



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

SCHEME OF INSTRUCTION AND SYLLABI of
B. Tech. Program

RGUKT, Basar

2016-2017

**III YEAR
I SEMESTER**

Subject Code	Course Name	L-T-P	Credits
CS3101	Artificial Intelligence	4-0-0	4
CS3102	Compiler Design	4-0-0	4
CS3103	Operating Systems	4-0-0	4
CS3104	Web Technologies	4-0-0	4
BSBE2001/3001	Environmental Science	4-0-0	3
BM3101	Personality Development	2-0-0	1
CS3701	Operating Systems Lab	0-0-3	2
CS3702	Web Technologies Lab	0-0-3	2
CS3901	Seminar-II	0-0-2	1
Total		22-0-8	25

L-Lectures, T-Tutorials, P-Practicals, C-Credits

CS3101

ARTIFICIAL INTELLIGENCE

Externals: 60Marks

Internals: 40Marks

L-T-P-C

4-0-0-4

Objectives

- To learn the distinction between optimal reasoning Vs. human like reasoning
- To understand the concepts of state space representation, exhaustive search, heuristic search together with the time and space complexities.
- To learn different knowledge representation techniques.
- To understand the applications of AI, namely game playing, theorem proving, expert systems, machine learning and natural language processing

UNIT – I

Introduction : AI problems, foundation of AI and history of AI; Intelligent agents: Agents and Environments, the concept of rationality, the nature of environments, structure of agents, problem solving agents, state space, problem formulation,

Search Techniques: Uninformed search strategies: BFS, DFS, Iterative deepening DFS, Bidirectional search.

UNIT – II

Informed search: Greedy best first search, A* search. Heuristic Functions,

Local search Algorithms and Optimization problem: Hill climbing search, Local beam search. **Game playing:** Adversarial search, Games, minimax, algorithm, optimal decisions in multiplayer games, Alpha-Beta pruning, Evaluation functions, cutting of search. Solution of constraint satisfaction problems using search.

UNIT – III

Knowledge Representation & Reasoning: logical Agents, Knowledge Based Agents, First Order Logic, propositional logic, Inference in First-order Logic, Resolution, Forward & Backward Chaining, frames.

UNIT -IV:

Planning: state-space, plan space and partial order planning, planning graphs, planning algorithms;

Uncertainty Treatment: Formal and empirical approaches including Bayesian theory, belief functions, certainty factors, and fuzzy sets.

UNIT -V:

Learning: Inductive learning, decision tree learning. Statistical Learning Methods: Statistical Learning, Learning with complete data, learning with Hidden variable, Instance based learning, Using neural network.

Case Study: Handwritten Digit Recognition, Natural Language Processing.

Suggested References::

1. Artificial Intelligence – A Modern Approach. Second Edition, Stuart Russel, Peter Norvig, PHI/
Pearson Education.
2. Pearson Education.
3. Rich, E. and Knight, K., “Artificial Intelligence”, Tata McGraw-Hill, 2006.
4. Nilsson, N. J., “Artificial Intelligence: A New Synthesis”, Morgan Kaufmann, 1998

CS3102

COMPILER DESIGN

Externals: 60Marks

Internals: 40Marks

L-T-P-C

4-0-0-4

Objectives:

- To introduce the major concept areas of language translation and compiler design.
- To enrich the knowledge in various phases of compiler and its use, code optimization techniques, machine code generation, and use of symbol table.
- To extend the knowledge of parser by parsing LL parser and LR parser.
- To provide practical programming skills necessary for constructing a compiler.

UNIT-I:

Introduction – Programs related to compilers. Analysis of source program, Phases of compiler, modules related to compiler, Grouping of phases. Lexical analysis – The role of Lexical Analyzer. Input Buffering. Specification of Tokens. Recognition of Tokens. The Lexical-Analyzer Generator Lex.

UNIT-II:

Syntax Analysis – Introduction. Top-Down parsing, Brute Forcing, Recursive Descent, Predicative LL(1), Bottom-Up parsing : Shift reduce parsing, Introduction to LR Parsing, Powerful LR parsers: SLR, CALR, LALR, Parser Generators – Yacc. Error Recovery : Introduction, Error detecting and Reporting in various Phases, Lexical Errors, Syntax Errors handling, and error Recovery in various Phases

UNIT-III:

Syntax Directed Translation – Syntax Directed Definitions. Evaluation Orders for SDDs. Applications of Syntax Directed Translation. Symbol Table Organization - Structure of Symbol table, Symbol Table organization, Data Structures of symbol Table.

