J.B Institute of Engineering & Technology

Department of Information Technology

ACADEMIC PLANNING FOR

III B.Tech I Semester

Academic Year (2010-11)

1. **Automata & Compiler Design**
2. **Software Engineering**
3. **Linux Programming**
4. **Operating Systems**
5. **Computer Networks**
6. **Managerial Economics & Financial Analysis**
7. **Operating System & Computer Networks Lab**
8. **Advanced Eng Communication Skills Lab**

1. Automata & Compiler Design

JNTU Syllabus

Unit No:	Topic:
Unit I	Formal language and regular expression
	Finite automata-DFA,NFA
	Conversion of regular to NFA,NFA to DFA
	Finite Automata to Lexical Analysis
	Lex Tools
Unit II	Context free grammar and parsing
	Context free grammars, derivation
	Parse trees
	Ambiguity LL(K) grammars and LL(1) Parsing
Unit III	Bottom op parsing handle pruning
	LR Grammar Parsing
	LALR Parsing
	Parsing ambiguous grammars
	YACC programming specification
Unit IV	Semantics: Syntax directed translation
	S-attributed and L-attributed grammars
	Intermediate Code-abstract syntax tree
	Translation of simple statements and control flow statements
	Context sensitive features
	Chomsky hierarchy of languages and recognizers

Unit V	Type Checking ,Type conversions equivalence
	Overloading of functions and operations
	Runtime Storage organization
	Storage allocation strategies
	Scope access to now local names
	parameters
Unit VI	Language facilities for dynamic storage allocation
	Code Optimization
	Principle sources of optimization
	Optimization of basic blocks
	Peephole optimization
	Flow graphs
Unit VII	Data flow analysis of flow graphs
	Code generation:Machine dependant code generation
	Object code forms
	Generic code generation algorithms
Unit VIII	Register allocation and assignment
	Using DAG representation of Block

Guidelines to Students

Where will this subject help?

Automata and Compiler Design is used all around you every day, and you may not notice them. They define about the languages, push down automata and context free grammars and Chomsky normal forms and many more which mainly explains the students .

Books / Material

Text Books
T1: Theory Of Computation, Michael sisper. **T2:** The Compiler design, Fifth Edition, Aho Ullman,.

Suggested / Reference Books
R1: Modern Compiler Design, D.Grune and others,Wiley-india **R2:** Compiler Construction, LOUDEN, Cengage Learning. **R3:**Modern Compiler Construction in C,Andrew W.Appel.

Course Schedule

Number of Hours / lectures available in this Semester / Year	**65**

Distribution of Hours Unit – Wise

Unit	Topic	Total No. of Hours
I	Formal language and regular expression	05
	Finite automata-DFA,NFA	
	Conversion of regular to NFA,NFA to DFA	
	Finite Automata to Lexical Analysis	
	Lex Tools	
II	Context free grammar and parsing	07
	Context free grammars, derivation	
	Parse trees	
	Ambiguity LL(K) grammars and LL(1) Parsing	
III	Bottom op parsing handle pruning	05
	LR Grammar Parsing	
	LALR Parsing	
	Parsing ambiguous grammars	
	YACC programming specification	
IV	Semantics:Syntax directed translation	05
	S-attributed and L-attributed grammars	
	Intermediate Code-abstract syntax tree	
	Translation of simple statements and control flow statements	
V	Context sensitive features	10
	Chomsky hierarchy of languages and recognizers	
	Type Checking ,Type conversions equivalence	
	Overloading of functions and operations	

Topic wise Coverage:

Unit I : Formal language and regular expression:

LEARNING OBJECTIVES: Automata and compiler Design mainly deals with the languages which are formal and regular and also deals with grammar present in the machine. An compiler is a program that accepts a program in source language and converts it into a machine understandable format. The push down automata is the major one it's a five tuple set containing states, alphabets, transition function and accept states

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LECTURE PLAN:

Total no_ of classes: 05

S.No	Name of the Topic	Text/Reference book code	No. of classes required
1	Formal language and regular expression	T1	1
2	Finite automata-DFA,NFA	T1	1
3	Conversion of regular to NFA,NFA to DFA	T1	1
4	Finite Automata to Lexical Analysis	T1	1
5	Formal language and regular expression	T1	1

UNIT-II : Context free grammar and parsing

LEARNING OBJECTIVES:

Learning Objectives

- Context free grammars and its derivation
- parse trees and its information
- ambiguity of grammars
- LL(K) grammars
- LL(1) Parsing

LECTURE PLAN:

Total No_ of Classes: 07

S.No	Name of the Topic	Reference book code	No. of classes required
06	Context free grammar and parsing	T2	1
07	Context free grammars, derivation	T2	1
08	Parse trees	T2	1
09	Ambiguity LL(K) grammars and LL(1) Parsing	T2	1
10	Context free grammar and parsing in context	T2	1
11	Context free grammars, derivation	T2	1
12	Parse trees	T2	1

ASSIGNMENT-II

UNIT-III : Bottom up parsing handle pruning:

LEARNING OBJECTIVES:

LECTURE PLAN:

Total No_ of Classes: 05

S.No	Name of the Topic	Text/Reference book code	No. of classes required
13	Bottom op parsing handle pruning	T2	1
14	LR Grammar Parsing	T2	1
15	LALR Parsing	T2	1
16	Parsing ambiguous grammars	T2	1
17	YACC programming specification	T2	1

UNIT-IV : Semantics:Syntax directed translation

- **LEARNING OBJECTIVES:**

LECTURE PLAN:

Total No_ of Classes: 05

S.No	**Name of the Topic**	**Text/Reference book code**	**No. of classes required**
18	Semantics:Syntax directed translation	T2	2
19	S-attributed and L-attributed grammars	T2	1
20	Intermediate Code-abstract syntax tree	T2	1
21	Translation of simple statements and control flow statements	T2	1

