

DAYANANDA SAGAR ACADEMY OF TECHNOLOGY & MANAGEMENT



CURRICULUM

Scheme and Syllabus III to IV Semester

Outcome Based Education

(Academic Year 2024-2025)

Department of Master of Computer Applications

3rd & 4th Semester MCA

ABOUT THE INSTITUTE

Dayananda Sagar Academy of Technology and Management- DSATM was established in 2011 with 5 UG Programmes and 1 PG Program, the programmes are approved by All India Council for Technical Education (AICTE) New Delhi, Affiliated to Visvesvaraya Technological University (VTU), Belagavi and DSATM is an autonomous institute from 2023-2024.

The Dayananda Sagar Institutions is one of pioneer institutions in India and abroad with six decades of excellence in Academic and Research. The newer campuses were necessary to accommodate the growing need of the technology and innovation.

DSATM nurtures the students in academic, research, sports, cultural and extracurricular activities.

- Creating an academic environment to nurture and develop competent entrepreneurs, leaders and professionals who are socially sensitive and environmentally conscious.
- Integration of Outcome Based Education and cognitive teaching and learning strategies to enhance learning effectiveness.
- Developing necessary infrastructure to cater to the changing needs of Business and Society.
- Optimum utilization of the infrastructure and resources to achieve excellence in all areas of relevance.
- Adopting learning beyond curriculum through outbound activities and creative assignments.
- Imparting contemporary and emerging techno-managerial skills to keep pace with the changing global trends.
- Facilitating greater Industry-Institute Interaction for skill development and employability enhancement.
- Establishing systems and processes to facilitate research, innovation and entrepreneurship for holistic development of students.
- Implementation of Quality Assurance System in all Institutional processes.

VISION OF THE INSTITUTE

To strive at creating the institution a center of highest caliber of learning, so as to create an overall intellectual atmosphere with each deriving strength from the other to be the best of engineers, scientists with management & design skills.

MISSION OF THE INSTITUTE

- To serve its region, state, the nation and globally by preparing students to make meaningful contributions in an increasing complex global society challenges.
- To encourage, reflection on and evaluation of emerging needs and priorities with state-of-the-art infrastructure at institution.
- To support research and services establishing enhancements in technical, economic, human and cultural development.
- To establish interdisciplinary center of excellence, supporting/ promoting student's implementation.
- To increase the number of Doctorate holders to promote research culture on campus.
- To establish IIPC, IPR, EDC, innovation cells with functional MOU's supporting student's quality growth.

QUALITY POLICY

Dayananda Sagar Academy of Technology and Management aims at achieving academic excellence through continuous improvement in all spheres of Technical and Management education. In pursuit of excellence cutting – edge and contemporary skills are imparted to the utmost satisfaction of the students and the concerned stakeholders.

ABOUT THE DEPARTMENT

The MCA program at Dayananda Sagar Academy of Technology was started in the year 2021 with an intake of 60. Subsequently in the year 2023, the intake was increased to 120. The duration of the MCA program is 2 years. The department believes that Innovative Teaching-Learning methods coupled with problem-solving using modern tools help students to enhance their skills & enable them to handle the challenges faced in their professional lives. The department provides quality education with high standards to achieve academic excellence thereby achieving the career goals of the students. Various workshops/Technical Talks/Guest Lectures are organized through the department club "Xcurrate". Our students have completed MOOC's from various online platforms that has benefitted them in taking industrial internships. Our students are doing extremely well both in academics and extracurricular activities. The department offers various electives in cutting-edge technologies so that students are industry-ready.

The department encourages faculties and students to participate in National/International conferences to exhibit their ideas in the form of presentations and also publications in peer-reviewed Journals. The department has dedicated & committed faculty members supported by technical & administrative staff. The teaching faculties of the department are highly committed and give their best to the students by incorporating an innovative teaching learning process. The faculties are actively involved in research. Faculties publish their research work in various reputed International peer-reviewed journals. The students of MCA are placed in reputed companies such as Virusta, TCS, Capgemini, Cognizant, Tata Elxsi, Cognizant, Newton School and many more.

VISION OF THE DEPARTMENT

Nurture Continuous Learning through research and innovations in the field of Computer Science, Technology and Applications, to build competent professionals

MISSION OF THE DEPARTMENT

- Create a learning environment to motivate students to build strong technology skills.
- Promote value based ethical practices in all facets of learning.
- Instill Entrepreneurial collaborative thinking through structured interventions and industry participation.

PROGRAM EDUCATION OBJECTIVES (PEO'S):

PEO1: Analyse real life problems, design computing systems appropriate to its solutions that are technically sound, economically feasible and socially acceptable.

PEO2: Exhibit professionalism, ethical attitude, communication skills, team work in their profession and adapt to current trends by engaging in lifelong learning.

PEO3: Demonstrate Leadership and Entrepreneurship Skills by incorporating organizational goals.

PROGRAM OUTCOMES (PO's)

MCA Graduates will be able to:

1. Foundation Knowledge: Apply knowledge of mathematics, programming logic and coding fundamentals for solution architecture and problem solving.
2. Problem Analysis: Identify, review, formulate and analyse problems for primarily focussing on customer requirements using critical thinking frameworks.
3. Development of Solutions: Design, develop and investigate problems with as an innovative approach for solutions incorporating ESG/SDG goals.
4. Modern Tool Usage: Select, adapt and apply modern computational tools such as development of algorithms with an understanding of the limitations including human biases.
5. Individual and Teamwork: Function and communicate effectively as an individual or a team leader in diverse and multidisciplinary groups. Use methodologies such as agile.
6. Project Management and Finance: Use the principles of project management such as scheduling, work breakdown structure and be conversant with the principles of Finance for profitable project management.
7. Ethics: Commit to professional ethics in managing software projects with financial aspects. Learn to use new technologies for cyber security and insulate customers from malware
8. Life-long learning: Change management skills and the ability to learn, keep up with contemporary technologies and ways of working.

PROGRAM SPECIFIC OUTCOMES (PSO's)

PSO 1: The graduates of the Program will have skills to develop, deploy and maintain applications for desktop, web, mobile, cloud and cross platforms using modern tools and technologies.

PSO 2: The graduates of the program analyze the societal needs to provide novel solutions through technological based research.



