, Addison-Wesley Publication.
 2. A.J. Holub : **Compiler design in C**, Prentice-Hall of India

Books Recommended:

1. Trembly and Sorensen : **Theory and Practices of Compiler Writing**, McGraw-Hill computer science series.

CSE 3142: Compiler Design Lab

Credits: 1 Contact Hours: 26

Year: 3rd Semester: Odd

Prerequisite: CSE2211 Theory of Computation, CSE2221 Design and Analysis of Algorithms, CSE2121 Data Structure

Course Type Theory Laboratory work Project work Viva Voce

Motivation To enlighten the student with knowledge base in compiler design and its applications.

Course Objective:

The objective of this course is to implement NFA and DFA from a given regular expression, to implement different types of parser and to implement front end of the compiler by means of generating Intermediate codes and finally to implement code optimization techniques.

Course Outcomes (COs), Program Outcomes (POs) and Assessment:

CO No.	CO Statement	Corresponding PO	Domain / level of learning taxonomy	Delivery methods and activities	Assessment tools
CO1	To demonstrate a working understanding of the process of lexical analysis, parsing and other compiler design aspects.	Design/development of solutions (PO3), Modern tool usage (PO5)	Cognitive domain – level 4	<input type="checkbox"/> Lecture Note <input checked="" type="checkbox"/> Text Book <input type="checkbox"/> Audio/Video <input type="checkbox"/> Web Material <input checked="" type="checkbox"/> Lab Manual	<input checked="" type="checkbox"/> CA <input checked="" type="checkbox"/> Final Exam <input checked="" type="checkbox"/> Assignment <input checked="" type="checkbox"/> Note book <input checked="" type="checkbox"/> Presentation

Assessment and Marks Distribution:

Students will be assessed on the basis of their overall performance in all the exams, class tests, assignments, and class participation. Final numeric reward will be the compilation of:

Assignments + Continuous assessment due in different times of the semester (20%)

A comprehensive lab exam (70%), Total Time: 3 hours.

A class participation mark (10%).

Lab Course Contents/List of Experiments:

1. Write a C program that read the following string:

“ Md. Tareq Zaman, Part-3, 2011”

- a) Count number of words, letters, digits and other characters.
 b) Separates letters, digits and others characters.

2. Write a program that read the following string:

“ Munmun is the student of Computer Science & Engineering”.

- a) Count how many vowels and Consonants are there?
 b) Find out which vowels and consonants are existed in the above string?
 c) Divide the given string into two separate strings, where one string only contains the words started with vowel, and another contains the words started with consonant.

3. Write a program that abbreviates the following code:

CSE-3141 as Computer Science & Engineering, 3rd year, 1st semester, Compiler Design, Theory.

4. Build a lexical analyzer implementing the following regular expressions:

Integer variable = (i-nl-N)(a-zA-Z0-9)*

ShortInt Number = (1-9)|(1-9)(0-9)|(1-9)(0-9)(0-9)|(1-9)(0-9)(0-9)(0-9)

LongInt Number = (1-9)(0-9)(0-9)(0-9)(0-9)+

Invalid Input or Undefined = Otherwise

5. Build a lexical analyzer implementing the following regular expressions:

Float variable = (a-zA-Ho-zO-Z)(a-zA-Z0-9)*

Float Number = 0.(0-9)(0-9)|(1-9)(0-9)*(0-9)(0-9)

Double Number = 0.(0-9)(0-9)(0-9)+|(1-9)(0-9)*(0-9)(0-9)(0-9)+

Invalid Input or Undefined = Otherwise

6. Build a lexical analyzer implementing the following regular expressions:

Character variable = ch_(a-zA-Z0-9)(a-zA-Z0-9)*

Binary variable = bn_(a-zA-Z0-9)(a-zA-Z0-9)*

Binary Number = 0(0|1)(0|1)*

Invalid Input or Undefined = Otherwise

7. Write a program to recognize C++

i) Keyword ii) Identifier iii) Operator iv) Constant

8. Write a program which converts a word of C++ program to its equivalent token.

RESULT:

Input: 646.45

Output: Float

Input: do

Output: Keyword

Input: 554

Output: Integer

Input: abc

Output: Identifier

Input: +

Output: Arithmetic Operator

9. Write a program to convert the following regular grammar to a regular expression that can describe the words of the language { On10m | n, m 1}:

S \square 0S

S \square 0B

B \square 1C

C \square 0C

C \square 0

10. Write a program that will check an English sentence given in present indefinite form to justify whether it is syntactically valid or invalid according to the following Chomsky Normal Form:

S \square SUB PRED

SUB \square PN | P

PRED \square V | V N

PN \square Sagor | Selim | Salma | Nipu

P \square he | she | I | we | you | they

N \square book | cow | dog | home | grass | rice | mango

V \square read | eat | take | run | write

11. Write a program to implement a shift reducing parsing.

12. Write a program to generate a syntax tree for the sentence a+b*c with the following grammar:

E \square E+E-E|E|E*E|E/E|(E)|a|b|c

13. Write a program which checks a validity of C++ expression derived by the following grammar:

E \square E A E | (E) | ID

A \square + | - | * | /

ID \square any valid identifier | any valid integer

RESULT:

Input: Enter a string: 2+3*5

Output: VALID

Input: Enter a string: 2+*3*5

Output: INVALID

14. Write a program to generate FIRST and FOLLOW sets using a given CFG.

15. Write a program to generate a FOLLOW set and parsing table using the following LL(1) grammar and FIRST set:

Grammar FIRST set

E \square TE' {id, ()}

$$\begin{array}{ll}
 E' \sqsubseteq +TE' \mid \epsilon & \{+, \epsilon\} \\
 T \sqsubseteq FT' & \{id, \emptyset\} \\
 T' \sqsubseteq *FT' \mid \epsilon & \{*, \epsilon\} \\
 F \sqsubseteq (E) \mid id & \{id, \emptyset\}
 \end{array}$$

16. Write a program to generate a parse tree of predictive parser using the following parsing table:

	id	+	*	()	\$
E	E \sqsubseteq TE'			E \sqsubseteq TE'		
E'		E' \sqsubseteq +TE'			E' \sqsubseteq ϵ	E' \sqsubseteq ϵ
T	T \sqsubseteq FT'			T \sqsubseteq FT'		
T'		T' \sqsubseteq ϵ	T' \sqsubseteq *FT'		T' \sqsubseteq ϵ	T' \sqsubseteq ϵ
F	F \sqsubseteq id			F \sqsubseteq (E)		

17. Write a program that converts the C++ expression to an intermediate code of Post-fix notation form.

RESULT:

Input: Enter infix expression: (A – B) * (D/E)

Output: Postfix: AB – DE / *

18. Write a program that converts the C++ statement to an intermediate code of Post-fix notation form.

RESULT:

Input: Enter infix statement: if a then if c-d then a+c else a*c else a+b

Output: Postfix: acd - ac + ac * ? ab + ?

CSE 3151: Engineering Ethics and Environment Protection

Credits: 2 Contact Hours: 26

Year: 3rd Semester: Even

Prerequisite: None

Course Type Theory Laboratory work Project work Viva Voce

Motivation

Course Objective:

The aim of this course is to create awareness on Engineering Ethics and Human Values and instill Moral and Social Values to appreciate the rights of others. It will also help the learners to understand the relationship between technology and environment and the implied social costs and benefits

Course Outcomes (COs), Program Outcomes (POs) and Assessment:

CO No.	CO Statement	Corresponding PO	Domain / level of learning taxonomy	Delivery methods and activities	Assessment tools
CO1	To understand the basic perception of profession, professional ethics and various moral issues	Ethics: (PO8)	Cognitive domain – level 2	<input type="checkbox"/> Lecture Note <input checked="" type="checkbox"/> Text Book <input type="checkbox"/> Audio/Video <input type="checkbox"/> Web Material <input checked="" type="checkbox"/> Lab Manual	<input checked="" type="checkbox"/> CA <input checked="" type="checkbox"/> Final Exam <input checked="" type="checkbox"/> Assignment <input checked="" type="checkbox"/> Note book <input checked="" type="checkbox"/> Presentation
CO2	To understand various social issues and evaluate the effects of the use of technology on social culture, economic, legal, health welfare of the society	The Engineers and the society (PO6)	Cognitive domain – level 5	<input type="checkbox"/> Lecture Note <input checked="" type="checkbox"/> Text Book <input type="checkbox"/> Audio/Video <input type="checkbox"/> Web Material <input checked="" type="checkbox"/> Lab Manual	<input checked="" type="checkbox"/> CA <input checked="" type="checkbox"/> Final Exam <input checked="" type="checkbox"/> Assignment <input checked="" type="checkbox"/> Note book <input checked="" type="checkbox"/> Presentation
CO3	To Identify and evaluate the effects of the use of technology on environment	Environment and sustainability (PO7)	Cognitive domain – level 4	<input type="checkbox"/> Lecture Note <input checked="" type="checkbox"/> Text Book <input type="checkbox"/> Audio/Video <input type="checkbox"/> Web Material <input checked="" type="checkbox"/> Lab Manual	<input checked="" type="checkbox"/> CA <input checked="" type="checkbox"/> Final Exam <input checked="" type="checkbox"/> Assignment <input checked="" type="checkbox"/> Note book <input checked="" type="checkbox"/> Presentation

Assessment and Marks Distribution

Continuous Assessments (CA) (20%)

A comprehensive final exam + Lab note book (70%)

A class participation mark (10%).