UNIT-V: Context sensitive features:

- **LEARNING OBJECTIVES:**

LECTURE PLAN:

Total No_ of Classes: 10

S.No	Name of the Topic	Text/Reference book code	No. of classes required
22	Context sensitive features	T2	1
23	Chomsky hierarchy of languages and recognizers	T2	1
24	Type Checking ,Type conversions equivalence	T2	2
25	Overloading of functions and operations	T2	2
26	Context sensitive features	T2	2
27	Chomsky hierarchy of languages and recognizers in languages	T2	2

UNIT-VI: Runtime Storage organization:

- **LEARNING OBJECTIVES:**

LECTURE PLAN:

Total No_ of Classes: 09

S.No	Name of the Topic	Text/Reference book code	No. of Lecture classes required
28	Runtime Storage organization	R3	1
29	Storage allocation strategies	R3	1
30	Scope acess to now local names	R3	1
31	parameters	R3	1
32	Language facilities for dynamic storage allocation	R3	1

UNIT-VII:

- **Code Optimization:**

LECTURE PLAN: Basic Design Using a RTOS:

Total No_ of Classes: 13

S.No	Name of the Topic	Text/Reference book code	No. of classes required
37	Code Optimization	R3	1
38	Principle sources of optimization	R3	1
39	Optimization of basic blocks	R3	1
40	Peephole optimization	R3	1
41	Flow graphs	R3	1
42	Runtime Storage organization	R3	1
43	Storage allocation strategies	R3	1
44	Scope acess to now local names	R3	1
45	Code Optimization	R3	1

UNITVIII: Code generation:Machine dependant code generation

❖ LEARNING OBJECTIVES:

LECTURE PLAN:

Total No_ of Classes: 11

S.No	Name of the Topic	Text/Reference book code	No. of classes required
50	Code generation:Machine dependant code generation	T1	1
51	Object code forms	T1	2
52	Generic code generation algorithms	T1	1
53	Register allocation and assignment	T1	1
54	Using DAG representation of Block	T1	1
55	Code generation:Machine dependant code generation	T1	1
56	Object code forms	T1	1

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2. Software Engineering

JNTU Syllabus

Unit – I	Introduction to Software Engineering : The evolving role of software, Changing Nature of Software, Software myths. A Generic view of process : Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models
Unit – II	Process models : The waterfall model, Incremental process models, Evolutionary process models, The Unified process. Software Requirements : Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.
Unit – III	Requirements engineering process : Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management. System models : Context Models, Behavioral models, Data models, Object models, structured methods.
Unit – IV	Design Engineering : Design process and Design quality, Design concepts, the design model. Creating an architectural design : Software architecture, Data design, Architectural styles and

	patterns, Architectural Design.
Unit – V	Object-Oriented Design : Objects and object classes, An Object-Oriented design process, Design evolution. Performing User interface design : Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.
Unit - VI	Testing Strategies : A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging. Product metrics : Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance
Unit - VII	Metrics for Process and Products : Software Measurement, Metrics for software quality. Risk management : Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.
Unit - VIII	Quality Management : Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

Guidelines to Students

Where will this subject help?

Software engineers develop the next-generation technologies for which we've become world-renowned. In addition to revolutionizing search technology, we use our world-class programming skills to innovate in a number of other areas as well. We try to hire software engineers with a broad set of skills. Our projects include working on advanced information-retrieval algorithms, massive scalability and storage solutions, and large-scale applications that enrich the user experience. We also work extensively on networking systems, advertising systems, and complex transaction systems in consumer applications.

Books / Material

Text Books 1)Software Engineering :A practitioner's approach,Roger pressman
2)Software Engineering , I an Sommerville

Suggested / Reference Books **3)Software Engineering,A precise approach Pankaj Jalote**
4)Software Engineering ,A preimer, Waman S Jawadekar

Course Schedule

Number of Hours / lectures available in this Semester / Year	**65**

Distribution of Hours Unit – Wise

Unit	Topic	Total No. of Hours
I	Introduction to Software Engineering	11
II	Process models	08
III	Requirements Engineering Process	8
IV	Design Engineering	5
V	Modeling Component-level design	09
VI	Testing Strategies	06
VII	Metrics for Process and Products	08
VIII	Quality Management	09
	Total	65

Topic wise Coverage:

Unit I:

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LECTURE PLAN:

Total no_ of classes: 11

S.No	Name of the Topic	Reference book code	No. of classes required
1	Introduction to Software Engineering	1	2
2	The evolving nature of software,	1,	1

	changing nature of software		
3	Legacy software ,software myths	1	1
4	A generic view of software, software engineering	1	2
5	A layered technology, A process frame work.	1	1
6	The Capability Maturity Model Integration(CMMI)	1	2
7	Process patterns,process assessment,personal and team process model	1	2

ASSIGNMENT-1

1. Briefly describe the evolving role of software
2. Briefly describe CMMI

UNIT-II :

LECTURE PLAN:

Total No_ of Classes: 8

S.No	Name of the Topic	Reference book code	No. of classes required
8	Process models,The waterfall model,Incremental process model,Evolutionary process model	1	2

9	Specialized process models,The unified process	1	2
10	Software requirements:Functional and non-Functional requirements,User requirements	1	2
11	Interface specification, the software requirements document	1	2

ASSIGNMENT-II

3).Briefly describe the Incremental Process Model.

4)Briefly describe the functional and non-functional requirements.

UNIT-III

LECTURE PLAN:

Total No_ of Classes: 8

S.No	Name of the Topic	Reference book code	No. of classes required
12	Requirements Engineering Process:Feasibilty studies	2	2
13	Requirements elicitation and analysis	2	1
14	Requitrements validation	2	1
15	Requirements management	2	2

16	System models:Context models, Behavioural models	2	1
17	Data models ,Object models,structured methods	2	1

Assignment 3:

5)Briefly describe Requirement elicitation and analysis.

