JHARKAHAND UNIVERSITY OF TECHNOLOGY, RANCHI

Syllabus for B. Tech course in Computer Science & Engineering and Information Technology

Course Structure for 5th and 6th Semester CSE

Sl. No	Course Code	Category	Subject	L	T	P	Credit
1	CS501	Professional Core-I	Computer Organization and Architecture	4	1	0	4
2	CS502	Professional Core-II	Compiler Design	3	1	0	3
3	CS503	Professional Core-III	Computer Graphics	3	1	0	3

4		Professional Electives-I	List of Professional Electives-I	3	1	0	3
5		Open Elective-1	List of Open Elective-1	3	1	0	3
Laboratory/Sessional							
1	CS501P	Laboratory-I	Computer Organization and Architecture Lab.	0	0	3	1
2	CS502P	Laboratory-II	Compiler Design Lab.	0	0	3	1
3	CS503P	Laboratory-III	Computer Graphics Lab.	0	0	3	1
4		Laboratory-IV	Professional Electives-I Lab.	0	0	3	1
5		Laboratory-V	General Proficiency / Seminar	0	0	2	2
Total Credits (Theory + Sessional)							22

List of Electives 5thSemester CSE

Professional Elective-I	
Course No.	Subject Name
IT502	Web Technology

CS504	Linux Programming
CS505	System Analysis and Design
IT503	Semantics Web

Open Elective-I

Course No.	Subject Name
CS602	Data Science*
CS506	Computer Architecture*
IT401	Data Base Management Systems*
IT504	Data Communication

*These subjects are open for all the branches other than CSE and IT.

CS609	AI and Machine Learning*
CS601	Computer Network*
IT602	Internet Of Things (IOT)

*These subjects are open for all the branches other than CSE and IT.

Detailed Syllabus

This

Computer Science & Engineering and Information Technology					
Code: CS501	**Computer Organization and Architecture**	**L**	**T**	**P**	**C**
		4	**1**	**0**	**4**

course open to all branch except CSE/IT.

Course Outcomes:

1. Ability to describe the organization of computer and machine instructions and programs
2. Ability to analyze Input / Output Organization
3. Analyze the working of the memory system and basic processing unit.
4. Ability to solve problems of multi cores, multiprocessors and clusters.
5. Choose optical storage media suitable for multimedia applications.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	-	3	-	2	2	-	-	-	-	-	-	1
CO2	2	2	2	2	2	-	-	-	-	-	-	2
CO3	2	2	2	2	3	-	-	-	-	-	-	2

CO4	3	3	3	2	2	-	-	-	-	-	-	2
Average												

*3: high, 2: moderate, 1 low

MODULE-I:

Basics of Digital Electronics: Multiplexers and De multiplexers, Decoder andEncoder, Codes, Logic gates, Flip flops, Registers.

Register Transfer and Micro Operations: Bus and Memory Transfer, Logic Micro Operations, Shift Micro Operations, Register transfer and register transfer language, Design of arithmetic logic unit.

MODULE II:

Basic Computer Organization: Instruction codes, Computer instructions, Timing and Control, Instruction cycle, Memory reference Instruction, Complete computer description, Design of basic computer, Input output and interrupt.

MODULE III:

Control Unit: Hardwired controls, Micro programmed controls.

Central Processing Unit : Program control, Reduced instruction set computer, Complex instruction set computer, Data Transfer, Manipulation, General register and stack organization, Addressing mode.

MODULE IV:

Computer Arithmetic: Addition and subtraction algorithm, Multiplication algorithm, Division algorithms.

MODULE V:

Input-Output Organization: Priority interrupt, Peripheral devices, Input output interface, Data transfer schemes, Program control and interrupts, Direct memory access transfer, Input/output processor.

Memory Unit: High speed memories, Memory hierarchy, Processor Vs Memory speed, Cache memory, Associative memory, Inter leave, Virtual memory, Memory management.

MODULE VI :

Introduction to Parallel Processing: Pipelining, Characteristics of multiprocessors, Interconnection structures, Inter processor arbitration, Inter processor communication, Synchronization.

Text Books:
1. Computer System Architecture by Morris Mano, Prentice hall, 3rd Edition, (2007)

References:
1. Computer Organization by Carl Hamacher, ZvonkoVranesic, SafwatZaky, Tata Mcgraw Hill, 5th Edition, (2011)

2. Computer Architecture : A Quantitative Approach by Hennessy, J. L, David A Patterson, and Goldberg, Pearson Education, 4th Edition, (2006)

JHARKAHAND UNIVERSITY OF TECHNOLOGY, RANCHI

Syllabus for B. Tech course in Computer Science & Engineering and Information Technology

Computer Science & Engineering					
Code: CS502	**Compiler Design**	**L**	**T**	**P**	**C**
		3	1	0	4

Pre-requisites: knowledge of automata theory, context free languages, computer architecture, data structures and simple graph algorithms, logic or algebra.

MODULE-I:

Introduction to compiler and Finite automata

Compilers, Analysis of source programs, Tokens, patterns, lexemes, Phases of compilers, Parsing, Parse trees, Ambiguity, Associativity and precedence of operators, Top-down parsing, Bottom-up parsing, Left recursion, Syntax directed translation. Classification of grammars, NFA, DFA, Conversion of NFA to DFA, RE to NFA (Thompson's Construction), Optimization of NFA/DFA using FIRSTPOS, LASTPOS, FOLLOWPOS.