Dayananda Sagar Academy of Technology & Management
(Autonomous Institute under VTU)

Affiliated to **VTU**
Approved by **AICTE**
Accredited by **NAAC** with **A+** Grade
6 Programs Accredited by **NBA**
(CSE, ISE, ECE, EEE, MECH, CV)

PROPOSED PG CREDIT STRUCTURE IN ALIGNMENT WITH VTU

Sl.No	Semester	No. of Credits
1	1 st Semester	23
2	2 nd Semester	24
3	3 rd Semester	27
4	4 th Semester	26
Total		100

PROPOSED PG SCHEME- 3rd Sem

Sl. No	Course Category	BOS	TD	Teaching Hours/Week					Credits
				Lecture	Tutorial	Practical	Project	Total	
				L	T	P	S	(Hrs/week)	
1	PCC	MCA	MCA	3	0	0	0	3	3
2	IPCC	MCA	MCA	3	0	2	0	5	4
3	IPCC	MCA	MCA	3	0	2	0	5	4
4	PEC-3	MCA	MCA	3	0	0	0	3	3
5	PEC-4	MCA	MCA	3	0	0	0	3	3
6	AEC	MCA	MCA	0	0	2	0	2	1
7	INT	MCA	MCA	0	0	0	14	14	7
8	SP	MCA	MCA	0	0	0	2	2	2
Total								27	

PROPOSED PG SCHEME- 4th Sem

Sl. No	Course Category	BOS	TD	Teaching Hours/Week					Credits
				Lecture	Tutorial	Practical	Project	Total	
				L	T	P	S	(Hrs/week)	
1	PEC-5	MCA	MCA	3	0	0	0	3	3
2	PEC-6	MCA	MCA	3	0	0	0	3	3
3	SEM	MCA	MCA	0	0	0	4	4	2
4	PROJ	MCA	MCA	0	0	0	32	32	18
								Total	26

Percentage of Mapping– Theory & Practical - Scheme & Syllabus- 3rd semester

3rd Sem Sl. No	Course Category	Theory	Practical
1	PCC	100%	--
2	IPCC	60%	40%
3	IPCC	60%	40%
4	PEC-3	100%	--
5	PEC-4	100%	--
6	AEC	--	100%
7	INT	--	100%
8	SP	--	100%
Total Percentage		84%	76%

Percentage of Mapping– Theory & Practical - Scheme & Syllabus- 4th semester

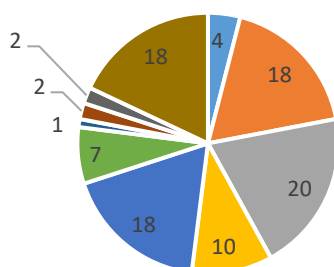
Sl. No	Course Category	Theory	Practical
		1	PEC-5
2	PEC-6	100%	--
3	SEM	--	100%
4	PROJ	--	100%
Total Percentage		100%	100%

Scheme Distribution

Department of Master of Computer Applications

Course Component	Credits	% of Credits
Basic Science (BS)	4	4%
Program core (PC)	18	18%
Program core Integrated (PCI)	20	20%
Program core exclusive Lab	10	10%
Professional Elective Course(PEC)	18	18%
Internship (INT)	07	7%
Ability Enhancement Course (AEC)	01	1%
Mandatory Core Course(MCC)	02	2%
Technical Seminar	02	2%
Project (PR)	18	18%
Total	100	100%

Scheme-Credit Distribution



- Basic Science (BS)
- Program core (PC)
- Program core Integrated (PCI)
- Program core exclusive Lab
- Professional Elective Course(PEC)
- Internship (INT)
- Ability Enhancement course (AEC)
- Mandatory Core Course(MCC)
- Technical Seminar
- Project (PR)

SEMESTER WISE CREDIT BREAKDOWN FOR MCA DEGREE CURRICULUM

BATCH 2023-2025

Course Category	Semester				Total Credits
	1 st	2 nd	3 rd	4 th	
Basic Sciences (BSC)	4	-	-	-	04
Professional Core Courses (PCC)	9	6	3	-	18
Integrated Professional Core Course (IPCC)	4	8	8	-	20
Professional Elective Course (PEC)	-	6	6	6	18
Ability Enhancement Course (AEC)	-	-	1	-	01
Program Core exclusive labs	4	4	2	-	10
Internship (INT)	-	-	7	-	07
Technical Seminar	-	-	-	2	02
Mini Project / Project Work (PW)	-	-	-	18	18
Mandatory Core Course(MCC)	2	-	-	-	02
Non-credit Mandatory Courses (NCMC)	0	-	-	-	-
Total Credits	23	24	27	26	100

Scheme of Teaching and Examinations – 2023
Outcome Based Education (OBE) and Choice Based Credit System (CBCS)
(Effective from 2023-24)

3rd SEMESTER: Master of Computer Applications (MCA)

Sl. No	Course Code	Course Title	Course Category	BOS	TD	Teaching Hours/Week					Credits	Examination			
						Lecture	Tutorial	Practical	Project	Total		SEE Duration (Hrs)	CIE Marks	SEE Marks	Total Marks
						L	T	P	S						
1	23MCA31	Internet of Things	PCC	MCA	MCA	3	0	0	0	3	3	3	50	50	100
2	23MCA32	Artificial Intelligence and Machine learning	IPCC	MCA	MCA	3	0	2	0	5	4	3	50	50	100
3	23MCA33	Computer Networks	IPCC	MCA	MCA	3	0	2	0	5	4	3	50	50	100
4	23MCA34X	Professional Elective Course-3	PEC	MCA	MCA	3	0	0	0	3	3	-	100	-	100
5	23MCA35X	Professional Elective Course-4	PEC	MCA	MCA	3	0	0	0	3	3	3	50	50	100
6	23MCA36	Smart Systems Laboratory	AEC	MCA	MCA	0	0	2	0	2	1	3	50	50	100
7	23MCA37	Societal Impact Project	SP	MCA	MCA	0	0	4	0	4	2	3	100	-	100
8	23MCA38	Internship	INT	MCA	MCA	0	0	0	14	0	7	3	50	50	100
Total						15	0	10	14	25	27	21	500	300	800