UNIT-IV:

Intermediate code generation : Variants of syntax trees. Three-Address Code, Types and Declarations. Translation of Expressions. Type Checking. Control Flow. Activation record, activation tree and run time storage management.

UNIT-V:

Code Generation – Issues in the Design of a Code Generator. The Target Language. Addresses in the Target Code Basic Blocks and Flow Graphs. Optimization of Basic Blocks. Peephole Optimization. Register Allocation and Assignment. Machine Independent Optimizations – The Principal Sources of Optimizations, Introduction to data flow analysis, Foundation of data flow analysis.

Suggested References:

1. Alfred V Aho, Monica S Lam, Ravi Sethi, Jeffrey D Ullman – Compilers: Principles, Techniques & Tools, Pearson Education 2nd Edition 2007.

2. Keith D Cooper & Linda Tarezon, Engineering a Compiler, Morgan Kaufman, Second edition.
3. Kenneth C Loudon, Compiler Construction: Principles and Practice , Cengage Learning.
4. Lex&Yacc, John R Levine, O'Reilly Publishers.

CS3103

OPERATING SYSTEMS

Externals: 60Marks

Internals: 40Marks

L-T-P-C

4-0-0-4

Objectives:

- This course provides a comprehensive introduction to understand the underlying principles, techniques and approaches which constitute a coherent body of knowledge in operating systems.
- In particular, the course will consider inherent functionality and processing of program execution.
- The emphasis of the course will be placed on understanding how the various elements that underlie operating system interact and provides services for execution of application software.

UNIT-1:

Introduction to Operating systems:- OS structure and strategies, Process concept, interprocess communication, threads, multithreaded programming.

Process scheduling- scheduling criteria, scheduling algorithms, multi process scheduling, thread scheduling.

UNIT-2:

Memory Management, swapping, contiguous memory allocation, paging, static and dynamic partition, demand paging, page replacement algorithms, thrashing, segmentation with paging, virtual memory.

File System Interface:- file concept, access methods, directory structure, file system mounting, file sharing and protection.

File system structure, file system implementation, directory implementation, allocation methods, free space management, efficiency and performance, recovery

Case studies: - UNIX file system, Windows file system.

UNIT-3:

Process synchronization- critical section problem, semaphore, monitors.

Dead Locks- Necessary conditions, resource allocation graph, methods for handling deadlocks, prevention, avoidance, detection and recovery, protection, goals of protection, access matrix.

UNIT-4:

Device Management- Disk structure, Disk Attachment, Disk scheduling, Disk management, RAID structure, Stable Storage implementation

IO System- IO hardware, Application IO interface, Kernel IO subsystem, Transforming IO request to hardware operation, Streams.

UNIT-5:

Case Studies:-

Linux Systems:- Design principles, Kernel modules, process management, scheduling memory management, file systems, input and output, inter process communication, network structure, security.

Windows XP – Design principles, Architecture, Environment subsystem, file subsystem, networking, programming interface, Android OS.

Suggested Reading:

1. Abraham Siberchatz, Peter B. Galvin, Greg Gagne, Operating system concepts, Wiley India, 2006
2. Andrew S. Tanebaum, Modern Operating system, third edition, pearson education. Asia2008.
3. Dhananjay M. Dhamdhare, Operating system-concept based approach, third editon, Tata McGraw Hill, Asia 2009

CS3104

WEB TECHNOLOGIES

Externals: 60Marks

Internals: 40Marks

L-T-P-C

4-0-0-4

Objectives:

- Impart the new concepts in Web Technologies
- To develop understanding about the different technologies used in the World Wide Web

UNIT-I:

Web Essentials: Clients, Servers, and Communication. The Internet-Basic Internet Protocols - The World Wide Web-HTTP request message-response message-Web Clients Web Servers-Case Study.