6)Briefly describe Behavioural models.

UNIT-IV :

LECTURE PLAN:

Total No_ of Classes: 5

S.No	Name of the Topic	Reference book code	No. of classes required
18	Design Engineering,Design process and design quality,design concepts,	2	2
19	the design model,pattern based software design,	2	1
20	Creating an architectural design:software architecture,data design,architectural styles and patterns, architectural design	2	1
21	Assessing alternative architectural designs	2	1

Assignment 4:

7)What is design process and design quality.

8)What is architectural design.

UNIT-V:

LECTURE PLAN:

Total No_ of Classes:9

S.No	Name of the Topic	Reference book code	No. of classes required
22	Modeling component–level design:Designing class based components,conducting component-level design	1	2
23	Object constraint languagedesigning conventional components	1	2
24	Performing user interface design:golden rules,user interface analysis and design	1	2
25	Interface analysis,interface design step,	1	2
26	Design evaluation	1	1

Assignment5:

9)Describe class based components.

10)Briefly describe user interface design

UNIT-VI:

LECTURE PLAN:

Total No_ of Classes: 6

S.No	Name of the Topic	Reference book code	No. of Lecture classes required
27	Testing Strategies : A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing	1	2
28	Validation testing, System testing, the art of Debugging. Product metrics : Software Quality, Metrics for Analysis Model	1	2
29	Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.	1	2

Assignment 6

11)Briefly describe testing strategies.

12)Write about software quality.

UNIT-VII:

- **LEARNING OBJECTIVES:**

LECTURE PLAN:

Total No_ of Classes: 9

S.No	Name of the Topic	Reference book code	No. of classes required
30	Metrics for Process and Products	1	1
31	Software Measurement, Metrics for software quality	1	2
32	Risk management	1	2
33	Reactive vs. Proactive Risk strategies	1	2
34	software risks, Risk identification, Risk projection, Risk refinement	1	1
35	RMMM, RMMM Plan.	1	1

Assignment 7

13)Briefly describe metrics for software quality.

14)Describe software risks.

UNITVIII:

- **LEARNING OBJECTIVES:**

LECTURE PLAN:

Total No_ of Classes: 9

S.No	Name of the Topic	Reference book code	No. of classes required
36	Quality management:Quality concepts	1	2
37	Software Quallity assurance,software reviews	1	2
38	Formal technical reviews	1	1
39	Statistical Software quality assurance	1	2
40	Software reliability,The ISO 9000 Quality standards.	1	2

Assigment 8:

15)Briefly describe software quality assurance

16)Descrbe ISO 9000 quality standards

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3. Linux Programming

JNTU Syllabus

Unit – I	Linux utilities-file handling utilities, Security by file permissions, Process utilities, Filters, Text processing utilities, Backup utilities sed-scripts, Operations addresses, commands applications, awk-execution, field and records
Unit – II	Working with the bourne again shell(bash):Introduction , Shell responsibilities, pipes, and input redirection , Output redirection, here documents, running a shell script, the shell as a pL, Shell meta data characters, file name substitution, shell variable, Command substitution shell commands , the environment, quoting ,testing command command control structures, arithmetic in shell, Arithmetic in shell, shell script examples, interrupt processing, functions, debugging shell scripts,
Unit – III	Files: file concept, file system structures,Inodes, file attributes,file attributes, file types Library functions,the standard I/O and formatted/o in c,stream errors,kernel support for files system call file descriptors low level file access-file strutcture related ,system calls,file and record locking,file and directory,management,directory file ,APi symbolic links and hard links
Unit – IV	Process, process concept, kernel support ffor process, process attributes, process control, process creation, waiting for a process, process termination,zombie process,orphan process API,signal – introduction to signal,signal gernaration and handling , kernel support for signal, signal function, unreliable signal,kill,raise,alarm,pause,about,sleep functions
Unit – V	Interprocess communication: introduction to ipc, pipes, FIFOs introduction 3 types of ipc –message queues,semaphores and shared memory. Memory queues –kernel support for message queues semaphores and shared memory

Unit - VI	Semaphores-kernel support for semaphores,unix system V ApI for semaphores ,shared memory-kernel support for shared memory,unix system V API for shared memory semaphore and shared memory example
Unit - VII	Multithreading programming : difference between threads and processes, thread structures and uses, threads and light weight process, POFIX thread API creation threads,with semaphpores, and with muteness example programs
Unit - VIII	Sockets: introduction to sockets, socket Address, socket system calls for connection orienened protocol and connection protocol example client/server programs
	.

Guidelines to Students

Where will this subject help?

1.

Books / Material

Text Books:1.unix system programming using c++,t.chan,PHI(unit III to unit VIII)
2. unix concepts and application, 4th edtion sumitabha das,TMH. **3. Begginning Linux porgraming $th edition n.mattew, r.stones, wrox, wiley india editions**

Suggested / Reference Books 1.linux system programming,Robert love,O reilly
2.sUnix network programming w.r stevens PHI

