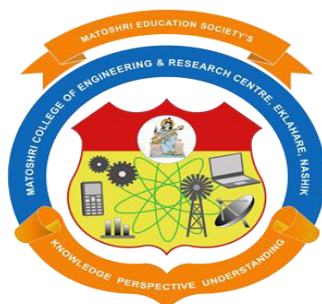


Curriculum For Master of Computer Application (MCA) (Pattern2024)

With Effect from A.Y. 2024-25



**Matoshri Education Society's
Matoshri College of Engineering and Research
Centre, Eklahare, Nashik
(Autonomous)**

**NBA and NAAC Accredited, Approved by All India Council for Technical Education, New Delhi,
Affiliated to Savitribai Phule Pune University, College Code: 5177
Website: <https://engg.matoshri.edu.in> Phone: +91 0253 2406600, 18002336602**

**Eklahare, Near Odhagaon, Off Nashik-Aurangabad Highway, Nashik,
Maharashtra 422105**

Curriculum for Post Graduate Programmes- MCA (Pattern 2024)

Matoshri College of Engineering and Research Centre, Eklahare, Nashik has been granted the academic autonomous status from academic year 2024-25 by University Grant Commission. The Academic autonomous status has been considered as an opportunity for imparting comprehensive education. The academic autonomous status can be utilized to implement the National Education Policy (NEP 2020) effectively. The institute has a prudent plan to incorporate necessary dynamism in academic structure to march towards the vision of the institute and develop the research and skill oriented human resources contributing to the development of the nation.

With a focus on staying at the forefront of educational innovation, the institution diligently prepares curricula that are both dynamic and industry-aligned. This process entails meticulous planning and collaboration to ensure the development of comprehensive programs catering to the evolving needs of students and industries alike.

The highlights of Master of Computer Application (MCA) curriculum:

- Every Post Graduate programme is of two years duration with four semesters.
- The curricula have been designed adhering to the NEP guidelines and norms.
- Efforts have been taken to design the curricula which are unambiguous and self explanatory.
- Students have to earn 84 credits for the award of MCA degree

Credit Requirement and Eligibility for the PG Programme

Eligibility first year PG admissions will be as per guidelines provided by Admission Regulating Authority of Government of Maharashtra and guidelines of NEP2020.

Examination and Passing

Rules of Passing

- To pass the course, the student has to earn a minimum of 40 percent marks in End Semester exam and 40 percent average marks (In-Semester marks + End-Semester marks) in the exam head.
- Students can earn the credit of the course if he/she passes the course with appropriate grade.
- The student is declared as PASS in the corresponding year if he/she earns the credits of all the courses of the year.
- A student will be awarded the master's degree if he/she earns 84 credits.

Rules of A.T.K.T.

The students who is not detained to appear in examination either in first semester or second semester of First year and, has filled the form of examination is eligible to take admission in second year of PG course.

Exit Point

For those who join 2 year PG programmes, there shall only be one exit point. Students who exit at the end of 1st year shall be awarded a Postgraduate Diploma.

This document includes-

- [Credit Distribution Across Semesters and Course Code Nomenclature](#)
- [Examination Heads and Assessment Schemes](#)
- [Various Courses' Categories, Description and Abbreviation](#)
- [Program Outcomes](#)
- [Four Semesters Course Structures](#)
- [Broad Courses' Categories, and Credit Distribution](#)
- [Curriculum for semester I](#)
- Curriculum for semester II
- Curriculum for semester III
- Curriculum for semester IV

Matoshri College of Engineering and Research Centre (Autonomous)
Curriculum for
Master of Computer Application (MCA) 2024-25

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	24P1505-B: Cyber Security	23
	24P1505-C: Operation Research	25
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	24P1512-B: Cloud Computing	
	24P1512-C: Business Intelligence and Analytics	
	24P1512-D: UI/UX Design	
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	24P1517: Blockchain Technology	
	24P1518: Program Elective Course -3	
	24P1519: Programming Lab 3	
	24P1520: Digital Marketing	
	24P1521: Dissertation Stage-I	
	24P1518-A: Industry 4.0 And Industrial Internet Of Things	
	24P1518-B: Natural Language Processing	
	24P1518-C: Full Stack Java Development	
24P1518-D: Deep Learning		
4.	Semester IV	
	24P1522: Internship\$	
	24P1523: MOOC Course on Advanced Java	
	24P1524: Dissertation Stage-II	

Table 1: Total Credit and Total Marks for Master of Computer Application (MCA)		
Semester	Total Credits	Total Marks
I	22	650
II	22	650
III	20	600
IV	20	600
Total	84	2500

Table 2: Nomenclature for Course Codes							
<p>Format for Course Codes- YY - Year of Course launch U/P- U : Undergraduate P- Postgraduate NN- Branch Code MM- Course Number</p>							
		<table border="1"> <tr> <td>YY</td> <td>U/P</td> <td>NN</td> <td>MM</td> </tr> </table>	YY	U/P	NN	MM	
YY	U/P	NN	MM				
NN	Post Graduate Programme	NN	Post Graduate Programme				
10	M.Tech. Geotechnical Engineering	13	M.Tech. Electrical Power Systems				
11	M.Tech. Data Science	14	M.Tech. Heat Power Engineering				
12	M.Tech. VLSI and Embedded System	15	Master of Computer Applications (MCA)				



Table 3: Examination Heads and Assessment Schemes

Exam Head	Abbreviation	In Semester Exam (40% of Total Marks)		End Semester Exam (60% of Total Marks)
		In_Sem_Exam_1 (20%)	In_Sem_Exam_2 (20%)	
Theory	TH	CAT/CCE based on 20% curriculum	CAT/CCE based on 20% curriculum	Theory examination based on 60% curriculum
Project	PROJ	Progress Review I with Demonstration, Presentation, Oral & Report	Progress Review II with Demonstration, Presentation, Oral & Report	Activity, Presentation, Demonstration, Oral & Report as applicable
Internship	INT	Progress Review I with Activity, Presentation, Demonstration, Oral & Report as applicable	Progress Review II with Activity, Presentation, Demonstration, Oral & Report as applicable	Activity, Presentation, Demonstration, Oral & Report as applicable
Practical	PR	Mid-semester exam based on experiment/ activity performance, demonstration, Presentation, Oral and Journal, Report as applicable		Experiment, activity performance, demonstration, Presentation, Oral & Report, journal as applicable
Term work	TW	Mid-semester exam based on experiment/ activity performance, demonstration, Presentation, Oral and Journal, Report as applicable		Activity, Experiment performance, demonstration, Presentation, Oral & Report, journal as applicable
Seminar	SEMI	Mid-semester review based on topic of study, literature study, draft of paper manuscript, report(s) and other as applicable		Discussions, Presentation, Report(s), publication as applicable
Continuous Assessment Test	CAT	Class test examination to assess and evaluate a student's progress with descriptive or objective questions as measure of the student's knowledge and skills in online or offline mode.		
Continuous and Comprehensive Evaluation	CCE	Examination that evaluate learners' abilities based on various dimensions viz- academic performance, work experience, skills, coordination, agility, innovation, teamwork, public speaking, behavior, and similar as a measure of knowledge, skills and attitude.		



Table 4: Various Courses' Categories, Description and Abbreviation		
Broad Category	Description	Abbreviations
Program Courses	Programme Core Course	PCC
	Programme Core Course Lab	PCCL
	Programme Elective Course	PEC
	Programme Elective Course Lab	PECL
Multidisciplinary Courses	Multidisciplinary Course	MDC
	Generic Elective	GE
Experiential Learning Courses	Project	PROJ
	Internship / On Job Training	INT / OJT
Course Type/ Teaching Learning Schemes / Examination Heads	Practical	PR
	Internship	INT
	Theory	TH
	Tutorial	TUT
	Lecture	Lect
	Laboratory Course	Lab
	Term work	TW
MOOC	Massive Open Online Courses by NPTEL under SWAYAM	MOOC
	Project Planning/ Entrepreneurship Development / Engineering Economics / Management/ Corporate Laws/ Corporate Governance	PMFG
In Semester Examination	In_Sem_Exam	ISE
Continuous Assessment Test	Continuous Assessment Test	CAT
End Semester Examination	End_Sem_Exam	ESE
Continuous & Comprehensive Evaluation	Continuous & Comprehensive Evaluation	CCE
Bloom's Taxonomy	Bloom's Taxonomy	BL
Course Outcome	Course Outcome	CO
Program Outcome	Program Outcome	PO

**Table 5: Program Outcomes**

At the end of Post Graduate Program, a student would have:	
PO1	Computational Knowledge: Apply knowledge of computing fundamentals, computing specialization, mathematics, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements.
PO2	Problem Analysis: Identify, formulate, research literature, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines.
PO3	Design /Development of Solutions: Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex Computing problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern Tool Usage: Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations.
PO6	Professional Ethics: Understand and commit to professional ethics and cyber regulations, responsibilities, and norms of professional computing practices.
PO7	Life-long Learning: Recognize the need, and have the ability, to engage in independent learning for continual development as a computing professional.
PO8	Project management and finance: Demonstrate knowledge and understanding of the computing and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO9	Communication Efficacy: Communicate effectively with the computing community, and with society at large, about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions.
PO10	Societal and Environmental Concern: Understand and assess societal, environmental, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practices.
PO11	Individual and Team Work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary environments.
PO12	Innovation and Entrepreneurship: Identify a timely opportunity and using innovation to pursue that opportunity to create value and wealth for the betterment of the individual and society at large.

Program Specific Outcomes

At the end of Post Graduate Program,	
PSO1	Student will be able to apply advanced statistical and machine learning techniques to conduct Innovative research and develop data-driven solution to complex problems in data science, while fostering lifelong learning skills to stay at the forefront of evolving technologies and methodologies.
PSO2	Graduates will be capable of conducting comprehensive system analysis and design, applying various methodologies and tools to access user requirement and create efficient, scalable system architecture.
PSO3	Student will stay abreast of emerging technologies and trends in IT industry, enabling them to integrate new tools and methodologies into their projects and adapt changing technological landscapes.



