

# Rajarshi Shahu Mahavidyalaya, Latur (Autonomous)

## Department of Computer Science

### Curriculum Structure (2018-19)

B. Sc. II (Computer Science) Semester IV	Course Code	Core Course	Title of the course with paper number	Hours/Week	Marks (50)		Credits
					Internal	End Semester	
	U-COS-343	CCCOS-3 Section -A	Paper-III Computer Networks	03	20	30	02
	U-COS-344	CCCOS-3 Section -B	Paper-II Operating System	03	20	30	02
	U-COS-345	CCCOSP-3	Laboratory Course -III (Computer Networks)	03	20	30	01
	U-COS-346	CCCOSP-4	Laboratory Course -IV (Linux O. S.)	03	20	30	01
		SECCOS-1	Office Automation Tools	03	25	25	2
			<b>Total Credits</b>				<b>06+02</b>

**Student Stay Hours: 15/Week**

B. Sc. II (Computer Science) Semester IV	Course Code	Core Course	Title of the course with paper number	Hours/Week	Marks (50)		Credits
					Internal	End Semester	
	U-COS-443	CCCOS-4 Section -A	Paper-VII Java Programming	03	20	30	02
	U-COS-444	CCCOS-4 Section -B	Paper-VIII Digital Electronics and Microprocessor 8086	03	20	30	02
	U-COS-445	CCCOSP-5	Laboratory Course-V (Java Programming)	03	20	30	01
	U-COS-446	CCCOSP-6	Laboratory Course-VI (DE and Microprocessor)	03	20	30	01
		SECCOS-2	HTML Programming	03	25	25	2
			<b>Total Credits</b>				<b>06+02</b>

**Student Stay Hours: 15/Week**

## B. Sc. – II [Computer Science] Semester III

### Course: Computer Network

Course Code: U-COS-343

Total Marks:50

Lectures: 45

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#### Learning Objectives:

- Build an understanding of the fundamental concepts of computer networking.
- Familiarize the student with the basic categorization and terminology of the computer networking area.
- Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.

#### Course Outcomes:

After completing this course the student must demonstrate the knowledge and ability to:

- Independently understand basic computer network technology.
- Understand and explain Data Communications System and its components.
- Identify the different types of network topologies and protocols.
- Identify the different types of network devices and their functions within a network
- Understand and building the skills of sub netting and routing mechanisms.

#### **UNIT I: Overview networking terminology** [10]

- 1.1. Network types- Transmission Media
- 1.2. Control Schemes Layered Architecture OSI Reference Model
- 1.3. TCP/IP Reference Model

#### **UNIT II: Telephone Networks Leased Lines PSTN ISDN Broadband** [12]

- 2.1. Encapsulation
- 2.2 End-to-end argument.
- 2.3 Protocol design issues.
- 2.4 Naming and Internet addressing, subnets.
- 2.5 DNS
- 2.6. Direct Link Networks, encodings, modulation.
- 2.7 Error detection and correction, CRC, Internet Checksum
- 2.8 CSMA/CD, Ethernet, Addressing

#### **UNIT III: Bridges, Spanning Tree, Flooding/Multicasting** [13]

- 3.1. Switching vs. routing,
- 3.2 switching architectures
- 3.3. ARP, IP
- 3.4 The best effort service model, IP header structure.
- 3.5 Transport introduction, Port numbers, service models,
- 3.6 UDP Intro to reliability

## **UNIT IV: Introduction to TCP**

[10]

- 4.1. Flow control vs. congestion control
- 4.2 Congestion collapse
- 4.3 Window-based and rate-based congestion control
- 4.4 Wireless TCP DNS
- 4.5 Electronic Mail
- 4.6 FTP TFTP SNMP etc.

### **References/Books:**

1. Computer Networks (Andrew S Tanenbaum)
2. Data and Computer Communications (William Stallings)

# B. Sc. – II [Computer Science] Semester III

## Course: Operating System

### Course Code: U-COS-343

Total Marks:50

Lectures: 45

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#### Learning Objectives:

- To learn the fundamentals of Operating Systems.
- To learn the mechanisms of OS to handle processes and threads and their communication
- To learn the mechanisms involved in memory management in contemporary OS
- To know the components and management aspects of concurrency management
- To learn programmatically to implement simple OS mechanisms

#### Course Outcomes:

After completion of course students able to

- Analyze the structure of OS and basic architectural components involved in OS design
- Analyze and design the applications to run in parallel either using process or thread

Models of different OS

- Understand the Mutual exclusion, Deadlock detection
- Conceptualize the components involved in designing OS

#### Unit-I Introduction and Operating System Organization

[12]

Introduction: System Software, Resource Abstraction, OS strategies.