Course Schedule

Number of Hours / lectures available in this Semester / Year	**65**

Distribution of Hours Unit – Wise

Unit	Topic	Total No. of Hours
I	Linux utilities-file handling utilities, Security by file permissions, Process utilities, Filters, Text processing utilities, Backup utilities sed-scripts, Operations addresses, commands applications, awk-execution, field and records	**11**
II	Working with the bourne again shell(bash):Introduction , Shell responsibilities, pipes, and input redirection , Output redirection, here documents, running a shell script, the shell as a pL, Shell meta data characters, file name substitution, shell variable, Command substitution shell commands , the environment, quoting ,testing command command control structures, arithmetic in shell, Arithmetic in shell, shell script examples, interrupt processing, functions, debugging shell scripts,	**08**
III	Files: file concept, file system structures,Inodes, file attributes,file attributes, file types Library functions,the standard I/O and formatted/o in c,stream errors,kernel support for files system call file descriptors low level file access-file strutcture related ,system calls,file and record locking,file and directory,management,directory file ,APi symbolic links and hard links	**8**
IV	Process, process concept, kernel support ffor process, process attributes, process control, process creation, waiting for a process, process termination,zombie process,orphan process API,signal –introduction to signal,signal gernaration and handling , kernel support for	**5**

	signal, signal function, unreliable signal,kill,raise,alarm,pause,about,sleep functions	
V	Interprocess communication: introduction to ipc, pipes, FIFOs introduction 3 types of ipc – message queues,semaphores and shared memory. Memory queues –kernel support for message queues semaphores and shared memory	**09**
VI	Semaphores-kernel support for semaphores,unix system V ApI for semaphores ,shared memory-kernel support for shared memory,unix system V API for shared memory semaphore and shared memory example	**06**
VII	Multithreading programming : difference between threads and processes, thread structures and uses, threads and light weight process, POFIX thread API creation threads,with semaphpores, and with muteness example programs	**08**
VIII	Sockets: introduction to sockets, socket Address, socket system calls for connection orienened protocol and connection protocol example client/server programs	**09**
	Total	**65**

Topic wise Coverage:

Unit I: xxxxxxxxxxxxxxx
LEARNING OBJECTIVES:

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LECTURE PLAN:
Total no_ of classes: 08

S.No	Name of the Topic	Reference book code	No. of classes required
1	Linux utilities-file handling utilities	3	2
2	Security by file permissions	1,3	1

3	Process utilities	3	1
4	Disk utilities networking commands	3	2
5	Filters	3	1
6	Text processing utilities	3	2
7	Operations addresses, commands applications	3	2
	.awk-execution, field and records		

ASSIGNMENT-1
1.

UNIT-II :

LEARNING OBJECTIVES:

LECTURE PLAN:
Total No_ of Classes:

S.No	Name of the Topic	Reference book code	No. of classes required
8	Working with the bourne again shell(bash):Introduction	4	2
9	Shell responsibilities, pipes, and input redirection	4	2
10	Output redirection, here documents, running a shell script, the shell as a pL	4	2
11	Shell meta data characters, file name substitution, shell variable	4	2
	Command substitution shell commands , the environment, quoting ,testing command command control structures, arithmetic in shell		
12	Arithmetic in shell, shell script examples, interrupt processing, functions, debugging shell scripts		

	Shell script examples interrupt processing, function, debugging shell script		

ASSIGNMENT-II

UNIT-III

- **LEARNING OBJECTIVES:**

LECTURE PLAN:
Total No_ of Classes:

S.No	Name of the Topic	Reference book code	No. of classes required
14	Files: file concept, file system structures, I nodes, file attributes,file attributes, file types	1,3	2
15	Library functions,the standard I/O and formatted/o in c,stream errors,kernel support for files system call file descriptors	1,3	1
16	low level file access-file strutcture related	1,3	1
17	directory,management,directory file ,	1,3	2
18	APi symbolic links and hard links	1,3	1
		1,3	1

UNIT-IV :

- **LEARNING OBJECTIVES:**

LECTURE PLAN:
Total No_ of Classes:

S.No	**Name of the Topic**	**Reference book code**	**No. of classes required**
19	Process, process concept,	1,4	2

20	kernel support ffor process, process attributes, process control, process creation,	1,4	1
21	waiting for a process, process termination,zombie process,orphan process API,signal –introduction to signal,signal gernaration and handling ,	1,4	1
22	kernel support for signal, signal function, unreliable signal,kill,raise,alarm,pause,about,sleep functions	1,4	1

UNIT-V:

- **LEARNING OBJECTIVES:**

LECTURE PLAN:
Total No_ of Classes:

S.No	Name of the Topic	Reference book code	No. of classes required
22	Interprocess communication: introduction to ipc, pipes	4	2
23	, FIFOs introduction 3 types of ipc –message queues,semaphores and shared memory.	4	2
24	Memory queues –kernel support for message	4	2
25	queues semaphores and	1,3	2
26	shared memory	1,3	1

UNIT-VI:

- **LEARNING OBJECTIVES:**

LECTURE PLAN:
Total No_ of Classes:

S.No	Name of the Topic	Reference book code	No. of Lecture classes required
27	Semaphores-kernel support for semaphores,unix system V ApI for semaphores ,shared memory-kernel support for shared memory,unix system V API for shared memory semaphore and shared memory example	1	2
28		1	2
29		1	2

UNIT-VII:

- **LEARNING OBJECTIVES:**

LECTURE PLAN:
Total No_ of Classes:

S.No	Name of the Topic	Reference book code	No. of classes required
30	Multithreading programming :	1,3	1
31	difference between threads and processes,	1,3	2
32	thread structures and uses, threads and light weight process,	1,3	2
33	POFIX thread API creation threads,	1,3	2
34	with semaphpores, and with muteness	1	1
35	example programs	1	1

UNITVIII:

- **LEARNING OBJECTIVES:**

LECTURE PLAN:
Total No_ of Classes:

S.No	Name of the Topic	Reference book code	No. of classes required
36	Sockets: introduction to sockets,	1,4,5	2
37	socket Address,	1	2
38	socket system calls for connection orienened protocol and connection protocol example client/server programs	1	1
39	protocol and connection protocol	1,3	2
40	example client/server programs	1,3	2