Markup Languages: XHTML. An Introduction to HTML History-Versions-Basic XHTML Syntax and Semantics-Some Fundamental HTML Elements-Relative URLs-Lists-tables-Frames-Forms-XML Creating HTML Documents-Case Study

UNIT-II:

Style Sheets: CSS-Introduction to Cascading Style Sheets-Features-Core Syntax-StyleSheets and HTML Style Rule Cascading and Inheritance-Text Properties-Box Model-Normal Flow Box Layout-Beyond the Normal Flow-Other Properties-Case Study.

Client-Side Programming: The JavaScript Language-History and Versions Introduction to JavaScript in Perspective-Syntax-Variables and Data Types-Statements-Operators-Literals-Functions-Objects-Arrays-Built-in Objects-JavaScript Debuggers.

UNIT-III

Host Objects: Browsers and the DOM-Introduction to the Document Object Model DOM History and Levels-Intrinsic Event Handling-Modifying Element Style-The Document Tree-DOM Event Handling-Accommodating Noncompliant Browsers Properties of window - Case Study.

Server-Side Programming: Java Servlets- Architecture -Overview-A Servlet-Generating Dynamic Content-Life Cycle- Parameter Data-Sessions-Cookies-URL Rewriting-Other Capabilities-Data Storage Servlets and Concurrency-Case Study-Related Technologies.

UNIT-IV

Representing Web Data: XML-Documents and Vocabularies-Versions and Declaration-Namespaces JavaScript and XML: Ajax-DOM based XML processing Event-oriented Parsing: SAX-Transforming XML Documents-Selecting XML Data: XPATH-Template based Transformations: XSLT-Displaying XML Documents in Browsers-Case Study-Related Technologies.

Separating Programming and Presentation: JSP Technology-Introduction-JSP and Servlets-Running JSP Applications Basic JSP-JavaBeans Classes and JSP-Tag Libraries and Files-Support for the Model-View-Controller Paradigm-Case Study-Related Technologies.

UNIT-V

Web Services: JAX-RPC-Concepts-Writing a Java Web Service-Writing a Java WebService Client-Describing Web Services: WSDL- Representing Data Types: XML Schema-communicating Object Data: SOAP Related Technologies-Software Installation-Storing Java Objects as Files-Databases and Java Servlets.

Suggested References:

1. Jeffrey C. Jackson, "Web Technologies--A Computer Science Perspective", Pearson Education, 2006.
2. Robert. W. Sebesta, "Programming the World Wide Web", Fourth Edition, PearsonEducation, 2007 .
3. Deitel, Deitel, Goldberg, "Internet & World Wide Web How To Program", ThirdEdition, Pearson Education, 2006.
4. Marty Hall and Larry Brown,"Core Web Programming" Second Edition, Volume I andII, Pearson Education, 2001.

BSBE2001/3001

ENVIRONMENTAL SCIENCE

Externals: 60Marks

Internals: 40Marks

L-T-P-C

4-0-0-3

Objectives:

Learning Objectives:

The syllabus aims to:

- Stimulate interest in the environment and endeavors to generate awareness about environmental concerns among students.
- Develop an understanding of how natural resources and the environment affect quality of life and the quest for sustainable development.
- Develop knowledge and understanding of environmental issues and principle and apply their knowledge to mitigate the environmental problems.
- Understand and resolve some of today's most challenging scientific and policy issues—including global climate change, pollution, biodiversity conservation, sustainability, environmental pollution and toxic waste disposal, disease control, disaster management, socio-environmental issues and balancing resource use and preservation.
- Design and evaluate strategies, technologies, and methods for sustainable management of environmental systems and for the remediation or restoration of degraded environments.
- Recognizes the global changes and responses for attaining a more sustainable environment.

UNIT 1: MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Definition, scope and importance, need for public awareness.

UNIT 2: NATURAL RESOURCES:

Renewable and non-renewable resources : Natural resources and associated problems.

- a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.
- b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
- c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- d) Food resources: World food problems, changes caused by agriculture and over-grazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- e) Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources.
- f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
 - .Role of an individual in conservation of natural resources.

- Equitable use of resources for sustainable lifestyles.

UNIT 3: ECOSYSTEMS & BIODIVERSITY

Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids.