Matoshri College of Engineering and Research Centre (Autonomous)
Master of Computer Application (MCA) (wef 2024-25)

Table 6: First Year Master of Computer Application (FY MCA)
Semester I

Courses				Teaching Scheme Hrs/Week			Examination and Marks (% of Total Curriculum and Marks)				Credit			
							In_Sem Exam (40%)		End_Sem Exam (60%)	Marks				
Course Code	Course Type	Title of Course	Exam Head	Lect	TUT	PR	CAT	CCE	ESE	Total	TH	TUT	PR	Total
24P1501	MDC	Statistical Foundation for Data Science	TH	04	-	-	20	20	60	100	04	-	-	04
24P1502	PCC	Software Testing and Quality Assurance	TH	04	-	-	20	20	60	100	04	-	-	04
24P1503	PCC	Python Programming	TH	02	-	-	20	20	60	100	02	-	-	02
24P1504	PCC	Artificial Intelligence	TH	04	-	-	20	20	60	100	04	-	-	04
24P1505	PEC	Program Elective Course 1	TH	04	-	-	20	20	60	100	04	-	-	04
24P1506	PCCL	Software Lab I	PR	-	-	04	20	30	50	-	-	02	02	4
24P1507	PECL	Program Elective Course 1 Lab	PR	-	-	02	20		30	50	-	-	01	01
24P1508	PMFG	Study of Indian Constitution	SEMI	-	01	-	20		30	50	-	01		01
Total				18	01	6	260		390	650	18	1	3	22
Total Hours/ Week				25			650			650	22			

Program Elective Course 1	
Course Code	Course Name
24P1505-A	Augmented Reality and Virtual Reality
24P1505-B	Cyber Security
24P1505-C	Operation Research
24P1505-D	Database System and SQL
24P1505-E	Generic Elective **

**GE: An elective course chosen generally from an unrelated discipline/subject, with an intention to seek. A core course offered in a discipline/subject may be treated as an elective by other discipline/subject and vice versa.



Matoshri College of Engineering and Research Centre (Autonomous)
Master of Computer Application (MCA) (wef 2024-25)

Table 7: First Year Master of Computer Application (FY MCA)
Semester II

Courses				Teaching Scheme Hrs/Week			Examination and Marks (% of Total Curriculum and Marks)				Credit				
							In_Sem Exam (40%)		End_Sem Exam (60%)	Marks					
Course Code	Course Type	Title of Course	Exam Head	Lect	TUT	PR	CAT	CCE	ESE	Total	TH	TUT	PR	Total	
24P1509	PCC	Data Science	TH	04	-	-	20	20	60	100	04	-	-	04	
24P1510	PCC	Java Programming	TH	04	-	-	20	20	60	100	04	-	-	04	
24P1511	PCC	Web Technology	TH	04	-	-	20	20	60	100	04	-	-	04	
24P1512	PEC	Program Elective Course -2	TH	04	-	-	20	20	60	100	04	-	-	04	
24P1513	PCCL	Software Lab II	TW+ PR	-	-	04	40	60	100	-		02	02		
24P1514	PECL	Program Elective Course 2 Lab	TW+ PR	-	-	04	40		60	100	-	-	02	02	
24P1515	PMFG	Mobile Application Development	SEMI	-	01	02	20		30	50	-	01	01	02	
Total				16	01	10	260		390		650	16	1	5	22
Total Hours/ Week				27			650				650	22			

Program Elective Course 2	
Course Code	Course Name
24P1512-A	Quantum Computing
24P1512-B	Cloud Computing
24P1512-C	Business Intelligence and Analytics
24P1512-D	UI/UX Design
24P1512-E	Generic Elective **

****GE:** An elective course chosen generally from an unrelated discipline/subject, with an intention to seek. A core course offered in a discipline/subject may be treated as an elective by other discipline/subject and vice versa.

Matoshri College of Engineering and Research Centre (Autonomous)
Master of Computer Application (MCA) (wef 2024-25)



Table 8: Second Year Master of Computer Application (FY MCA)
Semester III

Courses				Teaching Scheme Hrs/Week			Examination and Marks (% of Total Curriculum and Marks)				Credit				
							In_Sem Exam (40%)		End_Sem Exam (60%)	Marks					
Course Code	Course Type	Title of Course	Exam Head	Lect	TUT	PR	CCE	CCE	ESE	Total	TH	TUT	PR	Total	
24P1516	PCC	Machine Learning	TH	04	-	-	20	20	60	100	04	-	-	04	
24P1517	PCC	Blockchain Technology	TH	04	-	-	20	20	60	100	04	-	-	04	
24P1518	PEC	Program Elective Course -3	TH	04	-	-	20	20	60	100	04	-	-	04	
24P1519	PCCL	Programming Lab 3	PR	-	-	02	20	30	50	-	-	01	01		
24P1520	PMFG	Digital Marketing	SEMI	-	01	-	20		30	50	-	01	-	01	
24P1521	PROJ	Project Stage-I	PROJ	-	-	12	40		40	120	200	-	-	06	
Total				12	01	14	240		360		600	12	1	7	20
Total Hours/ Week				27			600			600	20			20	

Program Elective Course 3	
Course Code	Course Name
24P1518-A	Industry 4.0 And Industrial Internet Of Things
24P1518-B	Natural Language Processing
24P1518-C	Full Stack Java Development
24P1518-D	Deep Learning
24P1518-E	Generic Elective **

****GE:** An elective course chosen generally from an unrelated discipline/subject, with an intention to seek. A core course offered in a discipline/subject may be treated as an elective by other discipline/subject and vice versa.



**Matoshri College of Engineering and Research Centre (Autonomous)
Master of Computer Application (MCA) (wef 2024-25)**

**Table 9: Second Master of Computer Application (SY MCA)
Semester IV**

Courses				Teaching Scheme Hrs/Week			Examination and Marks (% of Total Curriculum and Marks)				Credit			
							In_Sem Exam (40%)		End_Sem Exam (60%)	Marks				
Course Code	Course Type	Title of Course	Exam Head	Lect	TUT	PR	CCE	CCE	ESE	Total	TH	TUT	PR	Total
24P1522	INT	Internship\$	TW	-	-	\$	50	50	150	250	-	-	8	8
24P1523	PCC	MOOC Course on Advanced Java	TH	4	-	-	20	20	60	100	4	-	-	4
24P1524	PROJ	Project Stage-II	PROJ	-	-	16	50	50	150	250	-	-	8	8
Total				4	-	16	240		360	600	4	-	16	20
Total Hours/ Week				-			600		20					

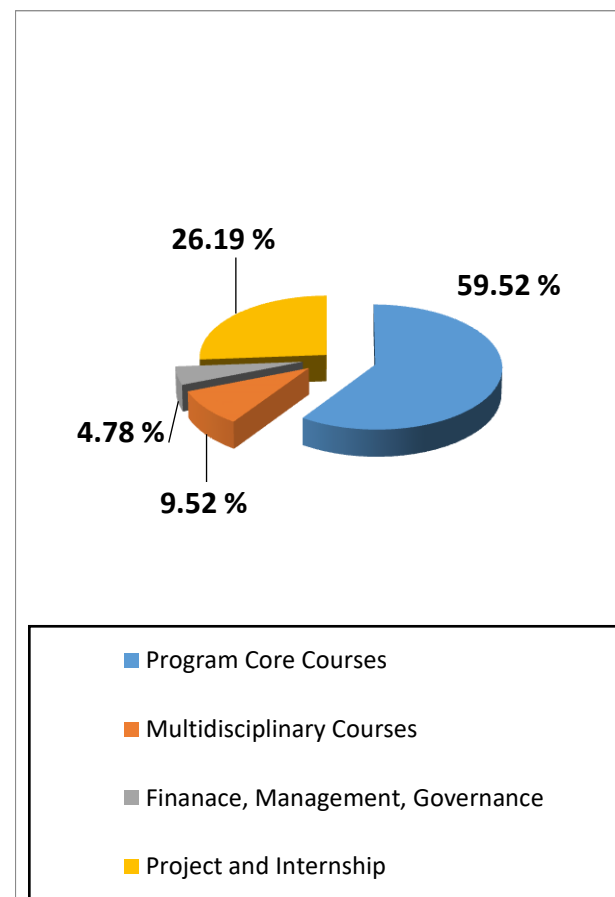
\$ Internship:

- Internship corresponding to major courses is to be completed after semester III Examinations and before commencement of semester IV of at least 180 hours/ 6 weeks; and it is to be assessed and evaluated in semester IV.
- It is almost imperative that the commencement of Semester IV needs to be approx. 3 weeks beyond the schedule.