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4. Operating Systems

JNTU Syllabus

Unit – I	Operating Systems over view, OS Functions, protection and security, Distributed Systems, Special purpose systems. OS structure, OS services And System calls, System programs , OS generations
Unit – II	Process management, Process concepts and threads, scheduling –criteria, algorithms their evaluation, Threads scheduling, case studies UNIX, Linux , Windows
Unit – III	Concurrency-Process synchronization, the critical section problem, semaphores, Paterson's solution, Synchronization Hardware, classic problems of Synchronization, monitors, synchronization examples, atomic transactions. case studies LINUX,UNIX,WINDOWS
Unit – IV	Memory management – swapping, contiguous memory allocations, paging, structure of the page table, segmentation, virtual memory demand paging, page replacement algorithms, Allocation of frames, thrashing. case studies UNIX, LINUX,WINDOWS
Unit – V	Principles of deadlocks- system model, deadlock characterization ,deadlock prevention ,detection and avoidance, recovery from deadlock.
Unit – VI	File system interface –the concept of file, access methods Directory structure, File system mounting, file sharing and protection, File system implementation File system structure and implementation Directory implementation allocation methods

	,free space management, efficiency and performance. Case studies UNIX ,LINUX, WINDOWS
Unit – VII	Mass storage structure – over view of mass storage structure disk structure ,disk attachment, disk scheduling swap-space management, RAID structure, stable- storage implementation, Tertiary storage structure. I/O systems-Hardware, application I/O subsystem, Transforming I/O requests to Hardware operations, STREAMS, performance.
Unit – VIII	Protection- Protection, Goals of Protection, Principles of Protection, Domain of protection Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights, Capability- Based systems, Language- Based Protection. Security- The security problem, program threats, system and network threats cryptography as a security tool, user authentication, implementing security defenses, firewalling to protect systems and networks, computer – security classifications, case studies UNIX, Linux, Windows.

Guidelines to Students

Where will this subject help?

1. Since present days no computer exists without OS students get clear idea about all topics related to OS, networking, Databases , This subject will help in every where in their carrier.

Books / Material

Text Books
1. **Operating System Concepts- Abraham Silberchatz, Peter B, Galvin, Greg Gagne, 8th edition, John Wiley.** 2. **Operating Systems- A Concept based Approach- D. M. Dhamdhere, 2nd Edition, TMH.**

Suggested / Reference Books
1. **Operating Systems- Internals and Design Principles, Stallings, sixth Edition-2009, Pearson education.** 2. **Modern Operating Systems, Andrew S Tanenbaum 2nd edition PHI.** 3. **Principles of Operating Systems, B. L. Stuart, Cengage learning, India Edition.** 4. **Operating Systems, A. S.Godbole,2nd Edition, TMH.** 5. **An Introduction to Operating Systems, P.C.P. Bhatt, PHI.** 6. **Operating Systems, G. Nutt, N. Chaki and S. Neogy.3rd Edition, Pearson Education.** 7. **Operating Systems, R. Elmasri, A. G. Carrick and D. Levine, Mc Graw Hill.** 8. **Operating Systems, S. Haldar, A. A. Aravind, Pearson Education**

Course Schedule

Number of Hours / lectures available in this Semester / Year 2011-2012	**65**

Distribution of Hours Unit – Wise

Unit	Topic	Total No. of Hours
I	Operating systems overview	08
II	Process management	07
III	Concurancy	09
IV	Memory management	08
V	Principle of Deadlock	05
VI	Filesystem interface	09
VII	Mass storage structure	08
VIII	Protection and Security	07
	Review of topic question papers	4
	Total	65

Topic wise Coverage:

Unit I: Operating Systems over view

LEARNING OBJECTIVES:

- After Explain the aim of operating system
- Learn the overview of computer system hardware
- Learn about handheld devices and real-time systems
- Learn the operating system functions
- Learn about symmetric and asymmetric multiprocessing
- Learn between client-server and peer-to-peer models of distributed systems
- Analyze essential properties of different types of operating systems
- Learn about major activities of an OS with regard to file management
- Analyze operating system protection and security factors
- Learn about models of inter process communication
- List the various memory hierarchy devices and differentiate them

LECTURE PLAN:

Total no_ of classes: 08

Lecture No.	Unit No.	Topic	Text Book and References
1.	1	Operating Systems over view	T1, R3
2.	1	OS functions,	T1, R3
3.	1	protection and security	T1, R3
4.	1	Distributed Systems,	T1, R3
5.	1	Special purpose systems.	T1, R2
6.	1	And System calls	T1, R2
7.	1	OS services, OS structure	T1, R1
8.	1	System programs , OS gener*a*tions	T2, R4

ASSIGNMENT-1

1. Define OS and explain about functions of OS briefly
2. Explain about storage structure and I/O structure
3. Explain evolution of OS
4. Explain about protection and security aspects
5. Explain about OS structure
6. Explain about system boot ? Explain about VMware architecture

UNIT-II : Process Management

LEARNING OBJECTIVES:

After studying this unit, Student should be able to :

- What common events lead to the creation of a process
- List three categories of information in a process control block
- What are the steps performed by an OS to create a new process
- Identify different process states
- Learn about short term , medium term and long term scheduling
- Learn about context and process switching
- Learn about process creation and process states in UNIX, LINUX and WINDOWS
- Distinguish between thread and process
- Learn about benefits of multithreaded programming and their models
- Learn about Pthreads
- Learn about threads in Unix, Linux and Windows
- Learn about types of CPU scheduling and their criteria for being the best with examples

LECTURE PLAN:

Total No_ of Classes: 7

9	2	Process management, Process concepts and threads,	T2, R1
10	2	scheduling –criteria,	T2, R2
11	2	algorithms their evaluation,	T2, R3
12	2	Threads scheduling,	T2, R2

13	2	case studies UNIX,	T2, R2
14	2	case studies Linux , Windows	T2, R2
		(End of Unit II) : Total Classes 7	

ASSIGNMENT-II

1 Differentiate the following i) Process switching versus Context switching
2 Discuss the attributes of a process .describe the typical elements of process control block
3 Discuss the following: a)user-level threads b)kernel-level threads c)multi-threading
a) Explain about all the states of a process with a neat diagram b) Explain about all CPU scheduling algorithms with examples
4 Explain about process creation and termination in UNIX
5 Explain about multithreading models
6 Explain about the types of schedulers
7 Explain Fair-share scheduling policy with an appropriate example. Compare its performance with any other scheduling policy.