Course Content:

Morals, values and Ethics, Integrity, Work ethic, Service learning, Civic virtue, Respect for others, Living peacefully, Caring, Sharing, Honesty, Courage, Valuing time, Cooperation, Commitment, Empathy, Self-confidence, Character, Spirituality, Introduction to Yoga and meditation for professional excellence and stress management.

Senses of 'Engineering Ethics', Variety of moral issues, Types of inquiry, Moral dilemmas, Moral Autonomy, Kohlberg's theory, Gilligan's theory, Consensus and Controversy, Models of professional roles, Theories about right action, Self-interest, Customs and Religion, Uses of Ethical Theories

Safety and Risk, Assessment of Safety and Risk, Risk Benefit Analysis and Reducing Risk, Respect for Authority, Collective Bargaining, Confidentiality, Conflicts of Interest, Occupational Crime, Professional Rights, Employee Rights, Intellectual Property Rights (IPR), Discrimination

Multinational Corporations, Environmental Ethics, Computer Ethics, Weapons Development, Engineers as Managers, Consulting Engineers, Engineers as Expert Witnesses and Advisors, Moral Leadership –Code of Conduct, Corporate Social Responsibility

Impact of technology on society: Innovation and creativity, the history and the trend of technology on the social and culture on society.

Environmental protection and related issues, Role of the engineer in energy conservation ecological balance and sustainable development

Text Book:

1. Mike W. Martin and Roland Schinzinger : **Ethics in Engineering, Tata McGraw Hill, New Delhi, 2003**
2. Govindarajan M, Natarajan S, Senthil Kumar V. S : **Engineering Ethics, Prentice Hall of India, New Delhi, 2004.**
3. S.F. Johnson, J.P. Gostelow and W.J. King : **Engineering and Society Challenges of Professional Practice, Prentice-Hall, 2000.**
4. L.S. Hjorth, B.A. Eichler and A.S. Khan : **Technology and Society: A bridge to the 21st Century, Prentice-Hall, 2000.**

Books Recommended:

1. Laura P. Hartman and Joe Desjardins : **Business Ethics: Decision Making for Personal Integrity and Social Responsibility, Mc Graw Hill education, India Pvt. Ltd. New Delhi 2013.**
2. Charles E. Harris, Michael S. Printchard and Michael J. Rabins : **Engineering Ethics - Concepts and Cases, Cengage Learning, 2009.**
3. Charles B. Fleddermann : **Engineering Ethics, Pearson Prentice Hall, New Jersey, 2004.**

CSE 3162: Mobile Application Development Lab

Credits: 1 Contact Hours: 26

Year: Third Semester Odd

Prerequisite: CSE1222: Object Oriented Programming Lab, CSE2252: Web Application Development Lab
Course Type Theory Laboratory work Project work Viva Voce
Motivation This Lab introduces you to the design and implementation of Android applications for mobile devices. Learn the basics of mobile application development using Android as the platform and Java and Kotlin as the programming language.

Course Objective:

This Laboratory course introduces you to the design and implementation of Android applications for mobile devices. You will develop an app from scratch, assuming a basic knowledge of Java, and learn how to set up Android Studio, work with various Activities and create simple user interfaces to make your apps run smoothly. You will also build upon concepts from the prior course, including handling notifications, using multimedia and graphics and incorporating touch and gestures into your apps.

Course Outcomes (COs), Program Outcomes (POs) and Assessment:

CO No.	CO Statement	Corresponding PO	Domain / level of learning taxonomy	Delivery methods and activities	Assessment tools
CO1	To demonstrate through a simple application the understanding of the basic concepts of Android.	Modern tool usage: (PO5)	Cognitive domain – level 4	<input checked="" type="checkbox"/> Lecture Note <input checked="" type="checkbox"/> Text Book <input checked="" type="checkbox"/> Audio/Video <input checked="" type="checkbox"/> Web Material <input checked="" type="checkbox"/> Lab Manual	<input checked="" type="checkbox"/> CA <input checked="" type="checkbox"/> Final Exam <input checked="" type="checkbox"/> Assignment <input checked="" type="checkbox"/> Note book <input checked="" type="checkbox"/> Presentation

Assessment and Marks Distribution:

Continuous Assessments (CA) (20%)
 A comprehensive final exam + Lab note book (70%)
 A class participation mark (10%).