MODULE-II:

Context Free Grammar

RE vs. CFG, Eliminating ambiguity and left recursion, Left factoring.

MODULE-III:

Compiler Parser

Top down parsing-LL parser, LL grammars. Bottom up parsing- LR parser, SLR parser, CLR parser, LALR parser. Polishing expressions Operator precedence grammar. LR grammars. Comparison of parsing methods. Error handling.

MODULE-IV:

Run time environments

Symbol tables, Language facilities for dynamic storage allocation, Dynamic storage allocation technique, Organization for non-block and block structured languages.

MODULE-V:

Intermediate code generation

Intermediate languages, graphical representations, Synthesized and inherited attributes, Dependency graph, Syntax directed translation, S and L- attributed definitions, Polish notation, Three address, quadruples, triples, indirect triples Flow of control statement.

MODULE-VI:

Code optimization and code generation

Basic blocks and flow graphs, Optimization of basic blocks, Code optimization techniques, Issues in design of code generator, Target machine code and simple code generator.

Suggested Text Books

- Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman, Monica S. Lam, *Compilers: Principles, Techniques, and Tools.* Addison-Wesley, 2006 (optional).
- Thomas W. Parsons, *Introduction to Compiler Construction.* Computer Science Press,**1992.**

Suggested Reference books

- Compiler design in C, A.C. Holub, PHI.
- Compiler construction (Theory and Practice), A.Barret William and R.M. Bates, Galgotia Publication.
- Compiler Design, Kakde.
-

COURSE OUTCOMES

1	*Identify* the issue that arises in the design and construction of translator for programming language.
2	*Analyze* RE and CFG to specify the lexical and syntactic structure of programming language.
3	*Design* different parsers from given specification.
4	*Assess* the various program transformations.
5	*Design* a compiler for a programming language.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
1	-	3	2	2	-	-	-	-	-	1	-	-
2	-	3	-	2	-	-	-	-	-	-	-	-
3	-	-	2	2	-	-	-	-	-	2	-	-
4	-	2	-	2	-	-	-	-	-	-	-	-
5	-	-	2	1	-	-	-	-	-	1	-	-

3: high, 2: moderate, 1: low

Computer Science & Engineering				
Code: CS503	Computer Graphics	L	T	P	C

				3	0	0	3

Objectives of the course:

This course covers basics of computer graphics. Computer graphics are pictures and films created using computers. Usually, the term refers to computer-generated image data created with the help of specialized graphical hardware and software. It is a vast and recently developed area of computer science. Computer graphics is responsible for displaying art and image data effectively and meaningfully to the consumer. It is also used for processing image data received from the physical world. Computer graphics development has had a significant impact on many types of media and has revolutionized animation, movies, advertising, video games, and graphic design in general.

Course Outcomes

After completing this course, the student will be able to:

CO1	Understand the basics of computer graphics, different graphics systems and applications of computer graphics.
CO2	Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.
CO3	Use of geometric transformations on graphics objects and their application in composite form.
CO4	Extract scene with different clipping methods and its transformation to graphics display device.
CO5	Render projected objects to naturalize the scene in 2D view and use of illumination models for this

Module – I:
Introduction to computer graphics and graphics systems. Raster and vector graphics systems, video display devices, physical and logical input devices, simple color models.

Module – II:
Points & lines, Line drawing algorithms; DDA algorithm, Bresenham's line algorithm, Circle generation algorithm; scan line polygon, fill algorithm, boundary fill algorithm, flood fill algorithm.

Module – III:
2D Transformation : Basic transformations : translation, rotation, scaling ; Matrix representations & homogeneous coordinates, transformations between coordinate systems ; reflection shear ; Transformation of points, lines, parallel lines, intersecting lines.

Module – IV:

Viewing pipeline, Window to Viewport co-ordinate transformation, clipping operations, point clipping, line clipping, clipping circles, polygons & ellipse.

Module – V:

Hidden Surfaces: Depth comparison, Z-buffer algorithm, Back face detection, BSP tree method, the Printer's algorithm, scan-line algorithm; Hidden line elimination, wire frame methods, fractal - geometry. Rendering of a polygonal surface; Flat, Gouraud, and Phong shading; Texture mapping, bump texture, environment map; Introduction to ray tracing; Image synthesis, sampling techniques, and anti-aliasing.

Text Books

1. Donald Hearn and Pauline Baker Computer Graphics, Prentice Hall, New Delhi, 2012

 2. Steven Harrington, "Computer Graphics- A programming approach", McGraw 3. Hill, 2nd Edition, 1987.

Reference Book

3. Foley J.D., Van Dam A, "Fundamentals of Interactive Computer Graphics", Addison Wesley, 1990

Computer Science & Engineering				
Code: IT502	**Web Technology**	**L**	**T**	**P**	**C**
		3	0	0	3

Course Objective: The focus in this course is on the World Wide Web continues to provide a foundation for the developmentofabroadrangeofincreasinglyinfluentialandstrategictechnologies,supporting a large variety of applications and services, both in the private and public sectors. There is a growing need for management and decision makers to gain a clearer understanding of the application development process, from planning through to deployment and maintenance. In this course, you will learn about the HTTP communication protocol, the mark up languages HTML, XHTML and XML, the CSS standards for formatting and transforming web content, interactive graphics, multimedia content on the web, client-side programming using Java script; an understanding of approaches to more dynamic and mobile content; and demonstrate how you can analyze requirements, plan, design, implement and test arrange of web applications.

