GOKARAJU RANGARAJU INSTITUTE OF ENINEERING AND TECHNOLOGY

(Autonomous)

Bachupally, Kukatpally, Hyderabad–500090, India. (040) 65864440

B. Tech Honors in Computer Science and Engineering

COURSE STRUCTURE AND SYLLABUS

III B. Tech - I Semester

S. No	BOS	Group	Course Code	Course Name	Credits				Hours				Int	Ext	Total Marks
					L	T	P	Total	L	T	P	Total			
1	CSE	PC		Principles of Programming Languages	3	0	0	3	3	0	0	3	30	70	100
			TOTAL		3	0	0	3	3	0	0	3	30	70	100

III B. Tech - II Semester

S. No	BOS	Group	Course Code	Course Name	Credits				Hours				Int	Ext	Total Marks
					L	T	P	Total	L	T	P	Total			
1	CSE	PC		Research Methodologies	3	0	0	3	3	0	0	3	30	70	100
2	CSE	PC		Natural Language Processing	3	0	0	3	3	0	0	3	30	70	100
			TOTAL		3	0	0	6	3	0	0	6	60	140	200

IV B. Tech - I Semester

S. No	BOS	Group	Course Code	Course Name	Credits				Hours				Int	Ext	Total Marks
					L	T	P	Total	L	T	P	Total			
1	CSE	PC		Multimedia Applications	3	0	0	3	3	0	0	3	30	70	100
2	CSE	PC		Design Patterns	3	0	0	3	3	0	0	3	30	70	100
			TOTAL		3	0	0	6	3	0	0	6	60	140	200

IV B. Tech - II Semester

S. No	BOS	Group	Course Code	Course Name	Credits				Hours				Int	Ext	Total Marks
					L	T	P	Total	L	T	P	Total			
1	CSE	PC		Technical Paper writing	0	0	2	2	0	0	4	4	30	70	100
2	CSE	PC		Deep Learning (Online through MOOCS)	3	0	0	3	3	0	0	3	30	70	100
			TOTAL		3	0	2	5	3	0	4	7	60	140	200

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
PRINCIPLES OF PROGRAMMING LANGUAGES

Course Code: **L/T/P/C: 3/0/0/3**
III Year I Semester

Course Objectives:

1. Understand the language constructs in different programming languages.
2. Compare and contrast syntax and semantics of a programming language.
3. Articulate different data types and control structures in different programming language.
4. Outline abstract data types, concurrency and exception handling
5. Summarize the logic programming language and functional programming language.

Course Outcomes:
1. Discuss the criteria for evaluating programming languages and language constructs including programming paradigms.
2. Describe formal methods of syntax.
3. Illustrate the data types and control structures in different programming languages
4. Construct abstract data types, concurrency and exceptions
5. Compare functional and imperative languages.

UNIT I
Preliminary Concepts: Reasons for studying, concepts of programming languages, Programming domains, Language Evaluation Criteria, Influences on Language design, Language categories, Programming Paradigms – Imperative, Object Oriented, Functional Programming , Logic Programming.

Programming Language Implementation: Compilation and Virtual Machines, Programming environments.

UNIT II
Syntax and Semantics: General Problem of describing Syntax and Semantics, formal methods of describing syntax - BNF, EBNF for common programming language features, parse trees, ambiguous grammars, attribute grammars, denotation semantics and axiomatic semantics for common programming language features.

Data types: Introduction, primitive, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types, Names, Variable, concept of binding, type checking, strong typing, type compatibility, named constants and variable initialization.

UNIT III

Expressions and Statements: Arithmetic relational and Boolean expressions, Short circuit evaluation, mixed mode assignment, Assignment Statements, Control Structures– Statement Level, Compound Statements, Selection, Iteration, Unconditional Statements, guarded commands.

Subprograms and Blocks: Fundamentals of sub-programs, Scope and lifetime of variable, static and dynamic scope, Design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-programs, generic sub-programs, parameters that are sub- program names, design issues for functions, user defined overloaded operators, co routines.