Lab Course Contents/List of Experiments:

1. Android Platform and Development Environment
2. Develop an application that use The Activity Class
3. Develop an application that use Intents, Permission, and Fragments
4. Develop an application that use different User Interface Classes
5. Develop a Modern Artistic UI which comply google design guideline
6. Develop an application that use AsyncTasks
7. Develop an application that use Notifications
8. Develop an application that use different Graphics elements
9. Develop an application that use Location
10. Build an app completely from scratch like Daily Selfie
11. Prepare to build an Android App in Group or 2 or 3 students and publish in amazon Appstore and google Playstore for final project presentation

ICE3161: Communication Engineering

Credits: 2 Contact Hours: 26

Year: Third Semester: Even

Prerequisite: None

Course Type Theory Laboratory work Project work Viva Voce
Motivation To develop fundamental concepts on Communication system.

Course Objective:

The major objectives of this course are to build the fundamentals of basic communication system, necessity and mechanism of modulation, demodulation and multiplexing techniques. The technical aspects of data communications such as transmission impairments, error detection and control. Understanding of the characteristics of various communication media and satellite communication systems.

Course Outcomes (COs), Program Outcomes (POs) and Assessment:

CO No.	CO Statement	Corresponding PO	Domain / level of learning taxonomy	Delivery methods and activities	Assessment tools
CO1	To demonstrate the mechanism, components and influencing factors of communication systems.	Engineering knowledge (PO1)	Cognitive domain – level 2	<input checked="" type="checkbox"/> Lecture Note <input checked="" type="checkbox"/> Text Book <input type="checkbox"/> Audio/Video <input type="checkbox"/> Web Material <input type="checkbox"/> Journal paper	<input checked="" type="checkbox"/> Class Test <input checked="" type="checkbox"/> Final Exam <input type="checkbox"/> Assignment <input type="checkbox"/> Participation <input type="checkbox"/> Presentation

CO2	To apply the concepts of data and signal, different modulation, demodulation and multiplexing schemes.	Engineering knowledge (PO1)	Cognitive domain – level 3	<input checked="" type="checkbox"/> Lecture Note <input checked="" type="checkbox"/> Text Book <input type="checkbox"/> Audio/Video <input type="checkbox"/> Web Material <input type="checkbox"/> Journal paper	<input checked="" type="checkbox"/> Class Test <input checked="" type="checkbox"/> Final Exam <input checked="" type="checkbox"/> Assignment <input type="checkbox"/> Participation <input type="checkbox"/> Presentation
CO3	To explain the characteristics of different guided and unguided media and satellite communication systems.	Engineering knowledge (PO1)	Cognitive domain – level 2	<input checked="" type="checkbox"/> Lecture Note <input checked="" type="checkbox"/> Text Book <input type="checkbox"/> Audio/Video <input type="checkbox"/> Web Material <input type="checkbox"/> Journal paper	<input checked="" type="checkbox"/> Class Test <input checked="" type="checkbox"/> Final Exam <input type="checkbox"/> Assignment <input type="checkbox"/> Participation <input type="checkbox"/> Presentation

Assessment and Marks Distribution:

Students will be assessed on the basis of their overall performance in all the exams, class tests, assignments, and class participation. Final numeric reward will be the compilation of:

Class tests + Assignments due in different times of the semester (20%)

A comprehensive final exam (70%), Total Time: 3 hours.

A class participation mark (10%).

Course Contents:

Fundamentals: Communication Engineering Fundamentals, Waveforms Spectra, Periodic waveforms and its properties, Fourier series, Noise and its different types.

Amplitude Modulation: Amplitude modulation, Amplitude modulation index, Frequency spectrum for sinusoidal AM

Frequency Modulation: Frequency Modulation, Sinusoidal FM, Frequency spectrum for Sinusoidal FM, FM transmitter. Phase Modulation.

Pulse modulation, Pulse Codes Modulation (PCM), Quantization, Compression, PCM Receiver, Differential PCM, Delta Modulation, Pulse Frequency Modulation (PFM), Pulse Time Modulation (PTM), Pulse Position Modulation (PPM).

Digital Communication: Digital Communication, Basic Digital Communication System, Synchronization, Asynchronous Transmission, Probability of Bit Error in Base band Transmission, Matched Filter, Eye Diagrams, Digital Carrier Systems, Amplitude Shift keying, Frequency Shift Keying, Phase Shift Keying, Differential Phase Shift Keying,

Radio Wave Propagation, Mode of Propagation, Satellite Communication, Fiber Optic Communication: Fiber Optic Communication, Propagation within a Fiber, Modes of Propagation, Losses in Fibers, Light sources for Fiber optics, Photo detectors.

Text Book:

1. Behrouz A. Forouzan : **Data Communications and Networking, Tata McGraw-Hill Edition**

Reference Books:

1. William Stallings : **Data and Computer Communications, Prentice Hall International, Inc.**
 2. John M. Senior : **Optical Fiber Communications, Prentice-Hall of India Pvt Ltd**