Course Prerequisite

- Programming for Problem solving.
- Object Oriented Programming Through Java.
- Basic concept of Networking.

Course Outcomes

After Successful completion of course, the students will be able to

CO	Description
CO 1	**Describe** various web technology and application development issues and trends.
CO 2	**Design** static and dynamic web pages using HTML, CSS and Java Script.
CO 3	**Design** and implement web services from the server and client side.
CO 4	**Build** interactive Web applications using JSP and Servlet.
CO 5	**Identify** the engineering structural design of XML and parse construction tree model.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO 1	-	3	-	-	-	-	-	-	-	2	-	-
CO 2	3	2	3	2	3	1	-	-	-	-	-	-
CO 3	-	-	3	-	2		-	-	2	-	-	-
CO 4	2	2	3	-	2	1	-	-	-	-	-	-
CO 5	2	2	-	-	-	-	-	-	-	-	-	-
Avg	2.33	2.25	3	2	2.33	1			2	2		

Note- *3: high, 2: moderate, 1 low*

Module – I

Introduction to html: Fundamentals of HTML elements, Document body, Different tags, sections, text, hyperlink, lists, tables, color and images, frames, frameset, form.

Web Pages: types and issues, tiers; comparisons of Microsoft and java technologies; WWW: Basic concept, web client and web server, HTTP protocol (frame format), universal resource locator (URL).

Module – II

Dynamic web pages: The need of dynamic web pages; an overview of DHTML, Cascading Style Sheets (CSS), comparative studies of different technologies of dynamic page creation.
Active web pages: Need of active web pages; java applet life cycle.

Module – III

JavaScript: Data types, variables, operators, conditional statements, array object, date object, string object.

Java Servlet: Servlet environment and role, HTML support, Servlet API, the Servlet Life cycle, cookies and sessions.

Module – IV

JSP: JSP architecture, JSP servers, JSP tags, understanding the layout in JSP, Declaring Variables, methods in JSP, inserting java expressions in JSP, processing request from user and generating dynamic response for the user, inserting applets and java beans into JSP, using include and forward action, comparing JSP and CGI program, comparing JSP and ASP program; Creating ODBC data source name, introduction to JDBC, prepare statement and callable statement.

Module – V

J2EE:AnoverviewofJ2EEwebservices,basicsofEnterpriseJavaBeans,EJBvs.JavaBeans,basic of RMI,JNI.

XML: Basics XML, elements and attributes, document type definition, xml parsers, sequential and tree approach

Text Books:

1. ChrisBates,"WebProgramming:BuildingInternetApplications",WileyDreamTech, 2nd Edition,2002.
2. Jeffrey C K Jackson, Web Technologies", Pearson Education, 1stEdition,2006.
3. JasonHunter,WilliamCrawford―JavaServletProgramming‖O'Reilly Publications, 2nd Edition, 2001.

References

1. W Hans Bergsten, "Java Server Pages", O"Reilly, 3rd Edition,2003.
2. D. Flanagan, "Java Script", O"Reilly, 6th Edition,2011.
3. Jon Duckett, "Beginning Web Programming", WROX, 2nd Edition,2008.
4. Herbert Schildt, "Java the Complete Reference", Hill - Osborne, 8th Edition,2011.

List of Open Source Software/learning website:

- Browsers like IE, Mozilla, Firefoxetc.
- Server softwareXAMPP/WAMP/LAMP.
- www.apachefriends.org
- www.w3.org
- www.w3schools.com
- www.php.net
- www.mysql.com
- www.phpmyadmin.net
- www.javatpoint.com

Computer Science & Engineering				
Code: CS504 **Linux Programming**	**L**	**T**	**P**	**C**
	3	**0**	**0**	**0**

Course objectives:

CO1: able to understand the basic commands of Linux operating system and can write shell scripts.

CO2: able to create file systems and directories and operate them

CO3: Students will be able to create processes background and fore ground etc. by fork() system calls

CO4: able to create shared memory segments, pipes, message queues and can exercise inter process communication

CO PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	2	2	2	-	-	-		-	-	-	-	-
CO2	2	2	2	-	-	-	-	-	-	-	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	-
CO4	3	3	3	1	-	-	-	-	-	-	-	-

Module -I: Linux Utilities:

File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities, Backup utilities;

Shell programming with Bourne Again Shell (bash): Introduction, Shell responsibilities, Pipes and redirection, here documents, Running a shell script, Shell as a programming language, Shell meta characters, File-name substitution, Shell variables, Command substitution, Shell commands, The environment, Quoting, test command, Control structures, Arithmetic in shell, Shell script examples, Interrupt processing functions, Debugging shell scripts.

Module-II: Files and Directories:

File concepts, File types File system structure, file metadata - Inodes, kernel support for files, System calls for the file I/O operations- open,create,read,wrirte,close,lseek,dup2,file status information-stat family, file and record locking-fcntl function, file permissions- chmod, fchmod, file ownership- chown, lchown, fchown, links-soft links and hard links-symlink, link, unlink.

