

Manipal School of Information Sciences (MSIS)
Manipal Academy of Higher Education, Manipal
Master of Engineering - ME (Cyber Security)

Course File

Course Name : Linux OS and Scripting
Course Code : CYS 5103
Academic Year : 2024 – 25
Semester : I
Name of the Course Instructor : Mrs. Keerthana B
Name of the Program Coordinator : Mrs. Keerthana B



**Signature of Programme coordinator with
date**



**Signature of Course Coordinator with
date**

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Program Education Objectives (PEOs)

The overall objectives of the Learning Outcomes-based Curriculum Framework (LOCF) for **ME (Cyber Security)** program are as follows.

PEO No.	Education Objective
PEO 1	To prepare students with the technical knowledge and skills needed to protect and defend computer systems, mobile devices, and networks.
PEO 2	To develop students' skills who can plan, implement, and monitor cyber security mechanisms to help ensure the protection of information technology assets.
PEO 3	To develop students who can identify, analyze, and remediate IT security breaches within the limits of cyber laws and ethical practices.
PEO 4	Possess analytical, communicative and leadership skills, and demonstrate the ability to work in multidisciplinary and multi-cultural environments.
PEO 5	Be Self-motivated and remain continuously employable by engaging in lifelong learning.

Program Outcomes (POs)

By the end of the postgraduate program in Cyber Security, graduates will be able to:

PO1	Independently carry out research investigation and development work to solve practical problems
PO2	An ability to write and present a substantial technical report/document
PO3	Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.
PO4	Ability to Identify, Analyze and evaluate the cybersecurity needs of an organization.
PO5	Develop knowledge in Cybersecurity to Monitor, Prevent, Predict and Detect and counter measure cyberattacks using tools and techniques using appropriate Security tools.

1. Course Plan

1.1 Primary Information

Course Name	:	Linux OS and Scripting
L-T-P-C		3-0-0-3
Contact Hours	:	36 Hours
Pre-requisite	:	Basic Programming skills

1.2 Course Outcomes (COs), Program outcomes (POs) and Bloom's Taxonomy Mapping

CO	At the end of this course, the student should be able to:	No. of Contact Hours	Program Outcomes (PO's)	BL
CO1	Apply critical thinking skills to identify and troubleshoot security issues related to operating systems, processes, and file handling.	6	PO1	3
CO2	Create and analyze scripts that automate common file editing and data analysis tasks, demonstrating an understanding of how to integrate these commands effectively.	14	PO3	3
CO3	Automate the task using scripting languages	12	PO4	3

1.3 Assessment Plan

Components	Internal Test 1	Flexible Assessments (2 – 3 in number)	End semester/Makeup examination
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Duration	90 minutes	To be decided by the faculty.	180 minutes
Weightage	0.2	0.1	0.5
Typology of questions	Applying; Analysing.	Applying; Analysing.	Applying; Analysing.
Pattern	Answer all 5 questions of 10 marks each. Each question may have 2 to 3 parts of 3/4/5/6/7 marks.	Assignment: (Solve problems by designing the data structure and functionalities for a given set of problems)	Answer all 10 full questions of 10 marks each. Each question may have 2 to 3 parts of 3/4/5/6/7 marks.
Schedule	As per academic calendar.	Assignment submission: November 2024	As per academic calendar.
Topics covered	File Management, Shell Scripting		Comprehensive examination covering the full syllabus. Students are expected to answer all questions.

1.4 Lesson Plan

L. No.	TOPICS	Course Outcome Addressed
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L0	Course delivery plan, Course assessment plan, Course outcomes, Program outcomes, CO-PO mapping, reference books	---
L1	Operating System, Kernel, Shell	CO1
L2	Components, Functions and Features	CO1
L3	Types of OS – Windows Vs LINUX	CO1
L4	Linux Kernel – kernel Types	CO2
L5	Old Booting Process – UEFI Vs BIOS – GRUB	CO1
L6	Virtualization – Types of Virtualizations	CO1
L7	File Systems	CO2
L8	Linux Commands -Getting help	CO2
L9	Linux Commands- File management	CO2
L10	Linux Commands- User Creation	CO2
L11	Linux Commands- Networking commands	CO3
L12	Linux Commands – Power utilities	CO3
L13	Linux Commands – globbing	CO3
L14	Scripting – constructs	CO2
L15	Scripting – conditional	CO2
L16	Scripting – looping	CO2
L17	Scripting – pipe redirection	
L18	Scripting – grep	
L17	Scripting – grep	CO3