UNIT IV

Abstract Data types: Abstractions and encapsulation, Introduction to data abstraction, design issues, language examples, C++ parameterized ADT, object oriented programming in C++, Java, C#,Python
Concurrency: Subprogram level concurrency, semaphores, monitors, message passing, Java threads, Examples: Java RMI, Parallel Java, Parallel C
Exception handling: Exceptions, Exception propagation, Exception handler in C++ and Java and PHP.
Logic Programming Language: Introduction and overview of logic programming, basic elements of prolog, application of logic programming.

UNIT V

Functional Programming Languages: Introduction, fundamentals of FPL, LISP, ML, Haskell, application of Functional Programming Languages and comparison of functional and imperative languages.

Lambda Calculus: Lambda expressions, Variables, Substitutions, Arithmetic, Conditionals, Recursion, Lambda Reduction, Type Assignment, Polymorphism, Lambda Calculus and Computability.

Text Books:
1. Concepts of Programming Languages Robert .W. Sebesta 6/e, Pearson Education.
2. Programming Languages –Louden, Second Edition,Thomson.

References:
1. Programming languages –Ghezzi, 3/e, JohnWiley
2. Programming Languages Design and Implementation – Pratt and Zelkowitz, Fourth Edition PHI/Pearson Education

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

RESEARCH METHODOLOGIES

Course Code: **L/T/P/C: 3/0/0/3**

III Year II Semester

Prerequisite: None

Course Objectives:
- To understand the research problem
- To know the literature studies, plagiarism and ethics
- To get the knowledge about technical writing and induce paper publication skills

Course Outcomes: Gain the sound knowledge of the following important elements:
- Distinguish research methods
- Carryout literature review thoroughly to identify contemporary research problems
- Data collection and analysis
- Write and publish a technical research paper
- Review papers effectively

UNIT - I
INTRODUCTION:
Objective of Research; Definition and Motivation; Types of Research; Research Approaches; Steps in Research Process; Criteria of Good Research.

UNIT - II
RESEARCH FORMULATION AND LITERATURE REVIEW:
Problem Definition and Formulation; Literature Review; Characteristics of Good Research Problem; Literature Review Process; Plagiarism, Ethics in Research.

UNIT - III
DATA COLLECTION:
Primary and Secondary Data; Primary and Secondary Data Sources; Data Collection Methods; Data Processing; Classification of Data.
DATA ANALYSIS:
Statistical Analysis; Multivariate Analysis; Correlation Analysis; Regression Analysis; Principle Component Analysis; Samplings

UNIT - IV
RESEARCH DESIGN:
Need for Research Design; Features of a Good Design; Types of Research Designs; Induction and Deduction.
HYPOTHESIS FORMULATION AND TESTING:
Hypothesis; Important Terms; Types of Research Hypothesis; Hypothesis Testing; Z-Test; t-Test; f-Test; Making a Decision; Types of Errors; ROC Graphics.

UNIT - V
PRESENTATION OF THE RESEARCH WORK:
Business Report; Technical Report; Research Report; General Tips for Writing Report; Presentation of Data; Oral Presentation; Bibliography and References; Intellectual Property Rights; Open-Access Initiatives; Plagiarism.

TEXT BOOKS:
1. Research Methodology. Methods & Technique: Kothari. C.R.
2. Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students"

REFERENCES:
1. Practical Research: planning and Design (8th Edition) – Paul D. Leedy and Jeanne E.Ormrod.
2. A Hand Book of Education Research – NCTE
3. Methodology of Education Research – K.S. Sidhu.
4. Tests, Measurements and Research methods in Behavioural Sciences- A.K. Singh.
5. Statistical Methods- Y.P. Agarwal.
6. Methods of Statistical Ananlysis- P.S Grewal.
7. Fundamentals of Statistics – S.C. Gupta, V.K. Kapoor.
8. Intellectual Property Rights by Deborah E. Bouchoux, Cengage Learning.
9. Managing Intellectual Property – The Strategic Imperative, Vinod V.Sople, 2nd Edition, PHILearning Private Limited.
10.Research methodology – S.S. Vinod Chandra, S. Anand Hareendran

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

NATURAL LANGUAGE PROCESSING

Course Code: **L/T/P/C:3/0/0/3**
III Year II Semester

Prerequisites:
Students are expected to have knowledge in Formal Languages and Automata Theory,Compiler Design.