Directories: Creating, removing and changing Directories- mkdir, rmdir, chdir, obtaining current working directory-getcwd, directory contents, scanning directories- opendir, readdir, rewin functions.

Module- III:

Process: Process concept, Layout of a C program image in main memory, Process environment – environment list, environment variables, getenv, setenv, Kernel support for process, Process identification, Process control - Process creation, replacing a process image, waiting for process, Process termination, Zombie process, Orphan process, ,system call interface for process management – fork, vfork, exit, wait, waitpid, exec family, process groups, sessions and controlling Terminal, differences between threads and processes.

Signals: Introduction to signals, Signal generation, Signal handling, Kernel support for signals, signal function, Unreliable signals, Reliable signals, Signal functions: kill, raise, alarm, pause, abort, sleep.

Module- IV:

Inter process Communication: Introduction to IPC, IPC between processes on a single computer system, IPC between processes on different systems, Pipes-creation IPC between related processes using FIFOs (Named pipes), differences between unnamed and named pipes, popen and pclose library functions.

Message Queues: Kernel support for messages, APIs for message queues, Client/Server example

Semaphores: Kernel support for semaphores, APIs for semaphores, file locking with semaphores.

Module-V:

Shared Memory: Kernel support for Shared Memory, APIs for Shared Memory, Shared Memory example.

Sockets: Introduction to Berkley Sockets, IPC over a network, client – server model, Socket address structures (Unix domain and internet domain), Socket system calls for connection oriented protocol and connectionless protocol, example-client/server programs- single server- client connection, multiple simultaneous clients, socket options- setsockopt and fcntl system calls, comparison of IPC mechanisms.

TEXT BOOKS:-

1. Unix System Programming using C++, T. Chan, PHI.
2. Unix concepts and Applications, 4th Edition, Sumitabha Das, TMH.
3. Beginning Linux Programming, 4th Edition, N.Matthew, R.Stones, Wrox, Willey India Edition.

REFERRENCE BOOKS:
1. Linux System Programming. Robert Love, O'Reilly, SPD.
2. Advanced Programming in the Unix environment, 2nd Edition, W.R.Stevens, Pearson Education.
3. Unix Network Programming, W.R.Steven, PHI.
4. UNIX for Programming and users, 3rd Edition, Graham Glass, King Ables, Pearson Edition.
5. UNIX and shell Programming, B.A.Forouzan and R.F.Koretsky, S.A.Sarawar, Pearson edition.
6. Unix The Text book, 2nd edition, S.M.Sarawar, Koretsky, S.A.Sarawar, Pearson Edition

Computer Science & Engineering					
Code: CS505	**System Analysis and Design**	**L**	**T**	**P**	**C**
		3	0	0	3

COURSE OUTCOMES:

CO 1	Identify the issue that arises in the design of systems as a whole
CO 2	Ability to understand the Software Development Life Cycle
CO 3	Students will be able to understand different types of system designing and Modelling
CO 4	Students will be able to understand Maintenance, Testing and structured Design
CO 5	Ability to understand the Security and Threats

CO-PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO 1	-	3	2	2	-	-	2	-	-	1	-	-
CO 2	-	3	-	2	-	-	-	-	-	-	-	-
CO 3	-	-	2	2	-	3	-	-	-	2	-	-
CO 4	-	2	-	2	-	-	-	-	-	-	-	-
CO 5	-	-	2	1	-	-	-	-	-	1	-	-

3: high, 2: moderate, 1: low

MODULE- I:

INTRODUCTION

System definition and concepts: Characteristics and types of system, Manual and automated systems

Real-life Business sub-systems: Production, Marketing, Personal, Material, Finance

Systems models types of models: Systems environment and boundaries, Real-time and distributed systems, Basic principles of successful systems

MODULE- II:

SYSTEMS ANALYST

Role and need of systems analyst, Qualifications and responsibilities, Systems Analyst as and agent of change,

Introduction to systems development life cycle (SDLC):

Various phases of development: Analysis, Design, Development, Implementation, Maintenance

Systems documentation considerations: Principles of systems documentation, Typesof documentation and their importance, enforcing documentation discipline in anorganization.

System Planning

Data and fact gathering techniques: Interviews, Group communication, Presentations, Sitevisits. Feasibility study and its importance, Types of feasibility reports System Selection plan and proposal Prototyping

Cost-Benefit and analysis: Tools and techniques

MODULE- III:

SYSTEMS DESIGN AND MODELING

Process modeling, Logical and physical design, Design representation, Systems flowcharts and structured charts, Data flow diagrams, Common diagramming conventions and guidelines using DFD and ER diagrams. Data Modeling and systems analysis, designing the internals: Program and Process design, Designing Distributed Systems.

Input and Output Classification of forms: Input/output forms design, User-interface design, Graphical interfaces

MODULE- IV:

MODULAR AND STRUCTURED DESIGN

Module specifications, Module coupling and cohesion, Top-down and bottom-up design

System Implementation and Maintenance

Planning considerations, Conversion methods, producers and controls, System acceptance Criteria, System evaluation and performance, Testing and validation, Systems quality Control and assurance, Maintenance activities and issues.