Dr. Swati A. Bhavsar
Chairman, BoS
Computer Engineering



Table 10: Broad Courses' Categories, and Credit Distribution				
Broad Category	Description	Credit	Total Credit	%
Program Courses Total Credit= 50 59.52% (19.00 % in online mode)	Programme Core Course	30	35	41.66
	Programme Core Course Lab	05		
	Programme Elective Course	12	15	17.85
	Programme Elective Course Lab	03		
Multidisciplinary Courses Total Credit = 26 09.52%	Multidisciplinary Course	08	08	09.52
Project Management, Finance, and Governance Total Credit =04 04.78%	Study of Indian Constitution	01	04	04.78
	Project Management and Finance	02		
	Company Law and Governance	01		
Experiential Learning Courses Total Credit =22 26.19%	Project	14	22	26.19
	Internship / On Job Training	08		
Total		84	84	100



Matoshri College of Engineering & Research Centre, Nashik
Master of Computer Application) 2024-25
First Year MCA (FYMCA)



24P1501: Statistical Foundation for Data Science

Teaching Scheme	Credit	Examination Head: TH
		Examination Scheme & Marks
TH: 04 Hours/Week	04	ISE: CAT: 20 Marks CCE: 20 Marks ESE: 60 Marks

Companion Course, if any: Python Programming(24P1503), Software Lab 1(24P1506)

Course Objectives:

- To develop the fundamental knowledge and understand concepts to become a data science professional.
- To develop predictive models to forecast future trends and outcomes.
- To apply statistical concepts and probability distributions to different real-world problems.
- To understand fundamental concepts of statistics and probability theory.
- To construct and evaluate simple and multiple regression models through visualization techniques

Course Outcomes: On completion of the course, learner will be able to–	BL
CO1: Demonstrate flow process for data science problems.	3
CO2: Analyze the mathematical concepts like probability distributions and statistics for different domains of data science.	4
CO3: Apply statistical techniques and models to analyze data and draw conclusions.	3
CO4: Analyze various mathematical and statistical knowledge gained to demonstrate the problems arising in practical situations. Analyze data pertaining to attributes and to interpret the results.	4
CO5: Evaluate the results of hypothesis testing to determine the validity of a research question.	6
CO6: Develop the ability to independently apply advanced probability distributions, statistical analysis, and regression techniques to investigate and solve complex research problems, present research findings through comprehensive technical report, and demonstrate expertise in these analytical methods.	5

Course Contents

Unit I	Introduction to Data Science	(08 Hrs.)
What is Data Science, Need of Data Science, Big data and Data Science, The current Scenario, Industry Perspective Types of Data: Structured vs. Unstructured Data, Quantitative vs. Categorical Data, Big Data vs. Little Data, Data science process, Role of Data Scientist.		
Case Studies	Discuss environmental conservation and data analysis	
Unit II	Descriptive Statistics	(08 Hrs.)
Need of statistics in Data Science and Big Data Analytics, Measures of Central Tendency: Mean Median, Mode, and Mid-range. Measures of Dispersion: Range, Variance, Mean Deviation, Standard Deviation, Quartiles. Skewness and Kurtosis, Correlation-Pearson correlation, Spearman Rank correlation.		
Case Studies	Collect the sample of Food Consumption Scores and discuss food insecurity using Measures of Central Tendency	
Unit III	Probability	(08 Hrs.)

Introduction to probability, sample space and events, permutations and combinations, Axioms of probability, conditional probability, Bayes Theorem.															
Case Studies		Discuss financial forecasting to assess the risk and return of investment portfolios using Bayes theorem													
Unit IV		Probability Distributions										(08 Hrs.)			
Random Variables, Discrete probability densities, cumulative Distribution, mathematical Expectations, Geometric Distribution, Binomial distribution, Poisson distribution															
Case Studies		Discuss the average amount of time spend in waiting in traffic using probability													
Unit V		Hypothesis Testing										(08 Hrs.)			
Testing of hypothesis– Null and alternative hypothesis, Test - type I and type II error Hypothesis testing- t-test -One Sampled and two sampled tests, Correlation -Pearson correlation coefficient.															
Case Studies		Assess the Impact of Personalized Learning on Student Engagement													
Learning Resources:															
Text Books:															
1. Jeffrey S. Saltz, Jeffre M. Stanton, “An Introduction to Data Science”, Sage Publications,2018															
2. Theory and Problems of Probability, Seymour Lipschutz and Marc iars Lipson, 2ndEdition Schaum’s Outline Series, ISBN: 0-07-118356-6.															
3. Larsen, Richard J., and Morris L. Marx: An Introduction to Mathematical Statistics and its Applications, Pearson Education, 2017.															
Reference Books:															
1. T. Hastie, R. Tibshirani, J. H. Friedman, The Elements of Statistical Learning: Data Mining, Inference, and Prediction. Springer, 2013.															
2. Peter Flach, Machine Learning: The Art and Science of Algorithms that Make Sense of Data. Cambridge University Press, 2012.															
e-Books:															
<ul style="list-style-type: none"> An Introduction to Statistical Learning by Gareth James 															
https://www.ime.unicamp.br/~dias/Intoduction%20to%20Statistical%20Learning.pdf															
MOOC Courses: <web links>															
1. https://nptel.ac.in/courses/106/106/106106179/															
2. Computer Science and Engineering - NOC: Data Science for Engineers															
The CO-PO Mapping Matrix															
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	3	3	-	2	-	-	-	2	-	3	2	3
CO2	3	2	1	1	-	-	-	-	-	-	-	-	3	2	2
CO3	1	3	3	2	-	-	-	-	-	-	-	-	3	2	2
CO4	3	3	3	1	-	-	3	-	-	3	-	-	3	2	2
CO5	2	2	3	2	2	-	-	3	3	1	-	-	3	2	2
CO6	3	3	3	3	3	-	-	-	2	3	3	2	3	3	3

Matoshri College of Engineering & Research Centre, Nashik
Master of Computer Application) 2024-25
First Year MCA (FYMCA)



24P1502: Software Testing and Quality Assurance

Teaching Scheme	Credit	Examination Head: TH
		Examination Scheme & Marks
TH: 04 Hours/Week	04	ISE: CAT: 20 Marks CCE: 20 Marks ESE: 60 Marks

Companion Course, if any: Software Lab I(24P1506)

Course Objectives:

- To know the importance of software testing and quality assurance
- To study white box and black box testing techniques
- To get acquainted with various testing types
- To study tools used for automation testing

Course Outcomes: On completion of the course, learner will be able to–

	BL
CO1: Demonstrate different approaches of quality management, assurance, and quality standard to software system	3
CO2: Design test plan, test cases and defect repository using case study.	5
CO3: Illustrate the concept of white box and black box testing techniques	3
CO4: Analyze various testing types	4
CO5: Implement waits to deal with elements that take time to load, ensuring robust automation tool.	3
CO6: Scrape data from dynamic web pages using Selenium scripts.	3

Course Contents

Unit I	Fundamentals of Software Quality Assurance	(08Hrs.)
FUNDAMENTALS OF SOFTWARE QUALITY: Definition of Quality, QA, QC, SQA, SQA basics, Components of the Software Quality Assurance System, software quality in business context, planning for software quality assurance, product quality and process quality, software process models, 7 QC Tools and Modern Tools. QUALITY ASSURANCE MODELS: Models for Quality Assurance, ISO-9000 series, CMM, CMMI, Test Maturity Models, SOFTWARE QUALITY ASSURANCE TRENDS: Software Process-PSP and TSP, OO Methodology, Clean-room software engineering, Defect Injection and prevention, Internal Auditing and Assessments, Inspections & Walkthroughs, Case Tools and their effect on Software Quality.		
Case Studies	A software development company leading to missed deadlines and increased customer complaints. Discuss a structured Software Quality Assurance(QA) process to improve the situation.	
Unit II	Essentials of Software Testing	(08 Hrs.)
SOFTWARE TESTING BASICS: Definition & Objectives of testing, testing life cycle, Software testing principles, The tester's role in a software development organization TEST PLAN AND TEST CASES: Preparation, Management and execution of Test Plan, Definition, Test Case Designing of Test Cases, prepared Test report. DEFECT MANAGEMENT: Origins of defects, Defect classes, The defect repository and test design, Defect examples, Developer /Tester support for developing a defect repository.		
Case Studies	Discuss defect tracking process using systematic approach aimed at enhancing visibility and resolution times.	
Unit III	Software Testing Techniques	(08 Hrs.)

WHITE-BOX TESTING METHODOLOGIES: Static testing: by humans, using static analysis tools, Structural Testing: unit/code functional testing, Code coverage Testing, Code Complexity testing, Mutation Testing BLACK-BOX TESTING METHODOLOGIES: Requirement based testing, Positive and negative testing, Boundary Value analysis, Equivalence Partitioning, State based or Graph-based Testing, Compatibility Testing, User Documentation Testing, Domain Testing															
Case Studies		Discuss white box testing as a primary strategy to uncover vulnerabilities and improve software reliability, as the company prepared to launch a new online banking platform, it recognized the need for rigorous testing to ensure code quality and security.													
Unit IV		Testing Strategies										(08 Hrs.)			
Integration testing, System and Acceptance testing, Scenario testing, Performance Testing, Regression testing, Ad hoc Testing, Usability and Accessibility Testing, GUI testing, Validation testing, Specification-based testing, Testing Object-Oriented Software, Testing Web Based Applications, Database Testing															
Case Studies		Discuss a range of software testing strategies aimed at improving product quality and reducing time-to-market if the company faced challenges in maintaining software quality amidst frequent feature updates and tight release schedules..													
Unit V		Selenium Tool										(08 Hrs.)			
Introduction to Selenium, Brief History of The Selenium Project, Selenium’s Tool Suite, Selenium IDÉ, Selenium RC, Selenium Web Driver, Selenium Grid, Test Design Considerations.															
Case Studies		With increasing user traffic and a growing number of features, MNO recognized the need for a robust automated testing solution to ensure the quality and reliability of its web applications. To improve testing efficiency and coverage discuss automated tool.													
Learning Resources:															
Text Books:															
1. Srinivasan Desikan, Gopalaswamy Ramesh, Software Testing: Principles and Practices Pearson.															
2. Daniel Galin, Software Quality Assurance: From Theory to Implementation, Pearson AddisonWesley															
Reference Books:															
1. Software Testing and Quality Assurance – Theory and Practice, Kshirasagar Naik, Priyadashi Tripathy, Wiley India, 2010															
2. Rajani & Oak, “Software Testing: Methodology, Tools and Processes” Tata McGraw-Hill, 2007															
e-Books: <web links>															
1. Selenium 1.0 Testing Tool beginners guide by David Burns, ISBN: 1849510261, ISBN 13:9781849510264															
2. Burnstein, “Practical Software Testing”, Springer International Edition, ISBN 81-8128-089-X															
MOOC Courses: <web links>															
1. https://www.my-mooc.com/en/mooc/software-testing-fundamentals/															
2. https://nptel.ac.in/courses/106/105/106105150/															
3. https://onlinecourses.nptel.ac.in/noc19_cs71/preview															
The CO-PO Mapping Matrix															
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	2	2	3	2	3	3	2	-	-	-	1	3	3
CO2	2	1	3	3	3	2	-	3	3	-	2	-	3	3	3
CO3	1	-	3	3	3	-	-	2	2	-	2	-	2	3	2
CO4	1	-	3	3	3	-	-	2	2	-	2	-	2	3	2
CO5	2	2	3	3	3	-	-	-	2	-	2	2	3	3	3
CO6	3	3	3	3	3	2	-	2	2	3	3	3	2	-	2

Matoshri College of Engineering & Research Centre, Nashik
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First Year MCA (FYMCA)



24P1503: Python Programming

Teaching Scheme	Credit	Examination Head: TH
		Examination Scheme & Marks
TH: 02 Hours/Week	02	ISE: CAT: 20 Marks CCE: 20 Marks ESE: 60 Marks

Companion Course, if any: Software Laboratory I (24P1506)

Course Objectives:

- To learn the basics of Python Programming
- To understand the python data structure
- To build object-oriented programs with Python classes.
- To learn read and write files in Python programming language.
- To build Python modules and package for reusability.