Professional Elective Course-3		Professional Elective Course-4	
23MCA341	Cyber Security	23MCA351	Blockchain Technology
23MCA342	Software Testing	23MCA352	Social Network Analysis
23MCA343	Storage Area Networks	23MCA353	Agile Software Development
23MCA344	Software Project Management	23MCA354	NOSQL

4th SEMESTER: Master of Computer Applications (MCA)

Sl. No	Course Code	Course Title	Course Category	BOS	TD	Teaching Hours/Week					Credits	Examination			
						Lecture	Tutorial	Practical	Project	Total		SEE Duration (Hrs)	CIE Marks	SEE Marks	Total Marks
						L	T	P	S						
1	23MCA41X	Professional Elective Course-5	PEC	MCA	MCA	3	0	0	0	3	3	3	50	50	100
2	23MCA42X	Professional Elective Course-6	PEC	MCA	MCA	3	0	0	0	3	3	3	50	50	100
3	23MCA43	Technical Seminar	SEM	MCA	MCA	0	0	0	4	4	2	-	100	-	100
4	23MCA44	Project Work	PROJ	MCA	MCA	0	0	0	32	32	18	3	100	100	200
5	23MCA45	Professional Development	NCMC	Online Course of 12 weeks to be completed from MOOC platform										PP	
Total						6	0	0	36	42	26	9	300	200	500

Professional Elective Course-5		Professional Elective Course-6	
23MCA411	Big Data Analytics	23MCA421	Digital Marketing
23MCA412	Cryptography and Network Security	23MCA422	Ethical Hacking
23MCA413	Natural Language Processing	23MCA423	Professional Communication and Ethics
23MCA414	Advanced Web Technologies	23MCA424	Enterprise Resource Planning

IPCC: Integrated Professional Core Course,

PCC: Professional Core Course

PBL: Project Based Learning

AEC: Ability Enhancement Course,

NCMC: Non-Credit Mandatory Course

MCC: Mandatory Core Course

L: Lecture,

T: Tutorial,

P: Practical

S= SDA: Skill Development Activity,

CIE: Continuous Internal Evaluation,

SEE: Semester End Evaluation.

Integrated Professional Core Course (IPCC): Refers to Integrated Professional Core Course Theory Integrated with practical's of the same course. Credit for IPCC can be 04 and its Teaching Learning hours (L : T : P) can be considered as (3 : 0 : 2) or (2 : 2 : 2). The theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper.

Newly introduced subjects in the syllabus

		3rd Semester	4th Semester
1.	List of Existing Elective Courses	Software Testing Blockchain Technologies Agile Software Development NOSQL Software Project Management	Big Data Analytics Natural Language Processing Advanced Web Technologies Digital Marketing
2.	List of New Existing Elective Courses	Cybersecurity Social Network Analysis Storage Area Networks	Cryptography and Network Security Professional Communication and Ethics Ethical Hacking Enterprise Resource Planning
3.	List of New Industry Aligned Courses	Smart Systems Laboratory Artificial Intelligence and Machine Learning	Big Data Analytics Advanced Web Technologies

Percentage of Change in the Syllabus

3 rd Semester						
SI.No	Course Code	Course Name	Topics Added	Topics removed	Revised in %	Justification
1	23MCA31	Internet of things	Sensors and Actuators IOT Physical devices and endpoints	Networks concepts	10%	To reach Industry Standards
2	23MCA32	Artificial Intelligence and Machine learning	Machine Learning Concepts	Connectionist models	10%	As per Industry Standards
3	23MCA33	Computer Networks	Transport and Data Link Layer	Physical Layer 2	5%	Practical component implementation
4	23MCA344	Software Project Management	-	-	0%	-
5	23MCA341	Cyber Security	-	Blockchain Technology	5%	-
6	23MCA351	Blockchain Technology	Bitcoins-Protocols on POW, Block chain for Government	Cryptography, DApp	10%	To understand the usage of blockchain in Government sectors.
7	23MCA353	Agile Software Development	Testing	-	10%	To reach Industry Standards
8	23MCA36	Smart Systems Laboratory	Mini Project	-	10%	To reach Industry Standards

4th Semester

Sl.No	Course Code	Course Name	Topics Added	Topics removed	Revised in %	Justification
1	23MCA411	Big Data Analytics	HIVE, PIG, Map reduce, MongoDB & Cassandra, ML for Big Data Analytics	Hadoop Parallel World, Meet Hadoop	20%	To get the practical exposure
2	23MCA414	Advanced Web Technologies	Web 5.0, Microservices, ReactJS, Node.js	Advanced PHP, AJAX	15%	Practical component implementation
3	23MCA422	Ethical Hacking	-	-	0%	-
4	23MCA424	Enterprise Resource Planning	-	-	0%	-

3rd SEMESTER

PROFESSIONAL CORE COURSE (PCC)

Teaching Hours/Week (L: T:P: S)	3:0:0:0
Total Hours of Pedagogy	40 hours
Credits:	03
Each Module	8 Hrs
CIE Marks	50
SEE Marks	50
Total Marks	100
Exam Hours	3
Examination nature (SEE)	Theory

3 Credit Course – Professional Core Course (PCC)

Assessment Details (both CIE and SEE)

- The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%.
- The minimum passing mark for the CIE is 50% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks).
- A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

Internal Assessment Test (IAT):

- For the Internal Assessment Test component of CIE, there are 25 marks and for Assignment component of the CIE, there are 25 marks. Two Tests, each of 50 Marks with 01-hour 30 minutes' duration, are to be conducted and average of two tests to be reduced to 25 marks
 - The first test will be administered after 40-50% of the syllabus has been covered, and
 - The second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.
- Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

The IA test questions are to be framed to map the Course Outcomes (COs), Program Outcomes (POs) and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Semester-End Examination:

Theory SEE will be conducted as per the scheduled timetable (duration 03 hours).