MODULE- V:

SYSTEM AUDIT AND SECURITY

Computer system as an expensive resource: Data and Strong media Procedures and norms for utilization of computer equipment, Audit of computer system usage,Audit trails

Types of threats to computer system and control measures: Threat to computer system and control measures, Disaster recovery and contingency planning

Object Oriented Analysis and design

Introduction to Object Oriented Analysis and design life cycle, object modeling: Class Diagrams, Dynamic modeling: state diagram, Dynamic modeling: sequence diagramming.

TEXT BOOKS: -

1. System Analysis and Design Methods, Whitten, Bentaly and Barlow, Galgotia Publication.

2. System Analysis and Design Elias M. Award, Galgotia Publication

REFERENCES

3. Modern System Analysis and Design, Jeffrey A. Hofer Joey F. George JosephS. Valacich Addison Weseley.

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Syllabus for B. Tech course in Computer Science & Engineering and Information Technology

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Computer Science & Engineering					
Code: IT503	**Semantics Web**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

COURSE OUTCOMES:

CO1	*Understand* and *explain* the overall architecture of semantic web and to illustrate the overview of design principles and technologies in semantic web.
CO2	*Design and implement* a small ontology that is semantically descriptive of your chosen problem domain, implement applications that can access, use and manipulate the ontology, represent data from a chosen problem in XML with appropriate semantic tags obtained or derived from the ontology.
CO3	*Describe* the semantic relationships among these data elements using Resource Description Framework (RDF).
CO4	*Design and implement* a web services application that ―discovers‖ the data and/or other web services via the semantic web (which includes the RDF, data elements in properly tagged XML, and the ontology), discover the capabilities and limitations of semantic web technology for different applications.

CO-PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	3	2	-	-	-	-	-	-	2	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-
CO4	-	3	3	2	-	-	-	-	-	-	2	-
Avg.	1.5	1.5	1.5	1	-	-	-	-	-	-	1	-

*3: high, 2: moderate, 1 low

DETAIL SYLLABUS:

MODULE-I:

INTRODUCTION

Introduction to the Syntactic Web and Semantic Web – Evolution of the Web – the Visual and Syntactic Web – Levels of Semantics – Metadata for Web Information – the Semantic Web Architecture and Technologies –Contrasting Semantic with Conventional Technologies– Semantic Modelling -Potential of Semantic Web Solutions and Challenges of Adoption Design Principles.

MODULE-II:

KNOWLEDGE REPRESENTATION AND ONTOLOGIES

Knowledge Representation and Reasoning - Ontologies- Taxonomies –Topic Maps – Classifying Ontologies - Terminological Aspects: Concepts, Terms, Relations Between Them – Complex Objects -Subclasses and Sub-properties definitions –Upper Ontologies – Quality – Uses - Types of Terminological Resources for Ontology Building – Methods and Methodologies for Building Ontologies – Multilingual Ontologies -Ontology Development Process and Life Cycle – Methods for Ontology Learning – Ontology Evolution – VersioningOntologies in Semantic Web.

MODULE-3:

STRUCTURING AND DESCRIBING WEB RESOURCES

Structured Web Documents - XML – Structuring – Namespaces – Addressing – Querying – Processing - RDF – RDF Data Model – Serialization Formats- RDF Vocabulary –Inferencing RDFS – basic Idea – Classes – Properties- Utility Properties – RDFS Modelling for Combinations and Patterns- Transitivity.

MODULE-4:

WEB ONTOLOGY LANGUAGE

OWL – Sub-Languages – Basic Notions -Classes- Defining and Using Properties – Domain and Range – Describing Properties - Data Types – Counting and Sets- Negative Property Assertions – Advanced Class Description – Equivalence – OWL Logic.

MODULE-5:

SEMANTIC WEB TOOLS AND APPLICATIONS

State - of- the- Art in Semantic Web Community-Development Tools for Semantic Web – Jena Framework – SPARL – Querying Semantic Web- Semantic Desktop – Semantic Wikis - Semantic Web Services – Application in Science – Business

TEXTBOOKS:

1. LiyangYu, ‖A Developer's Guide to the Semantic Web‖, Springer, First Edition, 2011.

2. John Hebeler, Matthew Fisher, Ryan Blace and Andrew Perez-opez, ―Semantic Web Programming‖, First Edition, Wiley, 2009.

3. Grigoris Antoniou, Frank van Harmelen, ―A Semantic Web Primer‖, Second Edition, MIT Press, 2008. 4. Robert M.Colomb,‖Ontology and the Semantic Web‖, Frontiers in Artificial Intelligence and Applications, IOS Press, 2007.

5. Dean Allemangand James Hendler, ‖Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL‖, Second Edition, Morgan Kaufmann, 2011.

6. Pascal Hitzler, Markus Krotzsch, Sebastian Rudolph, ―Foundations of Semantic Web Technologies, CRC Press, 2009.

REFERENCES:

1. Michael C. Daconta, Leo J.Obrst and Kevin T. Smith, ―The Semantic Web: A Guide to the Future of XML, Web Services, and Knowledge Management‖, First Edition, Wiley, 2003

2. Karin Breitman, MarcoAntonio Casanova and Walt Truszkowski, ―Semantic Web: Concepts,TechnologiesandApplications(NASAMonographsinSystemsandSoftware Engineering) Springer, 2010.