Course Outcomes: On completion of the course, learner will be able to	BL
CO1: Demonstrate proficiency in Python programming by applying problem-solving skills and implementing various programming constructs for building applications.	3
CO2: Express proficiency in the handling of strings and functions.	2
CO3: Develop problem-solving skills by implementing algorithms and data structures to solve real-world problems.	5
CO4: Create Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.	5
CO5: Articulate the object oriented programming concepts.	3
CO6: Understand basic statistical concepts and their application in Python for different domains of data science and visualization of data.	3

Course Contents

Unit I	Basics of Python	(06 Hrs.)
Introduction to Python programming, Features of Python, Execution of a Python Program, variables and identifiers, Data Types, Input operation, Comments, Reserved words, Indentation, Operators and expressions, Expressions in Python. Decision control statement, branching Statements, Structures/Iterative statements, break, continue, pass, else statement used with loops. Comparisons between C and Python.		
Case Studies	Design a simple command-line To-Do List application to manage tasks.	
Unit II	Python Data Collections	(06 Hrs.)
Strings: Creating and storing strings, string operations, formatting strings. Lists: Basic List operations, Built-in functions used on lists, List Comprehensions. Tuples and Sets: Basic Operations on Tuples, Functions to Process Tuples. Set Methods, set operations. Dictionaries: Operations on Dictionaries, Dictionary Methods.		
Case Studies	Analyze sales data using lists and loops and present the final statistics.	
Unit III	Functions, Modules and Packages	(06 Hrs.)

Functions: Calling Functions, Creating Functions, Formal Arguments, Positional Arguments, Default Arguments, Default Function Object Argument Example, Variable-length Arguments, Non-keyword Variable Arguments (Tuples), Keyword Variable Arguments (Dictionary), user defined functions and library functions, The return Statement and void Function, Scope and Lifetime of Variables, *args and **kwargs, Command Line Arguments. Modules: Standard Library modules, Commonly Used Modules, Categorizing the Standard Types, Unsupported Types. Packages: Understanding Packages Powerful Lambda or anonymous function in python

Case Studies Discuss Task Management System to help users organize their daily tasks. The system will allow users to add tasks, view tasks, mark tasks as complete, and delete tasks. Functions will be used to encapsulate the different operations.

Unit IV**Files and Database Connectivity****(06 Hrs.)**

Files and Database Connectivity: File Processing in python, Types of Databases Used with Python, Working with MySQL Database, Using MySQL from Python, Retrieving All Rows from a Table, Inserting Rows into a Table, Deleting Rows from a Table, Updating Rows in a Table, Creating Database Tables through Python

Case Studies

Implement an Inventory Management System to keep track of products, suppliers, and sales. The system will help the store efficiently manage its inventory, generate reports, and handle stock levels.

Unit V**Object-Oriented Programming Concept****(06 Hrs.)**

Object Oriented programming, Python Objects, Standard Types, Other Built-in Types, Internal Types, scope, Classes and Objects, Creating Classes in Python, Creating Objects in Python, The Constructor Method, Classes with Multiple Objects, Class Attributes versus Data Attributes, Encapsulation, Inheritance, and Polymorphism, Composition, containership, reusability, delegation, data abstraction

Case Studies

Create a probabilistic model for credit card fraud detection

Learning Resources:**Text Books:**

1. Core Python Programming: 2017 Edition, R. Nageswara Rao, DreamTech Publication.
2. Python for Data Analysis 2nd Edition, O'Reilly Publications
3. Core Python Programming, Wesley J Chun, 3rd Edition, Pearson Education.

Reference Books:

1. Professional Python, Sneeringer, Luke, 2016, John Wiley & Sons, ISBN -978-1-119-07085-6.
2. Mastering Python Fundamentals with ease, Asha Gowda KareGowda, Bhargavi K, LambartAcademic Publishing

e-Books: <web links><http://pkklib.iitk.ac.in/index.php/resources/e-books/e-text-books/33890:python-programming-using-problem-solving-approach>

MOOC Courses: <web links><https://archive.nptel.ac.in/courses/106/106/106106182/>

@The CO-PO Mapping Matrix

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	-	3	-	-	-	-	-	3	3	3
CO2	3	3	3	2	2	-	2	-	-	-	-	-	3	2	3
CO3	3	3	3	2	2	-	2	-	-	-	-	-	3	2	1
CO4	3	3	3	2	2	-	-	-	3	-	-	-	3	2	2
CO5	3	3	3	3	2	-	-	-	-	-	-	-	3	2	2
CO6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

Matoshri College of Engineering & Research Centre, Nashik
Master of Computer Application) 2024-25
First Year MCA (FYMCA)



24P1504: Artificial Intelligence

Teaching Scheme	Credit	Examination Head: TH
		Examination Scheme & Marks
TH: 04 Hours/Week	04	ISE: CAT: 20 Marks CCE: 20 Marks ESE: 60 Marks

Companion Course, if any: Data Science

Course Objectives:

- To present an overview of artificial intelligence (AI) principles and approaches.
- Develop a basic understanding of the building blocks of AI as presented in terms of intelligent agents: Search, Knowledge representation, inference, logic, and learning.
- To understand Natural language processing and Expert systems

Course Outcomes: On completion of the course, learner will be able to–

	BL
CO1: Demonstrate the modern view of AI as the study of agents that receive precepts from the Environment and perform actions.	3
CO2: Demonstrate the use of various search techniques.	3
CO3: Apply basic principles of AI in solutions that require problem-solving, inference, perception, knowledge representation, and learning.	3
CO4: Implement ideas underlying the modern logical inference system.	3
CO5: Explain about AI techniques for logical planning.	2
CO6: Demonstrate and enrich knowledge to select and apply AI tools to synthesize information and develop models within constraints of application area.	3

Course Contents

Unit I	Introduction to Artificial Intelligence	(08 Hrs.)
Introduction: What Is AI, The Foundations of Artificial Intelligence, The History of Artificial Intelligence, and Applications of AI. Intelligent Agents and Environments: Good Behavior: The Concept of Rationality, The Nature of Environments, The Structure of Agents, How the components of agent programs work.		
Case Studies	Discuss intelligent autonomous vehicles that can navigate complex urban environments with little to no human intervention	
Unit II	Search Techniques	(08 Hrs.)
Solving Problems by Searching: Study and analysis of Various searching algorithms. Implementation of Depth-first search Problem-Solving Agents, Searching for Solutions, Uninformed Search Strategies: Breadth-first search, Uniform-cost search, Depth-first search, Depth-limited search, Iterative deepening depth-first search, Bidirectional search Informed (Heuristic) Search Strategies: Greedy best first search A* search: Minimizing the total estimated solution cost, Conditions for optimality: Admissibility and consistency, Optimality of A*, Heuristic Functions		
Case Studies	An autonomous vehicle (AV) company needed to design a system for route planning that ensures the vehicle navigates efficiently and safely in urban environments. The challenge was to find the shortest path to a destination while considering dynamic obstacles and real-time traffic data.	
Unit III	Knowledge Representation	(08 Hrs.)