L20	Scripting – sed	CO3
L21	Scripting – sed	CO2
L22	Scripting – awk	CO2
L23	Scripting – awk	CO2
L24	Process Management	CO2
L25	IPC(Shared Memory, Pipes, Message Queues)	CO2
L26	Process – Process Control Block – Process Table –	CO2
L27	Process Application Memory	CO4
L28	Process Scheduling –Scheduling Algorithms(– FCFS, SJF, PS, RR) –	CO4
L29	process Synchronization	CO4
L30	Deadlocks	CO4
IT2		CO2, CO3, CO4
L31	Scripting – use case	CO4
L32	Scripting – use case	CO4
L33	Python automation	CO4
L34	Python automation	CO4
L35	Python automation	-
L36	Python automation	-

1.5 References

1. Linux Basics for Hackers: Getting Started with Networking, Scripting, and Security in Kali, OccupyTheWeb, No Starch Press, 2018.
2. Operating System principles, Abraham Silberschatz, Peter Galvvin, Grag Gagne, Seventh Edition John Wiley Publications, 2005
3. Advanced Bash Scripting Guide, Mendel Cooper, 2014.

1.6 Other Resources (Online, Text, Multimedia, etc.)

1. Web Resources: (<https://tldp.org/LDP/abs/html/>), Blog, Online tools and cloud resources.
2. Journal Articles.

1.7 Course Timetable

1 st Semester Data Structures and algorithms				Room: LG1 LH 12				
	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5
MON								
TUE		LOS						
WED								
THU		LOS						
FRI								
SAT			LOS					

1.8 Assessment Plan

COs		Marks& Weightage				
CO No.	CO Name	IT-1 (Max. 50)	IT-2 (Max. 50)	Assignment (Max. 10)	End Semester (Max. 100)	CO wise Weightage
CO1	Apply critical thinking skills to identify and troubleshoot security issues related to operating systems, processes, and file handling.	-	30	-	20	0.22
CO2	Create and analyze scripts that automate common file editing and data analysis tasks, demonstrating an understanding of how to integrate these commands effectively.	14	10	5	40	0.35

CO3	Automate the task using scripting languages	36	10	5	30	0.38
	Marks (weightage)	0.2	0.2	0.1	0.5	1.0

Note:

- In-semester Assessment is considered as the Internal Assessment (IA) in this course for 50 marks, which includes the performances in class participation, assignment work, class tests, mid-term tests, quizzes etc.
- End-semester examination (ESE) for this course is conducted for a maximum of 100 and the same will be scaled down to 50.
- End-semester marks for a maximum of 50 and IA marks for a maximum of 50 are added for a maximum of 100 marks to decide upon the grade in this course.

$$\begin{aligned}\text{Weightage for CO1} &= (\text{IT1 marks for CO1} / 2.5 + \text{IT2 marks for CO1} / 2.5 + \text{Assignment marks for CO1} + \text{ESE marks for CO1} / 2) / 100 \\ &= (0 + 30/2.5 + 0 + 20/ 2) / 100 = 0.22\end{aligned}$$

1.9 Assessment Details

The assessment tools to be used for the Current Academic Year (CAY) are as follows:

Sl. No.	Tools (TLP)	Weightage	Frequency	Details of Measurement (Weightage/Rubrics/Duration, etc.)
1	Sessional	0.3	1	<ul style="list-style-type: none">• Performance is measured using sessional attainment level.• Reference: question paper and answer scheme.• Each sessional is assessed for a maximum of 20 marks.
2	Assignments	0.2	1	<ul style="list-style-type: none">• Performance is measured using assignments/quiz attainment level.• Assignments are evaluated for a maximum of 10 marks.
3	ESE	0.5	1	<ul style="list-style-type: none">• Performance is measured using ESE attainment level.• Reference: question paper and answer scheme.• ESE is assessed for a maximum of 100 marks and scaled down to 50 marks.

1.10 Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5
CO1			*	*	
CO2			*	*	
CO3				*	*
Average Articulation Level	*		*	*	*