Types of operating systems - Multiprogramming, Batch, Time Sharing, Single user and Multiuser, Process Control & Real Time Systems.

Operating System Organization: Factors in operating system design, basic OS functions, implementation consideration; process modes, methods of requesting system services – system calls and system programs.

#### Unit II Process Management

[10]

System view of the process and resources, initiating the OS, process address space, process abstraction, resource abstraction, process hierarchy, Thread model (15L) Scheduling: Scheduling Mechanisms, Strategy selection, non-pre-emptive and pre-emptive strategies.

#### Unit III Memory Management

[13]

Mapping address space to memory space, memory allocation, strategies, fixed partition, variable partition, Paging, virtual memory, Demand Paged, Segment Memory Management

#### Unit IV Shell introduction and Shell Scripting

[10]

What is shell and various type of shell, Various editors present in Linux

Different modes of operation in vi editor

What is shell script, Writing and executing the shell script

Shell variable (user defined and system variables)

System calls, Using system calls

Pipes and Filters

Decision making in Shell Scripts (If else, switch), Loops in shell

Functions

Utility programs (cut, paste, join, tr, uniq utilities)

Pattern matching utility (grep)

**Books Recommended:**

1. A Silberschatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, 8<sup>th</sup> Edition, John Wiley Publications 2008.
2. A.S. Tanenbaum, Modern Operating Systems, 3<sup>rd</sup> Edition, Pearson Education 2007.
3. G. Nutt, Operating Systems: A Modern Perspective, 2<sup>nd</sup> Edition Pearson Education 1997.
4. W. Stallings, Operating Systems, Internals & Design Principles, 5<sup>th</sup> Edition, Prentice Hall of India. 2008.
5. M. Milenkovic, Operating Systems- Concepts and design, Tata McGraw Hill 1992.

## **B. Sc. – II [Computer Science] Semester III**

### **Course: Lab-Course III**

### **(Computer Networks)**

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#### **Learning Objectives:**

- Build an understanding of the fundamental concepts of computer networking.
- Familiarize the student with the basic categorization and terminology of the computer networking area.
- Understanding the procedure to create and manage LANs.

#### **Course Outcomes:**

- After completing this course the student must demonstrate the knowledge and ability to:
- Independently understand basic computer network technology.
- Create and Manage Local Area Networks
- Identify the different types of network topologies and protocols.
- Identify the different types of network devices and their functions within a network
- Understand and building the skills of sub netting and routing mechanisms.

#### **Practical List**

1. Study of different types of Network cables.
2. Practically implement the cross-wired cable and straight through cable using clamping tool.
3. Study of Network Devices in Detail.
4. Test TCP/IP Setup and create user accounts and user group.
5. Study of network IP.
6. Connect the computers in Local Area Network.
7. Study of basic network command and Network configuration commands.
8. Configure a Network topology using packet tracer software.
9. Configure a Network using Distance Vector Routing protocol.

## B. Sc. – II [Computer Science] Semester III

### Course: Lab-Course IV

#### (Linux O.S.)

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#### Learning Objectives

Skills and knowledge students will gain in this course:

- Install Red Hat based Linux distributions;
- Maintain operating system updates;
- Understanding of each of the following:
- Basics of Linux security;
- Major issues involved in Open Source licensing;
- Basics of Linux scripting and be able to write a simple script;

#### Course Outcomes

- After successfully completing this course, students should be able to –
- Comfortably use basic Linux commands from the command line (from a terminal window);
- Organize and manage their files within the Linux file system;
- Be knowledgeable enough about basic Linux shell scripting to be able to successfully read and write shell scripts;

#### Practical List:

1. Usage of following commands: ls, pwd, tty, cat, who, who am I, rm, mkdir, rmdir, touch, cd.
2. Usage of following commands: cal, cat(append), cat(concatenate), mv, cp, man, date.
3. Usage of following commands: chmod, grep, tput (clear, highlight), bc.
4. Write a shell script to check if the number entered at the command line is prime or not.
5. Write a shell script to modify “cal” command to display calendars of the specified months.
6. Write a shell script to modify “cal” command to display calendars of the specified range of months.
7. Write a shell script to accept a login name. If not a valid login name display message – “Entered login name is invalid”.
8. Write a shell script to display date in the mm/dd/yy format.
9. Write a shell script to display on the screen sorted output of “who” command along with the total number of users .
10. Write a shell script to display the multiplication table any number,
11. Write a shell script to compare two files and if found equal asks the user to delete the duplicate file.

12. Write a shell script to find the sum of digits of a given number.
13. Write a shell script to merge the contents of three files, sort the contents and then display them page by page.
14. Write a shell script to find the LCD(least common divisor) of two numbers.
15. Write a shell script to find the factorial of a given number.