UNIT-III : Concurrency

LEARNING OBJECTIVES:

Introduction to concept of concurrency and the implication of the execution of multiple concurrent processes

- To cite the basic requirements of mutual exclusion for concurrent processing
- Explain the various software and hardware approaches to achieve mutual exclusion
- Examine about semaphores, monitors and message passing
- Two classic problems in concurrency are used to illustrate the concepts
- Learn about concurrent atomic transactions
- Synchronization in UNIX , LINUX and WINDOWS

LECTURE PLAN: Total no_ of classes: 9

16	3	Concurrency-Process synchronization, the critical section problem,	T2, R1
17	3	semaphores, Paterson's solution, Synchronization Hardware,	T2, R2
18	3	monitors, synchronization examples,	T2, R3
19	3	classic problems of Synchronization, atomic transactions.	T2, R2
20	3	case studies UNIX	T2, R2
21	3	case studies LINUX	T2, R2
		case studies WINDOWS	

ASSIGNMENT-3

1. What are the principles of concurrency and explain the execution of the concurrentprocesswith an e.g.

2. What is a semaphore? Define the binary semaphore primitives and explain semaphore mechanism with an e.g.

3. What are the requirements for mutual exclusion? Explain in detail

4. What design and management issues are raised by the existence of concurrency? Point out how

5).a)Write the program for mutual Exclusion using semaphores Explain about infinite buffer producer/consumer problem for concurrent processing which uses binary semaphores

the issues of speed independence can be addressed

UNIT-IV : Memory management

LEARNING OBJECTIVES:

After studying this unit, student should be able to : Visualize the need to study memory management in operating systems

- List the memory management requirements
- Illustrate about loading programs into main memory
- Discuss about different memory management techniques
- Define what virtual memory is and describe it
- Examine the application of virtual memory
- Define the hardware and control structures
- Explain about OS software
- Page replacement algorithms with examples
- Memory management in UNIX , LINUX and WINDOWS environment

LECTURE PLAN:

Total No_ of Classes: 8

22	4	Memory management – swapping, contiguous memory allocations	T2, R1
23	4	paging, structure of the page table,	T2, R2
24	4	segmentation, virtual memory demand paging,	T2, R3
25	4	page replacement algorithms, Allocation of frames, thrashing.	T2, R2
26	4	case studies UNIX,	T2, R2
27	4	case studies Linux , Windows	T2, R2
		(End of Unit II) : Total Classes 7	

ASSIGNMENT-4

1.Explain with a neat sketch i) Address translation in a segmentation system
ii) Address translation in a paging system
2. i) Discuss the differences between a pure paging and demand segmentation virtual memory systems. What are the pros and cons of each scheme?
ii) What are the three main issues of implementing a virtual memory?
iii) Comment on the relative merits of using a local versus a global page replacement policy
3)State and explain the various page replacement algorithms in detail?
4.a)Differentiate between demand cleaning and pre-cleaning
b)What is the difference between resident set and a working set
c) Explain with suitable examples about page replacement algorithms
5)Write short notes on page table structure, Translation look aside buffer, Segmentation, paging.

UNIT-V: Principles of Deadlock

LEARNING OBJECTIVES:

After studying this unit, student should be able to :

- Review the principles of deadlock
- Describe methods that an operating system can use to deal with deadlock problem
- Discuss the conditions for deadlock
- Identify tool in characterizing the allocation of resources to processes i:e R.A.G.
- Analyze the Deadlock detection algorithm
- Learn the dining philosopher's problem
- Learn about I/O hardware, polling and interrupts
- Learn about DMA
- Learn about block , character and network devices Learn about STREAMS

LECTURE PLAN:

Total No_ of Classes:

28	5	Principles of deadlocks	**No. of classes required**

29	5	System model	2
30	5	Dead lock characterization	2
31	5	deadlock prevention	2
32	5	detection and avoidance	2
33	5	recovery from deadlock.	1

ASSIGNMENT-5

1.Explain with a neat sketch i) Address translation in a segmentation system
ii) Address translation in a paging system

2. i) Discuss the differences between a pure paging and demand segmentation virtual memory systems. What are the pros and cons of each scheme? ii) What are the three main issues of implementing a virtual memory? iii) Comment on the relative merits of using a local versus a global page replacement policy

1 State and explain the various page replacement algorithms in detail?

2 a)Differentiate between demand cleaning and pre-cleaning b)What is the difference between resident set and a working set c) Explain with suitable examples about page replacement algorithms

5.Write short notes on page table structure, Translation look aside buffer, Segmentation, paging.

UNIT-VI: File systems interface

34	6	Directory structure, File system mounting, file sharing and protection,	T1, R2
35	6	File system structure and implementation,	T1
36	6	Directory implementation	T1, R2
37	6	,free space management,	T1
38	6	Efficiency and performance	T1

39	6	File system implementation	T1, R2
40	6	Case study UNIX	T1, R2
41	6	Case Study Linux	T1,R2
42	6	Case study windows	T1, R2
43	6	(End of Unit VI) : Total Classes 9	

ASSIGNMENT-6

1.What is deadlock? Prove that an unsafe state is not deadlock state. Explain the necessary conditions for the deadlocks.