- The question paper will have ten questions. Each question is set for 20 marks.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module.
- The students have to answer 5 full questions, selecting one full question from each module.
- Marks scored shall be proportionally reduced to 50 marks.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **10 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The evaluation includes either through quiz or rubrics
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **10 Marks**

Total Marks scored for theory component of CIE (IAT+ CCA) is **25 Marks**

Possible Continuous and Comprehensive Assessment (CCA):

- Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom,
- The assessment of these techniques shall be in rubrics.
- The faculty can adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Professional Core Course (PCC) – 3 Credit course – Theory

Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Theory				50	----	----	25	
	Theory	Internal Assessment Test (IAT) - II	Module – 1 to 2.5	50	(50+50) / 2	25	15	Average of Two Internal test each of 50 Marks scale down the marks to 25
		Internal Assessment Test (IAT) - II	Module – 2.5 to 5	50				
	Continuous Comprehensive Assessment (CCA)	CCA-1- Pedagogical Initiatives / Activity Based learning	Considering all the Modules	50	(50+50) / 2	25	15	
		CCA-2- Pedagogical Initiatives / Activity Based learning		50				
Total CIE Theory						50	30	Total Marks of IAT and CCA is 50

SEE		Theory exam	Entire theory syllabus including questions from lab Component in respective Modules	100	----	50	20	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
CIE + SEE				100	----	----	50	



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	III			
Course Title	:	Internet of Things			
Course Code	:	23MCA31			
Course Type (Theory/ Practical/ Integrated)	:	Theory			
Category	:	PCC			
Stream	:	MCA	CIE	:	50 Marks
Teaching hours/ week (L:T:P:S)	:	3:0:0:0	SEE	:	50 Marks
Total Hours	:	40 Hrs	SEE	:	3 Hours
Credits	:	3	Duration	:	

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Understand the basics and significance of the Internet of Things
2	To understand different IoT architecture, operation, and business benefits for an IoT solution.
3	Explore the relationship between IoT, cloud computing, and big data and how IOT differs from traditional data collection systems.
4	Understand different domains with different use cases of Real time applications
5	Understand the basics and significance of the Internet of Things

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
- Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.
- Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.



DSATM

Scheme of Teaching and Examinations for MCA Programme -2024-25

Outcome Based Education and Choice Based Credit System (CBCS)

(Effective from the Academic Year 2024-25)

COURSE CURRICULUM

Module No.	Topics	Hours
1	What is IOT, Genesis of IOT, IOT and Digitization, IOT Impact, Convergence of IT and IOT, IOT Challenges, IOT Network Architecture and Design, Drivers Behind New Network Architectures, Comparing IOT Architecture, A Simplified IOT Architecture, The Core IOT Functional Stack, IOT Data Management and Compute Stack	8
Pedagogy	IOT architecture Roleplay	
2	Definition and Characteristics of IOT Sensors, Actuators, Physical Design of IOT – IOT Protocols, IOT communication models, IOT Communication APIs, IOT enabled Technologies Wireless Sensor Networks, Cloud Computing, Embedded Systems, IOT Levels and Templates, Domain Specific IOTs – Home, City, Environment, Energy, Agriculture and Industry. Smart Objects: The Things in IOT, Sensors, Actuators, and Smart Objects, Sensor Networks, Connecting Smart Objects, Communications Criteria, IOT Access Technologies.	8
Pedagogy	Sensors connectivity hands on session	
3	IOT Physical Devices and Endpoints- Introduction to Arduino and Raspberry Pi- Installation, Interfaces (serial, SPI, I2C) Controlling Hardware- Connecting LED, Buzzer, Switching High Power devices with transistors, Controlling AC Power devices with Relays, Controlling servo motor, speed control of DC Motor, unipolar and bipolar Stepper motors.	8
Pedagogy	IOT devices -Hands on session	
4	Sensors- Light sensor, temperature sensor with thermistor, voltage sensor, ADC and DAC, Temperature and Humidity Sensor DHT11, Motion Detection Sensors, Wireless Bluetooth Sensors, Level Sensors, USB Sensors, Embedded Sensors, Distance Measurement with ultrasound sensor	8
Pedagogy	Sensors and actuators-Hands on session	
5	IOT Physical Devices and Endpoints Arduino UNO: Introduction to Arduino, Arduino UNO, Installing the Software, Fundamentals of Arduino Programming. IoT Physical Devices and Endpoints - RaspberryPi: Introduction to RaspberryPi, About the RaspberryPi Board: Hardware Layout, Operating Systems on RaspberryPi, Configuring RaspberryPi, Programming. RaspberryPi with Python, Wireless Temperature Monitoring System Using Pi, DS18B20 Temperature Sensor, Connecting Raspberry Pi via SSH, Accessing Temperature from DS18B20 sensors, Remote access to RaspberryPi, Smart and Connected Cities, An IoT Strategy for Smarter Cities, Smart City IoT Architecture, Smart City.	8

Text Books

Sl. No.	Title of the Book/Name of the author/Name of the publisher/Edition and Year
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1	Da Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", 1stEdition, Pearson Education (CiscPress Indian Reprint. (ISBN: 9789386873743), 2017
2	Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madiseti, Universities Press, I BN: 9788173719547, 2021
Reference Books	
1	Vijay Madiseti and ArshdeepBahga, "Internet of Things (A Hands on Approach)", 1stEdition, VPT, . (ISBN: 978-8173719547),VPT, 2014.
2	.Raj Kamal, "Internet of Things: Architecture and Design Principles", 1st Edition, McGraw Hill Education, (ISBN: 978-9352605224), 2021

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	To understand and define the Roles, and challenges of IOT & OT, impact of IOT evolutionary phases, gateways, securities, and types of IOT architectures.	L1/L2	U/R
CO2	Apply the IOT architecture for designing the blocks of IOT , smart objects, sensors, actuators, and communication channels to transmit data wirelessly between	L3	A
CO3	Analyze the application of data analytics and programming for a given IoT business case.	L4	AN
CO4	Explore various sensors for data collection, protocol analysis, and data standardization in the creation and development of IoT platforms.	L5	C
CO5	Create IOT Applications for smart home automation, and temperature monitoring using IOT devices.	L6	E

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	–	–	–	–	–	–	–	–	–	–
CO2	3	–	–	–	–	–	–	–	3	–
CO3	–	3	–	–	–	–	–	–	–	3
CO4	–	–	3	–	3	–	–	–	–	–
CO5	–	–	–	3	–	–	–	3	–	–

Weblinks and Video Lectures (e-Resources)

1	https://www.youtube.com/watch?v=91aXs9E0qAI
2	https://www.youtube.com/watch?v=N_z4OaSuoAA

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory			
	Continuous Assessment Tests (IAT)		Continuous Comprehensive Assessment (CCA)	
	IAT-1	IAT-2	CCA-1	CCA-2
	50 Marks	50 Marks	50 Marks	50 Marks
Remember			10	5
Understand	10	20		5
Apply	20	20	10	10
Analyse	20	10	10	10