Introduction, types, characteristic features, structure and function of the following ecosystems:-

a. Forest ecosystem, b. Grassland ecosystem, c. Desert ecosystem, d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

b. Biodiversity- Definition : genetic, species and ecosystem diversity. Biogeographical classification of India Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values.

c. Biodiversity at global, National and local levels. India as a mega-diversity nation Hot-spots of biodiversity.

d. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT 4: ENVIRONMENTAL POLLUTION

Definition, Cause, effects and control measures of :- Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards

- Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution
- Pollution case studies.
- Disaster management: floods, earthquake, cyclone and landslides.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies.
- Environment Protection Act., Air (Prevention and Control of Pollution) Act. Water Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act .

UNIT 5 : SOCIAL ISSUES & THE ENVIRONMENT

Human Rights. Value Education. HIV/AIDS. Women and Child Welfare. Role of Information Technology in Environment and human health.

Field work: Visit to a local area to document environmental assets river/

forest/grassland/hill/mountain Visit to a local polluted site-Urban/Rural/Industrial/Agricultural .

Study of common plants, insects, birds. Study of simple ecosystems-pond, river, hill slopes, etc.

REFERENCES :

- a). Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- b). Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad- 380 013, India, Email:mapin@icenet.net (R)
- c). Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
- d) Clark R.S., Marine Pollution, Clarendon Press Oxford (TB)
- e). Cunningham, W.P. Cooper, T.H. Gorhan i, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 116p .

BM31001

PERSONALITY DEVELOPMENT

Externals: 60Marks

Internals: 40Marks

L-T-P-C

2-0-0-1

Guidelines: Learning approach is based on Real time case studies with class room activities

Course Objectives:

1. To develop interpersonal skills and be an effective goal oriented team player.
2. To develop professionals with idealistic, practical and moral values.
3. To develop communication and problem solving skills.
4. To re-engineer attitude and understand its influence on behavior.
5. To enhance holistic development of students and improve their employability skills.

UNIT I-SELF ANALYSIS (6 hours)

SWOT Analysis, Who am I, Personality Traits, Importance of Self Confidence, Self Esteem.

UNIT II-GOALS SETTINGS (6 hours)

Short term , Long term goal settings, SMART concept
Diversifying Risk and Optimizing Opportunities

UNIT III- TEAM DYNAMICS WITH INTERPERSONAL SKILLS (8 hours)

Team Dynamics, Team Work, Interpersonal Skills

Behavioral Skills GD, PI, Body Language Public Speaking, Verbal, Non Verbal Communications

UNIT II-CREATIVITY and Rationality (8 hours)

Out of Box thinking, Idea Generation with creativity

Brain Storming, Effective group meetings, Rationalization of ideas and way to effective implementation

.Class room and team activities coupled with group tasks depending upon time availability

CS3701

OPERATING SYSTEMS LAB

Externals: 60Marks

Internals: 40Marks

L-T-P-C

0-0-3-2

Objectives:

- Describe the general structure and purpose of an operating system
- Explain the concepts of process, address space, and file
- Compare and contrast various CPU scheduling algorithms
- Understand the differences between segmented and paged memories, and be able to describe the advantages and disadvantages of each

Experiments:

1. Study of hardware and software requirements of different operating systems (UNIX, LINUX, WINDOWS XP, WINDOWS 7/8).
2. Execute various UNIX commands
3. Write programs using the I/O system calls of UNIX operating system (open, read, write, etc). Write C programs to simulate UNIX commands like ls, grep, etc.
4. CPU Scheduling Policies.
5. FORK and JOIN construct
6. IPC – Semaphore
7. Implement some memory management schemes – I (Paging concepts)
8. Implementation of resource allocation graph (RAG) and Bankers Algorithm.
9. Implement any file allocation technique (Linked, Indexed or Contiguous)

For the detailed list of programs refer the lab manual.

Note: Any experiment according to the syllabus of CS3103 can be substituted

CS3702

WEB TECHNOLOGIES LAB

Externals: 60Marks

Internals: 40Marks

L-T-P-C

0-0-3-2

Objectives:

- Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's.
- Have a Good grounding of Web Application Terminologies, Internet Tools, E – Commerce and other web services

Experiments:

1. Will create a fully functional website(eg. online book store) using mvc architecture

For the detailed list of programs refer the lab manual.

Note: Any experiment according to the syllabus of CS3104 can be substituted

CS3901

Seminar-II

Externals: 100 marks

**L-T-P-C
0-0-2-1**

Objectives:

- To improve the presentation skills
- To prepare PPT more effectively

Student has to chose a topic related socio-economic matter to give a power point presentation.