1. What is deadlock avoidance? Explain process initiation denial and resource allocation denial in detail with example
2. What are the principles of deadlock? And explain in detail the two categories of resources
3. a)What are the conditions that must satisfy for deadlock occurrence and explain them

b)Is the deadlocks problem preventable? Justify your answer with example and diagram

5.What is the dining philosophers problem? Device an algorithm to solve the problem using semaphores

1 Write detailed notes on : a) Interrupts b) I/O communication techniques

2 Explain about devices in I/O interface

3 a)Explain about kernel I/O subsystem b)Explain about streams

UNIT-VII: Mass storage structure

LEARNING OBJECTIVES:

After studying this unit, student should be able to :

- Learn about magnetic disk
- Learn about disk scheduling algorithms
- Learn about disk management
- Learn about swap space management in UNIX
- Learn about RAID in detail
- Know about stable storages
- Learn about tertiary storage structure

LECTURE PLAN:

Total No_ of Classes: 8

44	7	Mass storage structure – over view of mass storage structure	**No. of classes required**
45	7	Disk structure	1
46	7	disk attachment, disk scheduling swap-space management	1
47.	7	I/O systems, I/O hardware, sub systems	2
48.	7	disk attachment, disk scheduling swap	2
49.	7	I/O systems	1
50.	7	disk scheduling swap	1
51	7	RAID structure, stable- storage implementation, Tertiary storage structure.	
52	7	Transforming I/O requests to Hardware operations, STREAMS, performance.	

ASSIGNMENT-7

1.(a) Explain various disk performance parameters.
(b) Show that the use buffer can reduce the running time by at most a factor of two.
2. Suppose the head of a moving- head disk with 200 tracks, numbered 0 to 199, is currently serving a request at track 143 and has just finished a request at track 125. If the queue of requests is kept in FIFO order: 86, 147, 91, 177, 94, 150, 102, 175,
130. What is the total head movement to satisfy these requests for the following disk scheduling algorithms.
(a) FCFS (b) Random (c) PRI (d) SCAN (e) SSTF (f) C- SCAN
3. (a) Discuss about N- step- SCAN policy for disk scheduling.
(b) Explain how double buffering improves the performance than a single buffer for I/O.
(b) Differentiate between logical I/O and device I/O.

4. (a) Bitmaps are not often used for main memory allocation. They are commonly used for disk space allocation. Speculate on why this is so.
(b) Give an example of an application that could benefit from operating system support for random access to indexed files.

5. a) Explain about RAID technology

UNIT -V111: Protection and Security

LEARNING OBJECTIVES:

After studying this unit, student should be able to :

- Examine the problems of protection and design a model for implementing protection
- To understand types of threats to security
- Identify and understand the different malicious programs
- Learn about access matrix , access control and access capability
- Learn about language based protection(JAVA)
- Learn about security problems
- Learn about security threats(Trojan horse, trap door, logic bomb)
- Learn about viruses
- Learn about network threats(worms, port scanning, DoS)
- Learn about cryptography
- Learn about USER Authentication
- Learn about intrusion detection, firewalls

LECTURE PLAN:

Total No_ of Classes: 7

53	8	**Case Study-II-Linux System** - Design Principles	
54	8	Kernel modules,	T1,R1
55	8	Process Management	T1,R1
56.	8	Scheduling Memory Management	T1,R1

57.	8	File Systems, Input and Output,	T1,R1
58	8	Interposes Communication ,	T1,R1
59.	8	Network Structure , Security	T1,R1
60		(End of Unit VIII) : Total Classes 7	

ASSIGNMENT-8:

1.Write short notes on a)viruses b)Worms c) Logic bomb d)Trap door 2.a) What are the security requirements of a computer and network.

b) Explain different types of threats.c) Explain the computer system assets.

3. a) Who are the various classes of intruders. b) Discuss about intrusion techniques

4.Write short notes on a)intrusion detection b)password protection

1. How resources of a computer system is protected b)Explain user and data oriented access control
2. (a) Discuss the password file protection mechanisms.

J.B Institute of Engineering & Technology

Department of Information Technology

ACADEMIC PLANNING FOR

III B.Tech I Semester

Academic Year (2010-11)

1. **Automata & Compiler Design**
2. **Software Engineering**
3. **Linux Programming**
4. **Operating Systems**
5. **Computer Networks**
6. **Managerial Economics & Financial Analysis**
7. **Operating System & Computer Networks Lab**
8. **Advanced Eng Communication Skills Lab**

5. Computer Networks

JNTU Syllabus

Unit – I	**Introduction to networks, internet, Protocols and standards, the OSI model, Layers in OSI model, TCP/IP suite, Addressing, Analog and digital signals.**
Unit – II	Physical Layer:digital transmission, multiplexing,transmission media,circuit switched networks, Datagram networks, Virtual circuit networks, switch and Telephone network.
Unit – III	Data link Layer: Introduction, Block coding, cyclic codes, checksum, framing, flow and error control, Noiseless channels, noisy channels, HDLC, point to point rotocols.
Unit – IV	Medium Access sub Layer: Random access, controlled access, channelization,IEEE standards, Ethernet, Fast Ethrnet,Giga-Bit Ethrtnet,Wireless LANs.
Unit – V	Connecting LANs, backbone networks and virtual LANs, Wireless WANs,SONET, frame relay and ATM.
Unit - VI	Network Layer: Logical addressing, internetworking, tunneling,address mapping,ICMP,IGMP,forwarding, uni-cast routing protocols, multicast routing protocols.
Unit - VII	Tranport Layer: Process to process delivery, UDP and TCP protocols, SCTP, data traffic, congestion, congestion control,QoS, integrated services, differentiated services,QoS in switched networks.
Unit - VIII	Application Layer- Domain name space, DNS n internet, electronic mail, FTP, WWW, HTTP,SNMP, multi-media, network security.