Evaluate	-	-	10	10
Create	-	-	10	10

CIE Course Assessment Plan

CO's	Marks Distribution						Total Marks	Weightage
	Test-1			Test-2				
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	-	5	5	5	-	-	15	15%
CO2	10	5	5	10	5	10	45	45%
CO3	-	10	10	5	5	10	40	40%
CO4	-	-	-	-	-	-		
CO5	-	-	-	-	-	-		
Total	10	20	20	20	10	20	100	100%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	15
Understand	-
Apply	45
Analyse	40
Evaluate	-
Create	-

SEE Course Plan

CO's	Marks Distribution						Total Marks	Weightage
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	-	5	5	5	-	-	15	15%
CO2	10	5	5	10	5	10	45	45%
CO3	-	10	10	5	5	10	40	40%
CO4	-	-	-	-	-	-		
CO5	-	-	-	-	-	-		
Total	10	20	20	20	10	20	100	100%

**INTEGRATED
PROFESSIONAL CORE
COURSE (IPCC)**

IPCC Course – Integrated Professional Core Course

Teaching Hours/Week (L: T:P: S)	3:0:2:0
Total Hours of Pedagogy	40 hours Theory + 20 Hours of Practical Classes
Credits:	04
Theory - Each Module	8 Hrs
Practical's	8-10 Programs / Experiments
CIE Marks	50
SEE Marks	50
Total Marks	100
Exam Hours	3
Examination nature (SEE)	Theory

- The theory part of the IPCC shall be evaluated both by CIE and SEE.
- The practical part shall be evaluated by only CIE (no SEE).
- However, questions from the practical part of IPCC shall be included in the SEE question paper.

Integrated Professional Core Course (IPCC) - 4 Credit Course

Assessment Details (both CIE and SEE)

- The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%.
- The minimum passing mark for the CIE is 50% of the maximum marks (25 marks out of 50) and for the SEE minimum passing mark is 40% of the maximum marks (20 out of 50 marks).
- A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation (CIE) for the Theory component of the IPCC (Maximum marks 50)

Internal Assessment Test (IAT):

- IPCC means practical portion integrated with the theory of the course.
- CIE marks for the theory component are 25 marks and that for the practical component is 25 marks.
- 25 marks for the theory component are split into 15 marks for two Internal Assessment Tests (Two Tests, each of 50 Marks with 01-hour 30 minutes' duration, are to be conducted and average of two tests to be reduced to 15 marks) and 10 marks for Two Continuous Comprehensive Assessment(CCA) methods.
- The first Internal test at the end of 40-50% coverage of the syllabus

- The second Internal test after covering 85-90% of the syllabus.
- Scaled-down marks of the sum of two tests and other assessment methods will be CIE marks for the theory component of IPCC (that is for 25 marks).
- The student has to secure 50% of 25 marks to qualify in the CIE of the theory component of IPCC.

The IA test questions are to be framed to map the Course Outcomes (COs), Program Outcomes (POs) and the Revised Blooms Taxonomy (RBT) Levels. Emphasis to be given for Higher order Thinking Skills(HOTS).

Continuous Internal Evaluation (CIE) for the practical component of the IPCC

- On completion of every experiment/program in the laboratory, the students shall be evaluated and Marks shall be awarded on the same day.
- The CIE marks awarded in the case of the Practical component shall be based on the continuous evaluation of the laboratory report, **05 Marks** are for conducting the experiment, **05 Marks** for preparation of the laboratory record, **5 Marks** for conducting Open Ended Experiments Each experiment. Marks of all experiments' write-ups are added to 15 marks.
- The Practical laboratory test (**duration 03 hours**) at the end of the 15th week of the semester/after completion of all the experiments (whichever is early) shall be conducted for **50 Marks** and scaled down to **5 Marks**.
- The open-ended experiment after completion of all the experiments shall be conducted for 20 marks with a split-up for 5 Marks for writeup, 10 Marks for Execution, and 5 Marks for Viva-Voce. Marks for writeup, Execution and Viva-Voce is added and scaled down to 05 marks.
- Scaled-down marks of write-up evaluations and tests added will be CIE marks for the laboratory component of IPCC for 25 marks.
- The student has to secure 50% of 25 marks to qualify in the CIE of the practical component of the IPCC.

Semester End Examination (SEE) for IPCC Theory

SEE will be conducted as per the scheduled timetable, with common question papers for the course (duration 03 hours)

- The question paper will have ten questions. Each question is set for 20 marks.
- The question paper shall be set for 100 Marks. The medium of the question paper shall be English. **The duration of SEE is 03 hours.**

- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module. The two questions shall be of same course outcome, program outcome and Blooms RBT level. Emphasis to be given for higher order RBT levels.
- The students have to answer 5 full questions, selecting one full question from each module.
- Marks scored by the student shall be proportionally scaled down to 50 Marks.
- The theory portion of the IPCC shall be for both CIE and SEE, whereas the practical portion will have a CIE component only.
- Questions mentioned in the SEE paper may include questions from the practical component.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be $(CCA1+CCA2)/2$ and scaled down to **10 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The Assessment will be through rubrics.
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **10 Marks**

Total Marks scored for theory component of CIE (IAT+ CCA) is **25 Marks**

Possible Continuous and Comprehensive Assessment (CCA):

- Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom,
- The assessment of these techniques shall be in rubrics.
- The faculty can adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

4 Credits Courses – Integrated Professional Core Course (IPCC)

Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Theory + Practical				50	----	----	25	
CIE	Theory	Internal Assessment Test (IAT) - I	Module – 1 to 2.5	50	$(50+50) / 2$	20	15	Average of Two Internal test each of 50 Marks scale down the marks to 15 Marks
		Internal Assessment Test (IAT) - II	Module – 2.5 to 5	50				
	Continuous Comprehensive Assessment (CCA)	CCA-1- Pedagogical Initiatives / Activity based learning	Considering all the Modules	50	$(50+50) / 2$	20	15	Two CCA methods to be adopted. If CCA chosen is Project Based Learning, then one assessment method may be adopted
		CCA-2- Pedagogical Initiatives/ Activity based learning		50				
	Total CIE Theory						40	30