3. Vipul Kashyap, Christoph Bussler and Matthew Moran, The Semantic Web: Semantics for Data and Services on the Web(Data-Centric Systems and Applications),Springer, 2008.

Computer Science & Engineering					***This**

Code: CS506	Computer Architecture*	L	T	P	C	**course open**
		3	0	0	3	**to all** **branch**

except CSE/IT.

Course Outcomes:

1. Ability to describe the organization of computer and machine instructions and programs
2. Ability to analyze Input / Output Organization
3. Analyze the working of the memory system and basic processing unit.
4. Ability to solve problems of multicores, multiprocessors and clusters.
5. Choose optical storage media suitable for multimedia applications.

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	-	3	-	2	2	-	-	-	-	-	-	1
CO2	2	2	2	2	2	-	-	-	-	-	-	2
CO3	2	2	2	2	3	-	-	-	-	-	-	2
CO4	3	3	3	2	2	-	-	-	-	-	-	2
Average												

3: high, 2: moderate, 1 low

MODULE-I:

Basics of Digital Electronics: Multiplexers and De multiplexers, Decoder andEncoder, Codes, Logic gates, Flip flops, Registers.

Register Transfer and Micro Operations: Bus and Memory Transfer, Logic Micro Operations, Shift Micro Operations, Register transfer and register transfer language, Design of arithmetic logic unit.

MODULE-II:

Basic Computer Organization: Instruction codes, Computer instructions, Timing and Control, Instruction cycle, Memory reference Instruction, Complete computer description, Design of basic computer, Input output and interrupt.

MODULE-III:

Control Unit: Hardwired controls, Micro programmed controls.

Central Processing Unit : Program control, Reduced instruction set computer, Complex instruction set computer, Data Transfer, Manipulation, General register and stack organization, Addressing mode.

MODULE-IV:

Computer Arithmetic: Addition and subtraction algorithm, Multiplication algorithm, Division algorithms.

MODULE-V:

Input-Output Organization: Priority interrupt, Peripheral devices, Input output interface, Data transfer schemes, Program control and interrupts, Direct memory access transfer, Input/output processor.

Memory Unit: High speed memories, Memory hierarchy, Processor Vs Memory speed, Cache memory, Associative memory, Inter leave, Virtual memory, Memory management.

MODULE-VI:

Introduction to Parallel Processing: Pipelining, Characteristics of multiprocessors, Interconnection structures, Inter processor arbitration, Inter processor communication, Synchronization.

Text Books:

1. Computer System Architecture by Morris Mano, Prentice hall, 3rd Edition, (2007)

References:

1. Computer Organization by Carl Hamacher, ZvonkoVranesic, SafwatZaky, Tata Mcgraw Hill, 5th Edition, (2011)
2. Computer Architecture : A Quantitative Approach by Hennessy, J. L, David A Patterson, and Goldberg, Pearson Education, 4th Edition, (2006)

Computer Science & Engineering						**Course**
Code: IT501	**Information System**		**L**	**T**	**P**	**C**	**Outcomes**

Code: IT501	**Information System**	L	T	P	C
		3	0	0	3

Course Outcomes

CO1: Define fundamental concepts of the information system.

CO2: Relate the basic concepts and technologies used in the field of information systems.

CO3: Understand various applications of IS in business environment and management.

CO4: Able to design and develop information systems.

CO5: Apply and analyze the different security challenges and ethical measures

CO PO mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	P11	P12
CO1	2	1	-	-	-	-		-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	2	1	-	-	-	-	-	-	-	-	-	-
CO4	2	2	1	-	-	-	-	-	-	-	-	-
CO5	2	2	-	**1**	-	-	-	-	-	-	-	--

Module 1–Introduction to Information systems

Information system, Fundamental roles of IS in business, Trends in information systems, The roles of IS in business, Types of Information systems; Components of Information Systems, Information system resources, information system activities, recognizing information systems; Fundamentals of strategic advantage, Using information technology for strategic advantage.

Module 2: Information Technology

Computer hardware; Computer software: Application software and System software; Data resource management: database management, database structures, data warehouse and data mining; Telecommunication and networks: Networking the enterprise, Telecommunication network alternatives; types of telecommunication networks.

Module 3: Business Applications

Enterprise business systems, Enterprise Resource Management, Customer relationship Management, Supply Chain Management, Benefits and challenges; E-Commerce systems, Decision support system, Executive information systems, knowledge management systems, Artificial intelligence technologies in business.

Unit 4: Development Process

System analysis and design, Systems development life cycle, Starting the systems development process, systems analysis, systems design, End User development, Implementation activities, implementation challenges.

Unit 5: Management Challenges

Business/IT security, ethics and society; ethical responsibility of business professionals, Privacy issues, computer crime, tools of security management, internetworked security defenses, security measures, System controls and audits; Managing information technology, Global IT management.