Definition of knowledge, properties for knowledge representation system, Issues of knowledge representations, Types of knowledge, Mappings Approaches to knowledge representations, knowledge using Rules, search Knowledge, predicate calculus-connectives, variables and quantification, Predicates and arguments, TMS (truth maintenance system), Statistical and probabilistic reasoning		
Case Studies (if any)	Discuss an intelligent diagnostic system that can assist doctors in diagnosing diseases based on patients' symptoms, medical history, and test results.	
Unit IV	Reasoning	(08 Hrs.)
Inference in First-Order Logic, Propositional vs. First-Order Inference, Unification and First-Order Inference, Forward Chaining, Backward Chaining, Resolution, Knowledge Representation, Ontological Engineering, Categories and Objects, Events, Mental Objects and Modal Logic, Reasoning Systems for Categories, Reasoning with Default Information		
Case Studies	Discuss AI-powered expert system to assist lawyers in evaluating the outcomes of legal cases.	
Unit V	Planning	(08 Hrs.)
Introduction : Search in planning, search vs. planning, planning as problem solving, components of a planning, Forward planning, Nonlinear planning using constraint posting, Hierarchical planning		
Case Studies	Discuss plan paths and tasks for each robot while dealing with the complexity of the warehouse layout, changing inventory positions, and potential robot collisions for a logistics company needed to automate the movement of goods in a large warehouse using autonomous robots..	
Learning Resources:		
Text Books:		
1. Artificial Intelligence: A Modern Approach by Peter and Norvig ISBN-0-13- 103805		
Reference Books:		
1. Artificial Intelligence by Elaine Rich, Kevin Knight and Nair ISBN-978-0-07- 008770-5, TMH,		
2. Artificial Intelligence by Saroj Kausik ISBN:- 978-81-315-1099-5, Cengage Learning		
3. Artificial Intelligence and Intelligent Systems by Padhy, Oxford University Press		
e-Books: <web links>		
1. https://www.cin.ufpe.br/~tfl2/artificial-intelligence-modern approach.9780131038059.25368.pdf		
MOOC Courses: <web links>		
1. https://nptel.ac.in/courses/106/105/106105077/		

@The CO-PO Mapping Matrix															
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	2	1	-	-	1	3	-	2	-	-	3	3	2
CO2	1	3	3	2	3	1	-	3	1	2	-	-	3	3	2
CO3	1	2	2	1	-	-	1	3	1	2	-	-	3	3	1
CO4	1	2	2	1	-	-	1	3	1	2	-	-	3	3	2
CO5	2	2	2	2	3	-	2	-	-	-	-	-	3	-	2
CO6	2	2	2	2	3	1	2	-	-	-	-	-	3	3	3



Matoshri College of Engineering & Research Centre, Nashik
Master of Computer Application) 2024-25
First Year MCA (FYMCA)
Program Elective Course 1

24P1505-A: Augmented Reality and Virtual Reality

Teaching Scheme	Credit	Examination Head: TH
		Examination Scheme & Marks
TH: 04 Hours/Week	04	ISE: CAT: 20 Marks CCE: 20 Marks ESE: 60 Marks

Prerequisite: Multimedia

Companion Course, if any: Program Elective Course 1 Lab (24P1507)

Course Objectives:

- To learn the fundamentals of sensation, perception, technical and engineering aspects of virtual reality systems.
- To provide a foundation to the fast-growing field of AR and make the students aware of the various AR devices.

Course Outcomes: On completion of the course, learner will be able to–	BL
CO1: Demonstrate a comprehensive understanding of the core principles, theories, and technologies that underpin Virtual Reality (VR).	3
CO2: Design and develop interactive VR and AR applications using industry-standard tools.	5
CO3: Understand the system of human vision and its implication on perception and rendering.	3
CO4: Summarize the basic concept of Augmented Reality (AR) systems.	3
CO5: Demonstrate the components of VR/AR hardware (e.g., head-mounted displays, sensors, cameras) and software platforms, understanding their functions and limitations in delivering immersive experiences.	3
CO6: Apply problem-solving skills to address technical challenges in VR/AR development, such as optimization of performance, resolution of latency issues, and minimizing motion sickness for users.	3

Course Contents

Unit I	Introduction to Virtual Reality	(08 Hrs.)
Defining Virtual Reality, History of VR, Human Physiology and Perception, Key Elements of Virtual Reality Experience, Virtual Reality System, Interface to the Virtual World-Input & output Visual, Aural & Haptic Displays, Applications of Virtual Reality.		
Case Studies (if any)	Discuss how Virtual Reality (VR) simulation platform adopted for training medical students in surgical procedures.	
Unit II	Representing the Virtual World	(08 Hrs.)
Representation of the Virtual World, Visual Representation in VR, Aural Representation in VR and Haptic Representation in VR, Geometric Models, Changing Position and Orientation, Axis-Angle Representations of Rotation, Viewing Transformations, Chaining the Transformations, Human Eye, eye movements & implications for VR.		
Case Studies	Discuss how an architectural firm adopted Virtual Reality (VR) technology to offer clients fully immersive tours ("walk" through the virtual space) of buildings before they were constructed.	
Unit III	Visual Perception & Rendering	(08 Hrs.)

Visual Perception - Perception of Depth, Perception of Motion, Perception of Color, Combining Sources of Information Visual Rendering -Ray Tracing and Shading Models, Rasterization, Correcting Optical Distortions, Improving Latency and Frame Rates, Motion in Real and Virtual Worlds-Velocities and Accelerations, The Vestibular System, Physics in the Virtual World, Interaction - Motor Programs and Remapping, Locomotion, Manipulation, Social Interaction. Audio -The Physics of Sound, The Physiology of Human Hearing, Auditory Perception, Auditory Rendering.															
Case Studies				Optimizing Rendering for Low-Latency VR Gaming											
Unit IV				Introduction to Augmented Reality (A.R)										(08 Hrs.)	
What Is Augmented Reality - Defining augmented reality, history of augmented reality, The Relationship Between Augmented Reality and Other Technologies-Media, Technologies, Other Ideas Related to the Spectrum Between Real and Virtual Worlds, applications of augmented reality Augmented Reality Concepts - How Does Augmented Reality Work? Concepts Related to Augmented Reality, Ingredients of an Augmented Reality Experience.															
Case Studies				Discuss Augmented Reality in Education - AR-based Learning											
Unit V				Augmented Reality Hardware and Software										(08 Hrs.)	
Augmented Reality Hardware – Displays – Audio Displays, Haptic Displays, Visual Displays, Other sensory displays, Visual Perception, Requirements and Characteristics, Spatial Display Model. Processors – Role of Processors, Processor System Architecture, Processor Specifications. Tracking & Sensors - Tracking, Calibration, and Registration, Characteristics of Tracking Technology, Stationary Tracking Systems, Mobile Sensors, Optical Tracking, Sensor Fusion. Computer Vision for Augmented Reality - Marker Tracking, Multiple-Camera Infrared Tracking, Natural Feature Tracking by Detection, Simultaneous Localization and Mapping, Outdoor Tracking Augmented Reality Software															
Case Studies				Augmented Reality in Remote Assistance - Porsche and HoloLens 2											
Learning Resources															
Text Books:															
1. Virtual Reality, Steven M. LaValle, Cambridge University Press, 2016															
2. Developing Virtual Reality Applications: Foundations of Effective Design, Alan B Craig, William R Sherman and Jeffrey D Will, Morgan Kaufmann, 2009.															
3. Allan Fowler-AR Game Developmentll, 1st Edition, A press Publications, 2018, ISBN 978-1484236178															
Reference Books:															
1. Gerard Jounghyun Kim, “Designing Virtual Systems: The Structured Approach”, 2005.															
2. Burdea, Grigore C and Philippe Coiffet, “Virtual Reality Technology”, Wiley Interscience, India, 2003.															
e-Books: http://lavalle.pl/vr/book.html															
MOOC Courses: https://www.coursera.org/learn/introduction-virtual-reality															
The CO-PO Mapping Matrix															
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	1	2	1	-	-	-	-	-	-	-	-	-	-	3
CO2	1	2	2	-	-	-	-	-	-	-	-	-	-	-	3
CO3	1	2	2	1	2	-	-	-	-	-	-	1	-	-	3
CO4	1	2	2	-	2	-	-	-	-	-	-	1	-	-	2
CO5	1	1	2	2	1	-	-	-	-	-	-	2	3	-	2
CO6	1	2	2	2	3	-	-	-	-	-	-	2	-	-	3



Matoshri College of Engineering & Research Centre, Nashik
Master of Computer Application) 2024-25
First Year MCA (FYMCA)
Program Elective Course 1

24P1505-B: Cyber Security

Teaching Scheme	Credit	Examination Head: TH
		Examination Scheme & Marks
TH: 04 Hours/Week	04	ISE: CAT: 20 Marks CCE: 20 Marks ESE: 60 Marks

Prerequisite: Computer Network

Companion Course, if any: Program Elective Course 1 Lab (24P1507)

Course Objectives:

- To prepare students with the technical knowledge and skills needed to protect and defend computer systems and networks.
- To develop students that can plan, implement, and monitor cyber security mechanisms to help ensure the protection of information technology assets.
- To develop graduates that can identify, analyze, and remediate computer security breaches

Course Outcomes: On completion of the course, learner will be able to–	BL
CO1: Analyze and evaluate the cyber security needs of an organization.	4
CO2: Determine and analyze software vulnerabilities and security solutions to reduce the risk of exploitation.	3
CO3: Analyze logs to correlate events and identify patterns that indicate threats.	4
CO4: Demonstrate cryptographic methods ensure secure communication and data protection.	3
CO5: Identify and collect digital evidence in a forensically sound manner.	1
CO6: Apply ethical and legal principles in the handling and investigation of digital evidence.	3

Course Contents

Unit I	Overview of Cyber Security	(08 Hrs.)
Overview of Cyber Security, Internet Governance – Challenges and Constraints, Cyber Threats:- Cyber Warfare-Cyber Crime-Cyber terrorism-Cyber Espionage, Need for a Comprehensive Cyber Security Policy, Need for a Nodal Authority, Need for an International convention on Cyberspace. Cyber Security Regulations, Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards. The INDIAN Cyberspace, National Cyber Security Policy 2013.		
Case Studies	Discuss Cyber security in Financial Sector	
Unit II	Vulnerabilities and Access Control	(08 Hrs.)
Cyber Security Vulnerabilities-Overview, vulnerabilities in software, System administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Unprotected Broadband communications, Poor Cyber Security Awareness. Cyber Security Safeguards- Overview, Access control, Audit, Authentication, Biometrics, Cryptography, Deception, Denial of Service Filters, Ethical Hacking, Firewalls, Intrusion Detection Systems, Response, Scanning, Security policy, Threat Management.		
Case Studies	Discuss Vulnerabilities in E-Commerce - Securing Customer Data at ShopNow	
Unit III	Intrusion detection and Prevention	(08 Hrs.)