CIE	Practical	Conduction of Experiments	Performance-Continuous Evaluation of each experiment	05	15	Average of all Experiments	15	4	Performance of the Experiment (On completion of every experiment/program in the laboratory, the students shall be evaluated and marks shall be awarded on the same day. 20 marks are for conducting the experiment and calculations/observations/output)
			Record	05					
			Observation book	05					
		Practical Test	Write up	15	50	----	05	4	One Internal Practical Test after conduction of all Experiments for 50 Marks
			Execution	25					
			Viva-voce	10					
		Open Ended Experiment	Write up	05	20	----	05	2	One experiment for 20 marks. 20 marks reduced to 05 marks
			Execution	10					
			Viva-voce	05					
		Total CIE Practical							25

SEE		Theory exam	Entire theory syllabus including questions from lab Component in respective Modules	100	----	50	20	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
CIE + SEE				100	----	----	50	

- The Minimum Marks to be secured in CIE to appear for SEE shall be 10 (40% of Maximum Marks – 25) in the Theory Component and 10 (40% of Maximum Marks – 25) in the Practical component.
- The Laboratory Component for the IPCC shall be for CIE only.
- However, in SEE, the Questions from the Laboratory Component shall be included in the respective Modules only.

Note: If few of the 3 Credit Courses are Integrated course type, for such courses the method suggested for 4 Credit IPCC Course shall be followed



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	III		
Course Title	:	Artificial Intelligence and Machine Learning		
Course Code	:	23MCA32		
Course Type (Theory/ Practical/Integrated)	:	Integrated		
Category	:	IPCC		
Stream	:	MCA	CIE	50 Marks
Credits (L: T:P:S)	:	3:0:2:0	SEE	50 Marks
Total Hours	:	60 Hrs	SEE Duration	3 Hours

Course Learning Objectives: Students will be taught

Sl.No	Course Objectives
1	Understand the fundamentals of Artificial Intelligence and its significance
2	Learn the concepts of First order Logic and Propositional Logic
3	Learn the basic concepts of Generative AI
4	Understand the various algorithms in Machine Learning
5	Learn the various applications of Machine Learning

Teaching-Learning Process

Pedagogy (General Instructions):

These are sample Strategies; which teachers can use to accelerate the attainment of the various course outcomes.

1. Lecture method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.
2. Show Video/animation films to explain the infrastructures and the mechanism involved in the principle.
3. Encourage collaborative (Group) Learning in the class.
4. Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking.
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
6. Topics will be introduced in multiple representations.
7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.
9. Individual teachers can devise innovative pedagogy to improve teaching-learning



DSATM

Scheme of Teaching and Examinations for MCA Programme -2024-25

Outcome Based Education and Choice Based Credit System (CBCS)

(Effective from the Academic Year 2024-25)

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	Introduction to AI , Problem Solving and Generative AI Definition - Importance of AI, Evolution of AI - Applications of AI, Classification of AI systems with respect to environment, Intelligent Agents, Problem solving by Search, Problem space - State space, Blind Search - Types, Performance measurement - Informed search strategies, Heuristic functions, Local search strategies- Hill climbing, simulated annealing, Basics of generative models, Types of Generative Models	8
Pedagogy	Problem-Solving	
2	Logic and Reasoning Introduction to Logic and Reasoning -Propositional Logic-First Order Logic-Inference in First-Order Logic- Unification, Forward Chaining, Backward Chaining, Resolution. Learning: What is learning, Rote learning, Learning by Taking Advice, Learning in Problem-solving, Learning from example: induction, Explanation-based learning.	8
Pedagogy	AI Ethics Debate	
3	Introduction to Machine Learning: Need for Machine Learning, types of Machine Learning Algorithms, Challenges of Machine Learning, Machine Learning Process, Applications of Machine Learning Regression: Introduction to Regression, Steps in building a Regression model, Simple Linear Regression Model, Validation of Regression methods, Logistic Regression.	8
Pedagogy	Seminar	
4	Classification: Decision Trees Learning, Naive Bayes Classifier, K Nearest Neighbour, Support Vector Machine	8
Pedagogy	Hands on session	
5	Clustering: Working of Clustering algorithms, K Means Clustering, Creating Product segments using clustering, Hierarchical clustering Forecasting: Overview, Components of Time Series Data, Moving Average, Auto Regressive Integrated Moving Average Models	8
Pedagogy	Hands on session	

Textbooks:

1. Kevin Night and Elaine Rich, Nair B., "Artificial Intelligence (SIE)", Mc Graw Hill- 2008.
2. Russell, S. and Norvig, P. 2015. Artificial Intelligence - A Modern Approach, 3 rd Edition, Prentice Hall.
3. Generative AI for Beginners by Ethan James Whitfield
4. S. Shalev-Shwartz, S.Ben-David, "Understanding Machine Learning: From Theory to Algorithms", Cambridge University Press, 2014.

Reference books:

2. Peter Jackson, "Introduction to Expert Systems", 3rd Edition, Pearson Education, 2007.
3. Deepak Khemani "Artificial Intelligence", Tata Mc Graw Hill Education 2013.
4. Mehryar Mohri, Afshin Rostamizadeh, Ameet Talwalkar "Foundations of Machine Learning", MIT Press, 2nd Edition, 2018.
5. Tom Mitchell, "Machine Learning", McGraw Hill, 3rd Edition, 1997

List of Experiments or Programs

SI.No	Experiments/Programs	COs
1	Write a program to demonstrate linear regression using an appropriate dataset.	CO4
2	Write a program to demonstrate logistic regression using an appropriate dataset.	CO4
3	Write a program to demonstrate the working of the decision tree. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample	CO4
4	Write a program to implement Naive Bayes algorithm to classify the iris data set. Print both correct and wrong predictions.	CO4
5	Write a program to implement k-Nearest Neighbor algorithm to classify the iris data set. Print both correct and wrong predictions.	CO5
6	Write a program to implement clustering using the k-Means algorithm using an appropriate dataset.	CO4
7	Write a program to implement Hierarchical clustering	CO4
8	Write a program to implement Support Vector Machine algorithm	CO4
9	Write a program to implement clustering using random forest algorithm using an appropriate dataset.	CO5
10	Write a program to implement Forecasting using ARIMA Model	CO5