Textbooks:

1. O'Brien J. A. and Marakas G. M., Introduction to Information Systems, 14th Edition, McGraw-Hill Irwin, 2008.

Reference:

1. Kenneth C. Laudon, Jane Price Laudon, "Management Information Systems: Managing the digital firm", Pearson Education, PHI, Asia.
2. "Management Information Systems – The ManagersView", Tata McGraw Hill, 2008. Davis, Gorden B. Olson, M.H,
3. Jawadekar W S, "Management Information Systems", Second Edition, 2002, Tata.
4. "Modern Systems Analysis and Design" Jeffrey A.Hoffer, Joey F.George, Joseph S. Valachich, Prentice Hall

Computer Science & Engineering					
Code: IT504	**Data Communication**	**L**	**T**	**P**	**C**
		3	0	0	3

5. Module 1: Signals and Signal Analysis: Periodic and nonperiodic signals, Composite signals, Signal analysis, Time and frequency domain representation. Introduction to Data and signal fundamentals, Analog and digital signals.

6. Module 2: Analog Transmission: Concepts of carrier signal, noise, modulating signal and modulated signal; Amplitude modulation – double sideband suppressed carrier, double sideband transmitted carrier, single sideband; Frequency modulation – Narrowband FM and wideband FM; Digital to analog conversion – Amplitude shift keying, Frequency shift keying, Phase shift keying, Quadrature amplitude modulation, Performance.

7. Module 3: Digital Transmission: Problems with digital transmission, Different line coding schemes, Block coding schemes, Scrambling techniques; Analog to digital conversion – Sampling techniques, Sampling theorem, Pulse amplitude modulation, Pulse code modulation, Differential pulse code modulation, Delta modulation (along with advantages and disadvantages of each technique), Transmission modes (serial and parallel).

8. Module 4: Multiplexing and Spreading: Concept of multiplexing, Frequency division multiplexing, Time division multiplexing – Synchronous and Statistical time division multiplexing.

9. Module 5: Introduction: Data Communications, Networks, Network Types, Internet History, Networks Models: Protocol Layering, TCP/IP Protocolsuite, The OSI model, Introduction to Physical Layer-1: Data and Signals, Digital Signals, Transmission Impairment, Data Rate limits, Performance, Digital Transmission: Digital to digital conversion (Only Line coding: Polar, Bipolar and Manchester coding).

Reference books:-

1. **"Data and Computer Communication" by William Stallings**

2. **"Data Communication and Networking" by Behrouz A Forouzan**

3. **"Computer Networks" by Andrew S Tanenbaum**

4. **"Communication Systems" by B P Lathi**

5. **"Communication Systems: Analog and Digital" by Sanjay Sharma**

Computer Science & Engineering					
Code: CS501P	Computer Organization and Architecture Lab	L	T	P	C
		0	0	3	1

List of

Experiments:

1. To design Half adder and Full adder circuit using Multi-Sim and verify the truth table.
2. To design Half sub-tractor and Full sub-tractor circuit using Multi-Sim and verify the truth table.
3. To construct and verify the operation of Parity Bit Generator and Checker.
4. To construct and verify operation of 4x1, 8x1 Multiplexer.
5. To construct and verify the operation of 3x8 Decoder and 8x3 Encoder.
6. To design 2-bit arithmetic and logic unit and verify the truth table.
7. To design 4-bit universal shift register and verify the truth table.
8. To design the 4-bit ALU and verify the truth table.
9. To generate digital clock signal using 555 Timer.
10. To design 4-bit Binary Up Counter and verify the truth table.
    a. To study Cache Memory.
    b. To study Hardwired Control Unit&Micro-programmed Control Unit.

Computer Science & Engineering					
Code: CS502P	Compiler Design Lab	L	T	P	C
		0	0	3	1

Listof Experiments

1. To Design a lexical analyzer for given language to recognize a few patterns in C (Ex. identifiers, constants, comments, operators etc.) and the lexical analyzer should ignore redundant spaces, tabs, and new lines.
2. To test whether a given identifier is valid or not.
3. To find out the FIRSTPOS and FOLLOWPOS for a given expression.
4. To implement LL (1) parser.
5. To implement Recursive Descent parser.
6. To implement a Symbol Table.
7. To identify that, for a given set of grammar, whether the string belongs to that grammar or not.

Computer Science & Engineering					
Code: CS503P	Computer Graphics Lab	L	T	P	C

		0	0	3	1

List of Experiments:

1. To implement DDA Line Drawing Algorithm.
2. To implement Bresenham's Line Drawing Algorithm.
3. To implement Mid-Point Circle Drawing Algorithm.
4. To implement Mid-Point Ellipse Drawing Algorithm.
5. To implement 2-D Transformation.
6. To implement Boundary Fill Algorithm.
7. To implement Flood Fill Algorithm.
8. To implement Cohen Sutherland Line Clipping Algorithm.
9. To implement Sutherland Hodgeman Polygon Clipping Algorithm.

List of

Computer Science & Engineering				
Code: CS504P **Linux Programming Lab**	**L**	**T**	**P**	**C**
	0	0	3	1

experiments:

1. Execute various Linux shell commands in bash shell and explore various options and arguments using man page.

2. Shell Script basics

   i. Write a *shell script* that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers
   ii. Write a *shell script* that deletes all lines containing a specified word in one or more files supplied as arguments to it
   iii. Write a *shell script* that displays a list of all files in the current directory to which the user has read, write and execute permissions.
   iv. Write a *shell script* that receives any number of file names as its arguments, checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.
   v. Write a *shell script* that receives any number of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.
   vi. Write a *shell script* to list all of the directory files in a directory.