Guidelines to Students

Where will this subject help?

In Systems Networking.

Books / Material

Text Books
1. **Data communications and networking- Behrouz. A. Forouzan, Fourth Edition TMH,2006.** 2. **Computer Networks – Andrew S Tanenbaum, Fourth Edition, Pearson Education.**

Suggested / Reference Books
1. **An Engineering Approach to Computer Networks- S.Keshav, 2nd Edition, Pearson Education.** 2. **Data communications and Computer Networks, P.C. Gupta, PHI** 3. **Computer Networking: A Top-Down Approach Featuring the Internet, James F.Kurose, K. W .Ross, 3rd Edition, Pearson Education.**

Course Schedule

Number of Hours / lectures available in this Semester / Year	**65**

Distribution of Hours Unit – Wise

Unit	Topic	Total No. of Hours
I	Introduction to networks, internet, Protocols and standards, the OSI model, Layers in OSI model, TCP/IP suite, Addressing, Analog and digital signals.	**11**
II	Physical Layer: digital transmission, multiplexing, transmission media, circuit switched networks, Datagram networks, Virtual circuit networks, switch and Telephone network.	**11**
III	Data link Layer: Introduction, Block coding, cyclic codes, checksum, framing, flow and error control, Noiseless channels, noisy channels, HDLC, point to point protocols.	**08**
IV	Medium Access sub Layer: Random access, controlled access, channelization, IEEE standards, Ethernet, Fast Ethernet, Giga-Bit Ethernet, Wireless LANs.	**05**
V	Connecting LANs, backbone networks and virtual LANs, Wireless WANs,SONET, frame relay and ATM.	**06**
VI	Network Layer: Logical addressing, internetworking, tunneling, address mapping, ICMP, IGMP, forwarding, uni-cast routing protocols, multicast routing protocols.	**06**
VII	Tranport Layer: Process to process delivery, UDP and TCP protocols, SCTP, data traffic, congestion, congestion control, QoS, integrated services, differentiated services, QoS in switched networks.	**08**
VIII	Application Layer- Domain name space, DNS n internet, electronic mail, FTP, WWW, HTTP, SNMP, multi-media, network security.	**09**
	Total	**65**

Topic wise Coverage:

Unit I: Introduction to networks

LECTURE PLAN:

Total no_ of classes: 11

S.No	Name of the Topic	Reference book code	No. of classes required
1	Introduction to networks, internet	3	2
2	Protocols and standards, The OSI model,	1,3	1
3	Layers in OSI model, TCP/IP suite	3	1
4	TCP/IP suite ,Addressing	3	2
5	Analog and Digital signals	3	1
6	Overview	3	2
7	Conclusion	3	2

UNIT-II : Physical Layer

LECTURE PLAN:

Total No_ of Classes: 11

S.No	Name of the Topic	Reference book code	No. of classes required
8	digital transmission, multiplexing, transmission media, circuit	1, 2	3
9	switched networks, Datagram networks	1, 2	3
10	Virtual circuit networks, switch and Telephone network.	1, 2	3
11	Overview and Conclusion	1, 2	2

UNIT-III : Data link Layer

LECTURE PLAN:

Total No_ of Classes: 08

S.No	Name of the Topic	Reference book code	No. of classes required
12	Data link Layer: Introduction, Block coding, cyclic codes,	1,2	2
13	checksum, framing	1,2	1
14	flow and error control, Noiseless channels,	1,2	1
15	noisy channels, HDLC, point to point rotocols.	1,2,3	2

16	Data link Layer sub Layers	1,3	1
17	Conclusion	1,3	1

UNIT-IV : Medium Access sub Layer

LECTURE PLAN:

Total No_ of Classes: 05

S.No	Name of the Topic	Reference book code	No. of classes required
18	Medium Access sub Layer: Random access, controlled access, channelization.	1,2,3	2
19	IEEE standards,	1,3	1
20	Ethernet, Fast Ethrnet	1,2	1
21	Giga-Bit Ethrtnet,Wireless LANs	1,3	1

UNIT-V: Connecting LANs.

LECTURE PLAN:

Total No_ of Classes: 06

S.No	Name of the Topic	Reference book code	No. of classes required
22	Connecting LANs, backbone networks and virtual LANs.	1,2	2
23	Backbone networks and virtual LANs.	1,2,3	2
24	Wireless WANs, SONET	1,2	2

25	frame relay and ATM	1,3	2
26	Over view and Conclusion	1,3	1

UNIT-VI: Network Layer

LECTURE PLAN:

Total No_ of Classes: 06

S.No	Name of the Topic	Reference book code	No. of Lecture classes required
27	Network Layer: Logical addressing, internetworking.	1	2
28	Tunneling, address mapping, ICMP, IGMP, forwarding.	1	2
29	uni-cast routing protocols, multicast routing protocols.	1	2

UNIT-VII: Transport Layer

LECTURE PLAN:

Total No_ of Classes: 08

S.No	Name of the Topic	Reference book code	No. of classes required
30	Transport Layer: Process to process delivery.	1,3	1
31	UDP and TCP protocols.	1,3	2
32	SCTP, data traffic, congestion, congestion control, QoS.,	1,3	2

33	Integrated services.	1,3	2
34	Differentiated services.	1	1
35	QoS in switched networks	1	1

UNITVIII: Application Layer

LECTURE PLAN:

Total No_ of Classes: 09

S.No	Name of the Topic	Reference book code	No. of classes required
36	Application Layer- Domain name space, HTTP,SNMP,	1,2,3	2
37	DNS n internet, electronic mail	1	2
38	FTP, WWW.	1	1
39	Multimedia, network security.	1,2	2
40		1,2	2