Intrusion, Physical Theft, Abuse of Privileges, Unauthorized Access by Outsider, Malware infection, Intrusion detection and Prevention Techniques, Anti-Malware software, Network based Intrusion detection Systems, Network based Intrusion Prevention Systems, Host based Intrusion prevention Systems, Security Information Management, Network Session Analysis, System Integrity Validation.															
Case Studies		Intrusion Detection and Prevention in Financial Sector - Safeguarding Bank Data at Secure Bank.													
Unit IV		Cryptography											(08 Hrs.)		
Introduction to Cryptography, Symmetric key Cryptography, Asymmetric key Cryptography, Message Authentication, Digital Signatures, Applications of Cryptography. Overview of Firewalls- Types of Firewalls, User Management, VPN Security Protocols: - security at the Application Layer- PGP and S/MIME, Security at Transport Layer- SSL and TLS, Security at Network Layer-IPSec.															
Case Studies		Discuss Cryptography in Secure Cloud Storage - Protecting Data at Cloud Secure													
Unit V		Cyber Forensic											(08 Hrs.)		
Introduction to Cyber Forensics, Handling Preliminary Investigations, Controlling an Investigation, Conducting disk-based analysis, Investigating Information-hiding, Scrutinizing E-mail, Validating E-mail header information, Tracing Internet access, Tracing memory in real-time.															
Case Studies		Discuss Cyber Forensics in Intellectual Property Theft													
Learning Resources															
Text Books:															
1. The Hacker Playbook: Practical Guide To Penetration Testing – @Peter Kim.															
2. Applied Network Security Monitoring: Collection, Detection, and Analysis – @Chris Sanders, @Jason Smith.															
Reference Books:															
1. Network Security Through Data Analysis: Building Situational Awareness – Michael Collins.															
e-Books: <web links>															
1. https://heimdalsecurity.com/pdf/cyber_security_for_beginners_ebook.pdf															
2. http://larose.staff.ub.ac.id/files/2011/12/Cyber-Criminology-Exploring-Internet-Crimes-and-Criminal-Behavior.pdf															
3. http://docshare04.docshare.tips/files/21900/219006870.pdf															
MOOC Courses: <web links>															
1. https://swayam.gov.in/nd2_cec20_cs15/preview															
The CO-PO Mapping Matrix															
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	3	3	-	-	2	-	2	-	-	3
CO2	-	-	-	-	-	3	3	-	-	2	-	2	-	-	3
CO3	-	-	-	-	-	3	3	-	-	2	-	2	-	-	3
CO4	1	1	3	-	-	-	-	-	-	-	-	-	3	-	2
CO5	-	-	-	-	-	-	-	-	-	-	-	-	3	-	2
CO6	-	-	-	-	-	3	-	-	-	-	-	-	3	3	3



Matoshri College of Engineering & Research Centre, Nashik
Master of Computer Application) 2024-25
First Year MCA (FYMCA)
Program Elective Course 1

24P1505-C: Operation Research

Teaching Scheme	Credit	Examination Head: TH
		Examination Scheme & Marks
TH: 04 Hours/Week	04	ISE: CAT: 20 Marks CCE: 20 Marks ESE: 60 Marks

Companion Course, if any: Program Elective Course 1 Lab (24P1507)

Course Objectives:

- To use quantitative methods and techniques for effective decisions-making
- Model formulation and applications that are used in solving business decision problems.
- To make better organizational and operational decisions
- Introduces the concepts of linear programming modeling and its solution techniques
- Explores the mathematical properties of general linear programming problems
- To solve and analyze real-world business problems

Course Outcomes: On completion of the course, learner will be able to–	BL
CO1: Apply foundational concepts of OR such as optimization, linear programming, and decision analysis to solve practical problems in a variety of sectors.	3
CO2: Apply the transportation model to real-world scenarios such as supply chain optimization.	3
CO3: Gain knowledge of drawing project networks for quantitative analysis of projects	2
CO4: Apply appropriate technique to analyze a project with an objective to optimize resources.	3
CO5: Understand the characteristics of different types of decision-making environments and the appropriate decision-making approaches.	3
CO6: Develop simulation techniques to evaluate complex scenarios and make informed decisions.	5

Course Contents

Unit I	Introduction to Linear Programming	(08Hrs.)
Construction of the LP model, Linear Programming -Graphical method, graphical solution methods of Linear Programming problems, Simplex method, Phase II in simplex method Primal and Dual Simplex Method, Big-M Method, Duality and Sensitivity Analysis		
Case Studies (if any)	Linear Programming for Optimizing Crop Production in Agriculture	
Unit II	Transportation Model and its Variants	(08Hrs.)
Transportation Algorithm, Examples on Transportation Algorithm, Finding basic feasible solutions – Northwest corner rule, The Least cost method and Vogel’s approximation method. Assignment Model, Examples on Assignment Model, The Transshipment Model, Examples on Transshipment Model		
Case Studies (if any)	Discuss and study Assignment Model for Employee Shift Scheduling	
Unit III	CPM & PERT	(08Hrs.)
Basic difference between CPM & PERT, Arrow Networks, Time estimates, earliest completion time, Latest allowable occurrence time, Forward Pass Computation, Backward Pass Computation, Representation in tabular form, Critical Path, Probability of meeting the scheduled date of completion Various floats for activities, Critical Path updating projects, Selection of schedule based on Cost analysis Crashing the network Sequencing models. Solution of Sequencing Problem – Processing n Jobs through 2 Machines – Processing n Jobs through 3 Machines – Processing 2 Jobs through m machines		

Case Studies (if any)	Discuss CPM: Construction of a New Office Building and PERT - Launch of a New Product	
Unit IV	Network Models	(08Hrs.)
Network Models: Scope of Network Applications –Network definition, Minimum Spanning Tree Algorithm, Examples on Minimum Spanning Tree Algorithm, Shortest Route Problem, Maximal flow model, Minimum cost capacitated flow problem, Goal Programming Algorithms		
Case Studies (if any)	Optimize Supply Chain Distribution using Network Model	
Unit V	Decision Analysis	(08Hrs.)
Decision making under certainty, Decision – making under risk, Decision under uncertainty. Games Theory. Competitive games, rectangular game, saddle point, minimax (maximin) method of optimal strategies, value of the game. Solution of games with saddle points.		
Case Studies (if any)	Discuss Decision Analysis in Healthcare: Choosing Treatment Option	
Learning Resources		
Text Books:		
1. P. Sankara Iyer, "Operations Research", Tata McGraw-Hill, 2008.		
2. A.M. Natarajan, P. Balasubramani, A. Tamilarasi, "Operations Research", Pearson Education, 2005.		
3. Taha, Hamdy, Operations Research, 7th edition, (USA: Macmillan Publishing Company), 2003		
Reference Books:		
1. J K Sharma., "Operations Research Theory & Applications , 3e", Macmillan India Ltd, 2007.		
2. P. K. Gupta and D. S. Hira, "Operations Research", S. Chand & co., 2007.		
e-Books: <web links>		
1. https://www.bbau.ac.in/dept/UIET/EME-601%20Operation%20Research.pdf		
MOOC Courses: <web links>		
1. https://onlinecourses.nptel.ac.in/noc19_ma29/preview		
2. https://onlinecourses.swayam2.ac.in/cec20_ma10/preview		
The CO-PO Mapping Matrix		

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	-	-	3	-	-	3	-	3	3	3
CO2	3	3	3	3	3	-	-	3	-	-	3	-	3	3	3
CO3	3	3	3	3	3	-	-	3	-	-	3	-	3	3	3
CO4	3	3	3	3	3	-	-	3	-	-	3	-	3	3	3
CO5	3	3	3	3	3	-	-	3	-	-	3	-	3	3	3
CO6	3	3	3	3	3	-	-	3	3	3	3	3	3	3	3



Matoshri College of Engineering & Research Centre, Nashik
Master of Computer Application) 2024-25
First Year MCA (FYMCA)
Program Elective Course 1

24P1505-D: Database System and SQL

Teaching Scheme	Credit	Examination Head: TH
		Examination Scheme & Marks
TH: 04 Hours/Week	04	ISE: CAT: 20 Marks CCE: 20 Marks ESE: 60 Marks

Companion Course, if any: Program Elective Course 1 Lab (24P1507)

Course Objectives:

- To understand the fundamental concepts of database management. These concepts include aspects of database design, database languages, and database-system implementation.
- To provide a strong formal foundation in database concepts, technology and practice.
- To give systematic database design approaches covering conceptual design, logical design and an overview of physical design.
- Be familiar with the basic issues of transaction processing and concurrency control.
- To learn and understand various Database Architectures and Applications.

Course Outcomes: On completion of the course, learner will be able to–	BL
CO1: Design E-R Model for given requirements and convert the same into database tables.	5
CO2: Implement data integrity constraints to ensure accurate and reliable data.	3
CO3: Create and use stored procedures, functions, and packages for reusable business logic.	5
CO4: Identify and apply different normal forms to design efficient databases.	1
CO5: Analyze transaction states and manage concurrency control to avoid deadlocks.	4
CO6: Analyze and adjust existing database structures to improve performance and reduce anomalies.	4

Course Contents

Unit I	Introduction to Database Management Systems	(08 Hrs.)
Introduction to Database Management Systems, Purpose of Database Systems, Database-System Applications, View of Data, Database Languages, Database System Structure, Data Models, Database Design and ER Model: Entity, Attributes, Relationships, Constraints, Keys, Design Process, Entity Relationship Model, ER Diagram, Extended E-R Features, converting E-R & EER diagram into tables.		
Case Studies	E-R Diagram for University Course Management System	
Unit II	SQL	(08 Hrs.)
SQL: Characteristics and advantages, SQL Data Types and Literals, DDL, DML, SQL Operators, Tables: Creating, Modifying, Deleting, Database Modification using SQL Insert, Update and Delete Queries. Views, Indexes, SQL, Set Operations, Joins, Ordering of Tuples, Aggregate Functions, Nested Queries, Null values, where clause, group by clause. Entity integrity, Referential integrity.		
Case Studies	SQL Data Types in an E-Commerce System	
Unit III	PL/SQL	(08 Hrs.)