Course Objectives:

1. Role of natural language processing and language modelling.
2. The analysis of text at word level, syntactic level and semantic level.
3. Discourse processing of the text.
4. Knowledge in automated natural language generation and machine translation.
5. Explanation of information retrieval systems and usage of Lexical resources.

Course Outcomes:
1. Summarize the role of natural language processing in various applications and explain language modelling.
2. Apply word level analysis, syntactic analysis and semantic analysis on natural language processing.
3. Discuss discourse processing of text.
4. Illustrate the automation of natural language generation and machine translation of Indian languages.
5. Infer information retrieval systems and utilize lexical resources for processing naturallanguage text.

UNIT I
Overview: Origins and challenges of NLP, Language and Grammar, Processing Indian Languages, NLP Applications, Information Retrieval.
Language Modeling: Introduction, Various Grammar-based Language Models, Statistical Language Model.

UNIT II
Information Retrieval: Introduction, Design features of Information Retrieval Systems,Classical, Non-classical, Alternative Models of Information Retrieval, Evaluation
Lexical Resources: Introduction, WordNet, Frame Net, Stemmers, POS Tagger, Research Corpora

UNIT III

Word Level Analysis: Introduction, Regular Expressions, Finite State Automata, Morphological Parsing, Spelling Error Detection and correction, Words and Word classes, Part of Speech Tagging, TF, IDF

Syntactic Analysis: Introduction, Context-free Grammar, Constituency, Parsing, Probabilistic Parsing.

UNIT IV

Semantic Analysis: Introduction, Meaning Representation, Lexical Semantics, Ambiguity,Word Sense Disambiguation.

Discourse Processing: Introduction, Cohesion, Reference Resolution, Discourse Coherenceand Structure

UNIT V

Natural Language Generation: Introduction, Architecture of NLG Systems, GenerationTasks and Representations, Application of NLG.

Machine Translation: Introduction, Problems in Machine Translation, Characteristics of Indian Languages, Machine Translation Approaches, Translation involving Indian Languages

Text Books:

1. Tanveer Siddiqui, U.S. Tiwary, "Natural Language Processing and Information Retrieval", Oxford University Press, 2008.

References:

1. Daniel Jurafsky and James H Martin, "Speech and Language Processing: An introduction to Natural Language Processing, Computational Linguistics and Speech Recognition", Prentice Hall, 2nd Edition,2008.
2. James Allen, Bejamin/cummings, "Natural Language Understanding", 2nd edition,1995.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
MULTIMEDIA APPLICATIONS

Course Code: **L/T/P/C: 3/0/0/3**
IV Year I Semester

Course Objectives:
1. To Understand about Multimedia and Hyper media and video, audio and textapplications.
2. To Learn Multimedia Action Scripts
3. To Understand Multimedia application Development and Multimedia Data Compression techniques.
4. To learn various Video Compression Techniques.
5. To understand various network aspects used for multimedia applications.

Course Outcomes:
1. Identify and categorize various file formats like text, audio and video and image models.
2. Implement Action Script features in Multimedia applications.
3. Implement multimedia animation movies using action scripts.
4. Implement multimedia audio, video and data compression Techniques.
5. Apply various networking protocols for multimedia applications.

UNIT I
Fundamental concepts in Text and Image: Multimedia and hypermedia, World Wide Web, overview of multimedia software tools, Graphics and image data representation, graphics/image data types, file formats, **Color in image and video:** color science, color models in images, color models in video.
Fundamental concepts in video and digital audio: Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

UNIT II
Action Script I: Action Script Features, Object-Oriented Action Script, Data types and Type Checking, Classes, Authoring an Action Script Class.
Action Script II: Inheritance, Authoring an Action Script 2.0 Subclass, Interfaces, Packages, Exceptions.

UNIT III
Application Development: An OOP Application Frame work, Using Components with Action Script Movie Clip Subclasses.
Multimedia Data Compression: Lossless compression algorithm: Run-Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding, Lossless Image Compression, Lossy compression algorithm: Quantization, Transform Coding, Wavelet-

Based Coding, Embedded Zero tree of Wavelet Coefficients Set Partitioning in HierarchicalTrees (SPIHT).