3.
   i. Write a *C program* that makes a copy of a file using standard I/O and system calls.
   ii. Write a *C program* to emulate the Unix 'ls -l' command.

    iii.   Write client and server programs (*using C*) for interaction between server and client processes using Unix Domain sockets.

    iv.   Write a *C program* to list every file in a directory, its inode number and file name.

    v.   Implement in *C* the following Linux commands using system calls:
    (a) cat   (b) ls   (c) mv

    vi.   Write a C program to emulate the UNIX ls –l command.

    vii.   Write a C program to list for every file in a directory, its inode number and file name.

    viii.   Write a C program that demonstrates redirection of standard output to a file.

Ex: ls > f1.

4. Write a C program to create a child process and allow the parent to display "parent" and the child to display "child" on the screen.

5. Write a C program to create a Zombie process and orphan process.

6. Write a C program that illustrates how to execute two commands concurrently with a command pipe. Ex: – ls –l | sort

7. Write C programs that illustrate communication between two unrelated processes using named pipe

8. Write a C program to create a message queue with read and write permissions to write 3 messages to it with different priority numbers.

9. Write a C program to allow cooperating processes to lock a resource for exclusive use, using a) Semaphores b) flock or lockf system calls.

10. Write a C program that illustrates suspending and resuming processes using signals.

11. Write a C program that implements a producer-consumer system with two processes. (Using Semaphores).

12. Write client and server programs (using c) for interaction between server and client processes using Unix Domain sockets.

13. Write client and server programs (using c) for interaction between server and client processes using Internet Domain sockets.

14. Write a C program that illustrates two processes communicating using shared memory.

List of

Computer Science & Engineering				
Code: IT501P	**Information System Lab**	**L**	**T**	**P**	**C**
		0	**0**	**3**	**1**

Experiments:

1. Develop a student management system.

- It should contain all the information of University or a school.
- It should contain all the information of University Infrastructure or a school.
- It should contain all the information of University Students.

2. Design a marketing information system with fundamental inputs and outputs

Inputs: 1. Sales on units by each salesman for a period. 2. Estimated sales in units of competitor corresponding to above. 3. Economic conditions and trends.

Outputs: 1. Sales by product i.e. month wise and till date. 2. Sales by salesman i.e. month wise and till date. 3. Sales by trend analysis. 4. Sales forecasting

3. Given a fact table with sales data (for example sales (market#, product#, time#, amount) – see the lecture notes) and relevant dimension tables, write an SQL statement that slices the cube to select sales only in week 2, and dice it by regions.

4. To design a Personal Management Information System using XML to implement E-Commerce Marketing Strategies.

5. To identify top retail web sites and online sales volume of those websites and perform pattern analysis using data mining concepts.

6. To design an online learning database application with DBMS operations, working with tables, queries, forms, reports and data analysis.

7. To develop a transaction processing application to discover or identify similar patterns from transaction data using data mining techniques.

8. Case study 1

9. Case study 2

10. Mini Project

List of

Computer Science & Engineering				
Code: IT502P	**Web Technology Lab**	**L**	**T**	**P**	**C**
		0	**0**	**3**	**1**

Experiments

JHARKAHAND UNIVERSITY OF TECHNOLOGY, RANCHI
Syllabus for B. Tech course in Computer Science & Engineering and Information Technology

1. Design a web page using HTML which includes the following:

- To display your education details in a tabular format.
- To illustrate the usage of HTML Lists.
- To embed an image and create a link such that clicking on image takes user to other page.
- To embed an image map in a web page.
- To embed Audio and Video in a web page.

2. Design a static web page using HTML which includes the following:

- To create a frameset having header, navigation and content sections.
- To create frames such that page is divided into 3 frames 20% on left to show contents of pages, 60% in center to show body of page, remaining on right to show remarks.

3. Write an HTML program to design an Entry form of student details and send it to store at database server like SQL, Oracle or MS Access.

4. Design a web page using CSS which includes the following:

- Use different font styles.
- Set background image for both the page and single elements on page.
- Control the repetition of image with background-repeat property
- Define style for links as a:link, a:active, a:hover, a:visited
- Add customized cursors for links.
- Work with layers.

5. Write a Java applet program:

- To display moving text or content.
- To draw lines, ovals, and rectangles.
- To display a Digital Clock.
- To select a URL from my Applet and send the browser to that page.

6. Write a JavaScript program:

- To design the scientific calculator and make event for each button.
- To compute the squares and cubes of the numbers from 0 to 10 and outputs HTML text that displays the resulting values in an HTML table format.

7. Write JavaScript to validate the following fields of the above registration page:

- Name (Name should contains alphabets and the length should not be less than 6 characters).
- Password (Password should not be less than 6 characters length).

- E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com).
- Phone number (Phone number should contain 10 digits only).

8. Write a JavaBeans program to converts value of INR (Indian Rupees) into equivalent American/Canadian/Australian Dollar value.

9. Write a Java servlet programs to conduct online examination and to display student mark list available in a

Database.

10. Write an XML program:

- To display the Book information which includes the following:
- Title of the book
- Author Name
- ISBN number
- Publisher name
- Edition
- Price