PL/SQL: Concept of Stored Procedures & Functions, Cursors, Triggers, Assertions, roles and privileges, Embedded SQL, Dynamic SQL.															
Case Studies		Managing Employee and Department Data													
Unit IV		Relational Database Design and Normalization										(08 Hrs.)			
Relational Model: Basic concepts, Attributes and Domains, CODD's Rules, Normalization, Atomic Domains and First Normal Form, Decomposition using Functional Dependencies, Algorithms for Decomposition, 2NF, 3NF, BCNF. Basic concept of a Transaction, Transaction Management, ACID Properties, Concept of Schedule, Serial Schedule, Concurrency Control: Need, Locking Methods, Deadlocks, Time stamping Methods.															
Case Studies		Relational Database Design and Normalization for an E-Commerce Platform													
Unit V		Transaction Management and Query Processing										(08 Hrs.)			
Introduction to Database Architectures: Multi-user DBMS Architectures, Parallel Databases: Speedup and Scale up, Architectures of Parallel Databases. Distributed Databases: Architecture of Distributed Databases, Distributed Database Design, Distributed Transaction: Basics, Failure modes, Commit Protocols, Introduction to NoSQL Database, Types and examples of NoSQL															
Case Studies		Transaction Management and Query Processing for an Online Reservation System													
Learning Resources															
Text Books:															
1. Silberschatz A., Korth H., Sudarshan S., "Database System Concepts", McGraw Hill Publishers, ISBN 0-07-120413-X, 6th edition															
2. Connally T, Begg C., "Database Systems", Pearson Education, " ISBN 81-7808-861-4															
Reference Books:															
1. C J Date, —An Introduction to Database Systems, Addison-Wesley, ISBN: 0201144719															
2. S.K.Singh, —Database Systems : Concepts, Design and Application, Pearson, Education, ISBN 978-81-317-6092-5															
3. Pramod J. Sadalage and Martin Fowler, —NoSQL Distilled, Addison Wesley, ISBN10: 0321826620, ISBN-13: 978-0321826626															
e-Books:															
1. http://www.freebookcentre.net/database-books-download/Introduction-to-Database-Systems.html															
MOOC Courses:															
1. https://www.coursera.org/courses?query=database															
2. https://cs.stanford.edu/people/widom/DB-mooc.html															
The CO-PO Mapping Matrix															
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	3	-	-	-	3	3	-	-	-	-	3	2	3
CO2	-	-	3	-	-	-	3	3	-	-	-	-	3	3	3
CO3	3	3	3	3	3	-	2	-	-	-	-	-	3	3	3
CO4	3	3	3	3	-	-	-	-	-	-	-	-	3	3	3
CO5	3	3	3	3	3	-	-	3	2	-	-	-	3	3	3
CO6	2	3	3	3	3	-	-	-	2	-	-	-	3	3	3



Matoshri College of Engineering & Research Centre, Nashik
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First Year MCA (FYMCA)

24P1506: Software Lab I

Teaching Scheme	Credit	Examination Head: PR	
		Examination Scheme & Marks	
PR: 04 Hours/Week	02	ISE: 20 Marks	ESE: 30 Marks
Companion Course, if any: Python Programming(24P1503), Software Testing and Quality Assurance(24P1502)			
Course Objectives: <ul style="list-style-type: none"> • To develop Proficiency in Python Programming Fundamentals. • To define structure and components of a python program • To develop a strong grasp of Python data structures by writing programs that manipulate tuples and dictionaries. • To learn to discuss various software testing issues and solutions in software unit test, ingestion, regression and system testing. • To learn how to plan a test project, design test cases and generate a report. 			
Course Outcomes: On completion of the course, learner will be able to–			BL
CO1: Demonstrate proficiency in utilizing programming tools, Python integrated development environments (IDEs), effectively navigate and utilize the features provided by these tools to write program codes.			3
CO2: Demonstrate proficiency in using statements and expressions functions, manipulate and utilize strings, classes and objects to implement effective code with conditional branching in Python programs.			3
CO3: Create web applications using Python frameworks and understand client-server interactions			5
CO4: Analyze testing results and effectively communicate findings to stakeholders.			4
CO5: Contribute to continuous testing initiatives within an Agile or DevOps environment.			3
CO6: Apply theoretical knowledge to real-world scenarios by engaging in experiential learning activities such as high-end equipment demonstrations, participating in industry visits, and organizing or participating in technical events so as to imbibe problem-solving skills, foster innovation, and build professional competencies necessary for successful careers in engineering.			3
Guidelines for Instructor's Manual			
The instructor's manual is to be developed as a hands-on resource and reference. The instructor's manual need to include prologue (about University/program/ institute/ department/foreword/ preface etc), copy of curriculum, conduction & Assessment guidelines, topics under consideration-concept, objectives, outcomes, set of typical applications/assignments/ guidelines, and references.			
Guidelines for Student's Laboratory Journal			

The laboratory assignments are to be submitted by students in the form of a journal. Journal consists of prologue, Certificate, table of contents, and handwritten write-up of each assignment (Title, Objectives, Problem Statement, Outcomes, software & Hardware requirements, Date of Completion, Assessment grade/marks and assessor's sign, Theory-Concept in brief, algorithm, flowchart, Design, test cases, conclusion/analysis. Program codes with sample output of all performed assignments are to be submitted as soft copy. As a conscious effort and little contribution towards Green IT and environment awareness, attaching printed papers as part of write-ups and program listing to journal may be avoided. Use of DVD containing students programs maintained by lab In-charge is highly encouraged. For reference one or two journals may be maintained with program prints at the Laboratory.

Guidelines for Laboratory /Term Work Assessment

Continuous assessment of laboratory work is done based on overall performance and lab assignments performance of students. Each lab assignment assessment will assign grade/marks based on parameters with appropriate weight age. Suggested parameters for overall assessment as well as each lab assignment assessment include-timely completion, performance, innovation, efficient codes, punctuality and neatness.

Guidelines for Laboratory Conduction

List of laboratory assignments is provided below for reference. The instructor is expected to frame the assignments by understanding the prerequisites, technological aspects, utility and recent trends related to the topic. The assignment framing policy need to address the average students and inclusive of an element to attract and promote the intelligent students. The instructor may set multiple sets of assignments and distribute among batches of students. It is appreciated if the assignments are based on real world problems/applications. Encourage students for appropriate use of coding style, proper indentation and comments. Use of open source software and recent version is to be encouraged. In addition to these, the instructor may assign one real life application in the form of a mini-project based on the concepts learned. Instructor may also set one assignment or mini-project that is suitable to a respective branch beyond the scope of syllabus

Suggested List of Laboratory Experiments/Assignments (Instructor may design a newer one)

Software Lab I(24P1506)

Group A : Python Programming (24P1503)

Sr. No.	Experiments/Assignments	CO
1	Write a Python program to check whether an input number is an Armstrong number or not. An Armstrong number is an integer with three digits such that the sum of the cubes of its digits is equal to the number itself.	CO1, CO2, CO3, CO6
2	Write a Python program to accept the number and Compute a) square root of number, b) Square of number, c) Cube of number d) check for prime, d) factorial of number e) prime factors	CO1, CO2, CO3, CO6
3	Write a program to compute the smallest divisor and Greatest Common Divisor of two numbers.	CO1, CO2, CO3, CO6
4	Write a python program to generate Fibonacci series.	CO1, CO2, CO3, CO6
5	Write a python program to find factorial of a number Using recursion.	CO1, CO2, CO3, CO6
6	Implement Function with concept of call by reference.	CO1, CO2, CO3, CO6
7	Write a program to demonstrate working with tuple in python	CO1, CO2, CO3, CO6
8	Write a python program to sum all the items in a dictionary.	CO1, CO2, CO3, CO6
9	Implement tower of honoi.	CO1, CO2, CO3, CO6
10	Create class STORE to keep track of Products (Product Code, Name and price). Display menu of all products to user. Generate appropriate bill.	CO1, CO2, CO3, CO6

11	Create class EMPLOYEE for storing details (Name, Designation, gender, Date of Joining and Salary). Define function members to compute a)total number of employees in an organization b)count of male and female employee c) Employee with salary more than 10,000 d) Employee with designation “Asst Manager”.	CO1, CO2, CO3, CO6
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Group A :Software Testing and Quality Assurance(24P1502)

Sr. No.	Experiments/Assignments	CO
1	Study of Test Director Tools.	CO4,CO5,CO6
2	Prepare test plan for an identified Mobile Application	CO4,CO5,CO6
3	Design test cases for any E-Commerce website	CO4,CO5,CO6
4	Manual Testing a) Write black box test cases for an application using Test Director tool. b)Perform white box testing – Cyclomatic complexity, data flow testing, control flow testing	CO4,CO5,CO6
5	Automated Testing Perform Black Box testing using automated testing tool on an application. Testing Points to be covered – data driven wizard, parameterization, exception handling	CO4,CO5,CO6

Short Term Project

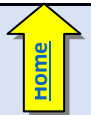
Learning Resources:

Textbooks:

1. Chun, J Wesley, Core Python Programming, Second Edition, Pearson, 2007 Reprint 2010
2. Kenneth A. Lambert, The Fundamentals of Python: First Programs, Cengage Learning, ISBN:978-1111822705
3. Gowrishankar S, Veena A, “Introduction to Python Programming”, 1st Edition, CRC Press/Taylor & Francis, 2018. ISBN-13: 978-081539437
4. Tamres L, “Introducing Software Testing”, Pearson Education, 2007.
5. Mathur A.P, “Fundamentals of Software Testing”, Pearson Education, 2008.
6. .Software Automation Testing Tools for Beginners, Rahul Shende, Shroff Publishers and Distributors, 2012
7. Barry, Paul, Head First Python, 2nd Edition, O Rielly, 2010
8. Lutz, Mark, Learning Python, 4th Edition, O Rielly, 2009

The CO-PO Mapping Matrix

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	-	-	3	-	-	3	-	3	3	3
CO2	3	3	3	3	3	-	-	3	-	-	3	-	3	3	3
CO3	3	3	3	3	3	-	-	3	-	-	3	-	3	3	3
CO4	3	3	3	3	3	-	-	3	-	-	3	-	3	3	3
CO5	3	3	3	3	3	-	-	3	-	-	3	-	3	3	3
CO6	3	3	3	3	3	-	-	3	3	3	3	3	3	3	3



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24P1507: Program Elective Course 1 Lab

Teaching Scheme	Credit	Examination Head: PR	
		Examination Scheme & Marks	
PR: 02 Hours/Week	01	ISE: 20 Marks	ESE: 30 Marks

Companion Course, if any: Program Elective Course 1(24P1505)

Course Objectives:

- To install and configure Unity and Visual Studio for VR development.
- To develop the ability to write Python programs to sniff and analyze packets on local networks.
- To understand cyber security by implementing and analyzing the effects of various network-based attacks using Python scripts.
- To implement Linear Programming Problems (LPP) using Python and SciPy/PuLP.
- To implement various SQL Operations using (DDL, DML) commands.