UNIT IV
Basic Video Compression Techniques: Introduction to video compression, video compression based on motion compensation, search for motion vectors, MPEG, Basic Audio Compression Techniques.

UNIT V
Multimedia Networks: Basics of Multimedia Networks, Multimedia Network Communications and Applications: Quality of Multimedia Data Transmission, Multimedia over IP, Multimedia over ATM Networks, Transport of MPEG-4, Media-on-Demand - (MOD).

Text Books:
1.Fundamentals of Multimedia By ZeNian Li and mark S Drew PHI/PearsonEducation
2.Essentials Action Script 2.0,Colin Moock,SPDO,REILLY

References:
1.Digital Multimedia, Nigel Chapman and Jenny Chapman,WileyDreantech
2.Macromedia Flash MX Professional 2004Unleashed,Pearson.
3.Multimedia and Communications Technology, SteveHeath, Elevier (FocalPress)
4.Multimedia Applications, Steinmetz, Nahrstedt, Springer

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DESIGN PATTERNS

Course Code: **L/T/P/C:3/0/0/3**
IV Year I Semester

Prerequisites:
Knowledge in OOPS and UML concepts

Course Objectives:
1. Ability to learn different design patterns available, and to apply them to solve Design Problems
2. The capability to analyze how Design patterns solve many of the day-to-day problems object-oriented designers face, and in many different ways.
3. Ability to learn creative, structural and behavioral design properties to help them understand existing object oriented systems.
4. The ability to learn different structural design patterns like Adapter, Bridge, Composite, Decorator, Façade. Flyweight, and Proxy.
5. The ability to use design patterns to make the system seen less complex by talking about it at a higher level of abstraction than that of a design notation.

Course Outcomes:
1. The ability to learn different design patterns available, and to organize them and solving of Design Problems using Design Patterns, to understand and analyze how to select a Design Pattern, use them in real life examples.
2. To capability to analyze how Design patterns solve many of the day-to-day problems object-oriented designers face, and in many different ways. To understand the applications of design patterns by using a case study of designing a Document Editor.
3. The skill to learn different creational design patterns like Abstract Factory, Builder, Factory Method, Prototype, Singleton. To Learn these design patterns to help them understand existing object-oriented systems.
4. The ability to learn different structural design patterns like Adapter, Bridge, Composite, Decorator, Façade. Flyweight, and Proxy. To recognize how the Design patterns help one identify less-obvious abstractions and the objects that can capture them. For example, objects that represent a process or algorithm dont occur in nature, yet they are a crucial part of flexible designs.
5. The ability to learn different behavioral design patterns like Chain of Responsibility Command, Interpreter, Iterator, Mediator, Observer, State, Strategy, Template Method, Visitor and To understand the impact the design patterns will have, how they are related to other work in design, and how you can get involved in finding and cataloging patterns.

UNIT I
Introduction: What Is a Design Pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

UNIT II
A Case Study: Designing a Document Editor: Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation, Summary.

UNIT III
Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion ofCreational Patterns.
Structural Pattern Part-I: Adapter, Bridge, and Composite.

UNIT IV
Structural Pattern Part-II: Decorator, Façade, Flyweight, Proxy.
Behavioral Patterns Part-I: Chain of Responsibility, Command, Interpreter, and Iterator.

UNIT V
Behavioral Patterns Part-II: Mediator, Memento, Observer, State, Strategy, Template Method Visitor, Discussion of Behavioral Patterns. What to Expect from Design Patterns, A Brief History, The Pattern Community An Invitation, A Parting Thought.

TEXT BOOKS
1.   Design Patterns by Erich Gamma, Pearson Education

REFERENCES
1.   Pattern's in JAVA Vol-I by Mark Grand, Wiley Dream Tech.
2.   Pattern's in JAVA Vol-II by Mark Grand, Wiley Dream Tech.
3.   JAVA Enterprise Design Patterns Vol-III by Mark Grand, Wiley Dream Tech