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	Level Indicator
CO1	Understand the basic concepts of AI and its applications	L1/L2	U/R
CO2	Apply appropriate AI methods to solve a given problem	L3	A
CO3	Analyse the various applications of Generative AI	L4	AN
CO4	Develop custom machine-learning models for specific applications	L5	C
CO5	Evaluate the effectiveness of different machine learning models using cross-validation and other validation techniques.	L6	E

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	3	-
CO3	-	3	-	-	-	-	-	-	-	3
CO4	-	-	3	-	3	-	-	-	-	-
CO5	-	-	-	3	-	-	-	3	-	-

Weblinks and Video Lectures (e-Resources)

1	https://www.youtube.com/watch?v=ukzFI9rgwfU
2	https://www.youtube.com/watch?v=oV74Najm6Nc
3	https://www.geeksforgeeks.org/artificial-intelligence-an-introduction/
4	https://cloud.google.com/use-cases/generative-ai

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory	
	Continuous Assessment Tests	

	Test-1	Test-2	Test-3	Alternative Assessment Tool (AAT)
	50 Marks	50 Marks	50 Marks	40 Marks
Remember	10	-	10	-
Understand	-	10	-	-
Apply	20	20	10	-
Analyse	20	20	30	-
Evaluate	-	-	-	20
Create	-	-	-	20

CIE Course Assessment Plan

CO's	Marks Distribution					Total Marks	Weightage
	Test-1		Test-2		Test-3		
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	5	5	5	5	10	30	20%
CO2	10	10	10	10	20	60	40%
CO3	10	10	10	10	20	60	40%
CO4							
CO5							
Total	25	25	25	25	50	150	100%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	5
Understand	-

Apply	10
Analyse	10
Evaluate	10
Create	15

SEE Course Plan

CO's	Marks Distribution						Total Marks	Weightage
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5	-	-	-	-	-	5	10%
CO2	-	5	5	-	5	5	20	20%
CO3	5	5	5	5	5	5	30	30%
CO4	-	5	-	5	5	5	20	20%
CO5	5	5	-	-	5	5	20	20%
Total	20	20	10	10	20	20	100	100%



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	III			
Course Title	:	Computer Networks			
Course Code	:	23MCA33			
Course Type (Theory/ Practical/ Integrated)	:	Integrated			
Category	:	IPCC			
Stream	:	MCA	CIE	:	50 Marks
Teaching hours/ week (L:T:P:S)	:	3:0:2:0	SEE	:	50 Marks
Total Hours	:	60 Hrs	SEE	:	3 Hours
Credits	:	4	Duration		

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Understand the fundamental concepts of Networks.
2	Describe how the packets are delivered on the internet and learn a simple LAN with hubs, bridges and switches.
3	Understand the advanced networking concepts.
4	Enumerate the functions and layers of the OSI and TCP/IP models
5	Explore design networks and protocols for distributed systems for web, email, video, and internet-of-everything.

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
- Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.
- Devise innovative pedagogy to improve Teaching-Learning Process (TLP).



DSATM

**Scheme of Teaching and Examinations for MCA Programme -2024-25
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2024-25)**

COURSE CURRICULUM

Module No.	Topics	Hours
1	Introduction: Data Communications, Networks types, Internet, Standards & administration, Network model Protocols Layering, TCP/IP Protocol suite, Addressing, OSI model.	8
Pedagogy	OSI Layer-Role play	
2	Physical Layer-1: Data & signals: Analog & Digital Signals, Transmission Impairment, Data Rate limits, Performance, Digital to digital conversion analog to digital conversion Transmission Modes, Digital-to-analog conversion, Simulation experiments.	8
Pedagogy	Encoding-Problem solving	
3	Physical Layer-2 and Switching: Multiplexing, Spread Spectrum, Guided media, Unguided media: wireless, Introduction to switching, Circuit Switched Networks, Packet switched, Datagram Networks, Virtual Circuit Networks—Structure of a switch	8
Pedagogy	Circuit switching -Hands on session Using Cisco packet tracer	
4	Data Link layer: Link layer addressing, Error detection & correction, Block coding, Cyclic codes, Checksum, Forward error correction, Data link layer protocol, HDLC, Point to point protocol, Random access, control access, Channelization, Ethernet protocol, Standard Ethernet, Fast Ethernet, Gigabit Ethernet, Telephone networks, Cable networks, SONET, ATM, IEEE 802.11 project, Bluetooth, Connecting devices, SDN	8
Pedagogy	CRC -Simulation Using Cisco packet tracer	
5	Network layer services, The Internet protocol: Introduction, ICMPV4, Mobile IP, Routing protocols, Client server programming, Interactive programming, Electronic mail, Telnet, Secure shell. Domain name systems, Multimedia, Multimedia internet, QOS support Integrated services, Differentiated services, MPLS, IPv6, Datagram format, Address structure, Extension headers, world wide web & HTTP, FTP, Electronic mail, Network Management: SNMP, ASN.1, Network layer Security, Firewalls, Application layer security	8

List of Programs:

Sl. No.	Experiments/Programs	COs
1	Simulate the network with five nodes n0, n1, n2, n3, n4, forming a star topology. The node n4 is at the center. Node n0 is a TCP source, which transmits packets to node n3 (a TCP sink) through the node n4. Node n1 is another traffic source, and sends UDP packets to node n2 through n4. The duration of the simulation time is 10 seconds	CO4
2	Simulate a variety of IP based Networks using Ns2	CO5
3	Develop a program to compute CRC code for the polynomials CRC-12, CRC-16 and CRC CCIP	CO5

4	Develop a simple data link layer that performs the flow control using the sliding window protocol, and loss recovery using the Go-Back-N mechanism	C05
5	Evaluates the existing network protocol performance using Ns2	C04
6	Simulate the network with five nodes n0, n1, n2, n3, n4, forming a star topology. The node n4 is at the center. Node n0 is a TCP source, which transmits packets to node n3 (a TCP sink) through the node n4. Node n1 is another traffic source and sends UDP packets to node n2 through n4. The duration of the simulation time is 10 seconds.	C05
7	Simulate to study the transmission of packets over Ethernet LAN and determine the number of packets drop destination.	C05
8	Simulate the different types of internet traffic such as FTP and TELNET over a wired network and analyze the packet drop and packet delivery ratio in the network.	C04
9	Implement the connectivity of Network cables and Practically implement the cross-wired cable and straight-through cable using a clamping tool.	C05
10	Configuring a Cisco Router as a DHCP Server	C04
11	Applications using TCP sockets like: Echo client and echo server Chat File Transfer	C05
12	Simulation of Distance Vector/ Link State Routing algorithm	C04
Open ended Programs		
1	Implement the commands like tcpdump, netstat, ifconfig, nslookup and traceroute. Capture ping and traceroute PDUs using a network protocol analyzer and examine	C04
2	Study of Network simulator (NS) and Simulation of Congestion Control Algorithms using NS.	C04
3	Performance evaluation of Routing protocols using Simulation tool	C04
4	Implement the code to simulate the ARP /RARP protocols	C05