Course Outcomes: On completion of the course, learner will be able to–

	BL
CO1: Create interactive VR experiences using industry-standard development tools.	5
CO2: Conduct penetration tests and vulnerability assessments to evaluate the security of systems.	3
CO3: Develop and solve mathematical models for operational problems using optimization software.	5
CO4: Design and optimize complex SQL queries to retrieve and manipulate data efficiently.	5
CO5: Collaborate on group projects, demonstrating effective communication and project management skills in a database context.	3
CO6: Apply theoretical knowledge to real-world scenarios by engaging in experiential learning activities such as high-end equipment demonstrations, participating in industry visits, and organizing or participating in technical events so as to imbibe problem-solving skills, foster innovation, and build professional competencies necessary for successful careers in engineering.	3

Guidelines for Instructor's Manual

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Suggested List of Laboratory Experiments/Assignments (Instructor may design a newer one)

Program Elective Course 1 Lab(24P1507)

Suggested List of Laboratory Experiments/Assignments

Augmented Reality and Virtual Reality(24P1505-A)

Sr. No.	Experiments/Assignments	CO
1.	Installation of Unity and Visual Studio, setting up Unity for VR development, understanding documentation of the same.	CO1, CO6
2.	Demonstration of the working of HTC Vive, Google Cardboard, Google Daydream and Samsung gear VR.	CO1, CO6
3.	Develop a scene in Unity that includes: a cube, plane and sphere, apply transformations on the 3 game objects.	CO1, CO6
4.	Develop a scene in Unity that includes: a video and audio source.	CO1, CO6
5.	Develop a scene in Unity that includes a sphere and plane. Apply Rigid body component, material and Box collider to the game Objects. Write a program to grab and throw the sphere using VR controller.	CO1, CO6
6.	Develop a simple UI (User interface) menu with images, canvas, sprites and button. Write a program to interact with UI menu through VR trigger button such that on each successful trigger interaction display a score on scene.	CO1, CO6

Cyber Security(24P1505-B)

Sr. No.	Experiments/Assignments	CO
1.	Write a program to sniff packet sent over the local network and analyze it.	CO2,CO6
2.	Create an attack using python script and implement attack and analyze the effect of attack. a) DDOS Attacks b) IP spoofing c) DNS Attack	CO2,CO6
3.	Write a program in python script for Spam Mail Detection (Spam Filtering Implementation).	CO2,CO6
4.	Add proxy server as an extension in Google chrome and check the IP address before and after changing the proxy.	CO2,CO6
5.	Study of network authentication protocol.	CO2,CO6
6.	Design a Case study and Implement cryptographic techniques to secure data transmission and storage.	CO2,CO6

Operation Research(24P1505-C)

Sr. No.	Experiments/Assignments	CO
1.	Implement LPP in Python using SciPy and PuLP package or C or C++	CO3,CO6
2.	Implement transportation model in Python/C/C++/Java	CO3,CO6
3.	Implement travelling salesman problem in Python/C/C++/Java	CO3,CO6
4.	Implement minimum spanning tree	CO3,CO6
5.	Implement critical path of a given network	CO3,CO6
6.	Implement Goal programming	CO3,CO6

Database System and SQL(24P1505-D)

Sr. No.	Experiments/Assignments	CO
1.	Implementation of DDL commands (Create, Alter & Drop) of SQL with suitable examples. Also implementation of DML commands (Insert, Update, & Delete) of SQL	CO4,CO5,CO6
2.	Implementation of Different types of Functions and implementation of sub queries.	CO4,CO5,CO6
3.	Implementation of PL/SQL Cursor	CO4,CO5,CO6
4.	Implementation of PL/SQL Trigger	CO4,CO5,CO6
5.	Implementation of SQL function	CO4,CO5,CO6
6.	Implementation of SQL procedure	

Learning Resources:

Textbooks:

- 1 William R Sherman and Alan B Craig, "Understanding Virtual Reality: Interface, Application and Design", (The Morgan Kaufmann Series in Computer Graphics)". Morgan Kaufmann Publishers, San
2. Alan B Craig, "Understanding Augmented Reality, Concepts and Applications", Morgan Kaufmann Publishers, ISBN:978-0240824086
3. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole and Sunil Belapure, Wiley INDIA. ISBN 978-81-265-2179-1.

The CO-PO Mapping Matrix

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	3	-	3	-	2	-	-	-	-	-	-	3	3
CO2	-	-	2	2	3	3	-	-	-	2	-	-	-	3	3
CO3	3	3	3	3	-	-	2	-	-	-	-	-	3	3	3
CO4	-	-	-	3	3	-	-	-	-	-	-	-	3	3	3
CO5	-	3	3	3	3	-	-	3	2	-	3	-	3	3	3
CO6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

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24P1508:Study of Indian Constitution

Teaching Scheme	Credit	Examination Head: SEM I
		Examination Scheme & Marks
TUT: 01 Hour/Week	01	ISE : 20 Marks ESE: 30 Marks

Prerequisite: Any graduate

Course Objectives:

- To realize the significance of the constitution of India to students from all walks of life and help them to understand the basic concepts of Indian constitution.
- To identify the importance of fundamental rights as well as fundamental duties.
- To understand the functioning of Union, State and Local Governments in the Indian federal system.
- To learn procedure and effects of emergency, composition and activities of election commission and amendment procedure.

Course Outcomes: On completion of the course, learner will be able to–	BL
CO1: Apply knowledge of the historical background, understand and explain the significance of Indian Constitution as the fundamental law of the land.	3
CO2: Analyze his fundamental rights in proper sense at the same time identifies his Responsibilities in national building.	4
CO3: Analyze the Indian political system, the powers and functions of the Union, State and Local Governments in detail	4
CO4: Understand Electoral Process, Emergency provisions and Amendment procedure	3
CO5: Comprehend the roles, powers, and functions of the Union executive, Union Legislature, and Union judiciary, with a focus on parliamentary procedures and the Supreme Court.	3
CO6: Discover the legislative, administrative, and financial relations between the Union and State governments, including provisions for emergency, trade, and amendments to the Constitution.	3

Course Contents

Unit I	Introduction to Constitution	(05 Hrs.)
Meaning and importance of the Constitution, salient features of Indian Constitution. Preamble of the Constitution. Fundamental rights-meaning and limitations. Directive principles of state policy and Fundamental duties -their enforcement and their relevance.		
Unit II	Union Government	(05 Hrs.)
Union Executive- President, Vice-president, Prime Minister, Council of Ministers. Union Legislature-Parliament and Parliamentary proceedings. Union Judiciary-Supreme Court of India –Composition and powers and functions.		
Unit III	State Governments	(05 Hrs.)
State Executive- Governor, Chief Minister, Council of Ministers. State Legislature-State Legislative Assembly and State Legislative Council. State Judiciary-High court.		
Unit IV	Local Governments	(05 Hrs.)
Local Government-Panchayat raj system with special reference to 73 rd and Urban Local Self Govt. with special reference to 74 th Amendment.		

Unit V	Election provisions, Emergency provisions, Amendment of the constitution												(05 Hrs.)		
Election Commission of India-composition, powers and functions and electoral process. Types of Emergency-grounds, procedure, duration and effects. Amendment of the constitution- meaning, Procedure and limitations.															
Learning Resources															
Text Books:															
1. M.V.Pylee, “Introduction to the Constitution of India”,4 th Edition, Vikas publication,2005.															
2. Durga Das Basu(DD Basu) , “Introduction to the constitution of edition, Prentice-Hall EEE, 2008. India”,(Student Edition),19 th															
Reference Books:															
1. Ministry of law and justice, The constitution of India, Govt of India, New Delhi, 2019.															
2. JN Pandey, The constitutional law of India, Central Law agency, Allahabad, 51e, 2019															
e-Books:															
1. https://cdnbbsr.s3waas.gov.in/s380537a945c7aaa788ccfcdf1b99b5d8f/uploads/2023/05/2023050195.pdf															
MOOC Courses:															
1. https://www.youtube.com/watch?v=rUioc1ykCiA															
The CO-PO Mapping Matrix															
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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CO2	-	-	2	-	-	-	-	-	-	2	-	2	-	-	-
CO3	-	-	-	-	-	-	-	-	-	2	-	2	-	-	-
CO4	-	-	-	-	-	-	-	-	-	2	-	2	-	-	-
CO5	-	-	-	-	-	-	-	-	-	2	-	2	-	-	-
CO6	-	-	-	-	-	-	-	-	-	2	-	2	-	-	-