Text Books

Sl. No.	Title of the Book/Name of the author/Name of the publisher/Edition and Year
1	Behrouz A. Forouzan: Data Communication and Networking, 6th Edition Tata McGraw-Hill, 2017
2	Larry L. Peterson and Bruce S. Davie: Computer Networks – A Systems Approach, 5th Edition, Elsevier,, 2021

Reference Books

1	Alberto Leon-Garcia and Indra Widjaja: Communication Networks - Fundamental Concepts and Key architectures Tata McGraw-Hill., edition 2, 2008
2	William Stallings: Data and Computer Communication, 8th Edition, Pearson Education, edition 11, 2022
3	Nader F Mir: Computer and Communication Networks, Pearson Education, edition 4, 2020

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Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understand the basic concepts of network protocol, OSI and TCP/IP model, and networks devices and data transmission.	L1/L2	U/R
CO2	Apply the techniques of encoding, channel allocation, framing, error and flow control in the data link layer.	L3	A
CO3	Analyse the various functions of Network Layer	L4	AN
CO4	Design and implement a network protocol using TCP/IP and UDP	L5	C
CO5	Evaluate the different types of networks and services for various scenarios.	L6	E

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	–	–	–	–	–	–	–	–	–	–
CO2	3	–	–	–	–	–	–	–	–	–
CO3	–	3	–	–	–	–	–	–	–	–
CO4	–	–	3	–	3	–	–	–	3	–
CO5	–	–	–	3	–	–	–	3	–	3

Weblinks and Video Lectures (e-Resources)

1	https://www.binghamton.edu/watson/continuing-education/data-science/intro-to-computer-networks.html
2	https://elearn.daffodilvarsity.edu.bd/course/view.php?id=5457
3	https://onlinecourses.nptel.ac.in/noc21_cs18/preview
4	https://jntuh.ac.in/uploads/academics/R22B.Tech.CSE(IOT)landIIYearSyllabus.pdf

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory				Practical
	Continuous Assessment Tests (IAT)		Continuous Comprehensive Assessment (CCA)		Practical Test
	IAT-1	IAT-2	CCA-1	CCA-2	
	50 Marks	50 Marks	50 Marks	50 Marks	
Remember	5	5	-	-	-
Understand	5	5	-	-	-
Apply	10	10	10	10	10
Analyse	10	10	10	10	10
Evaluate	10	10	15	15	10
Create	10	10	15	15	20

CIE Course Assessment Plan

CO's	Marks Distribution						Total Marks	Weightage
	Test-1			Test-2				
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5	-	5	-	-	-	10	10%
CO2	-	5	5	-	5	5	20	20%
CO3	5	5	5	5	5	5	30	30%
CO4	-	5	-	5	5	5	20	20%
CO5	5	5	-	-	5	5	20	20%
Total	15	20	15	10	20	20	100	100%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	5
Understand	-
Apply	10
Analyse	10
Evaluate	10
Create	15

SEE Course Plan

CO's	Marks Distribution						Total Marks	Weightage
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5	-	-	-	-	-	5	10%
CO2	-	5	5	-	5	5	20	20%
CO3	5	5	5	5	5	5	30	30%
CO4	-	5	-	5	5	5	20	20%
CO5	5	5	-	-	5	5	20	20%
Total	20	20	10	10	20	20	100	100%

**PROFESSIONAL
ELECTIVE COURSE
(PEC)**

PEC Course - Professional Elective Course

Teaching Hours/Week (L: T:P: S)	3:0:0:0
Total Hours of Pedagogy	40 hours
Credits:	03
Each Module	8 Hrs
CIE Marks	50
SEE Marks	50
Total Marks	100
Exam Hours	3
Examination nature (SEE)	Theory

3 Credit Course – Professional Elective Course (PEC)

Assessment Details (both CIE and SEE)

- The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%.
- The minimum passing mark for the CIE is 20% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 40% of the maximum marks (25 out of 50 marks).
- A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

Internal Assessment Test (IAT):

- For the Internal Assessment Test component of CIE, there are 25 marks and for Assignment component of the CIE, there are 25 marks. Two Tests, each of 50 Marks with 01-hour 30 minutes' duration, are to be conducted and average of two tests to be reduced to 25 marks
 - The first test will be administered after 40-50% of the syllabus has been covered, and
 - The second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.
- Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

The IA test questions are to be framed to map the Course Outcomes (COs), Program Outcomes (POs) and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Semester-End Examination:

Theory SEE will be conducted as per the scheduled timetable (duration 03 hours).

- The question paper will have ten questions. Each question is set for 20 marks.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module.
- The students have to answer 5 full questions, selecting one full question from each module.
- Marks scored shall be proportionally reduced to 50 marks.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **10 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The evaluation includes either through quiz or rubrics
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **10 Marks**

Total Marks scored for theory component of CIE (IAT+ CCA) is **25 Marks**

Possible Continuous and Comprehensive Assessment (CCA):

- Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom,
- The assessment of these techniques shall be in rubrics.
- The faculty can adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Professional Core Course (PCC) – 3 Credit course – Theory

Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details	
Total CIE Theory + Practical				50	----	----	20		
	Theory	Internal Assessment Test (IAT) - II	Module – 1 to 2.5	50	$(50+50) / 2$	25	10	Average of Two Internal test each of 50 Marks scale down the marks to 25	
		Internal Assessment Test (IAT) - II	Module – 2.5 to 5	50					
	Continuous Comprehensive Assessment (CCA)	CCA-1- Pedagogical Initiatives / Activity Based learning	Considering all the Modules	50	$(50+50) / 2$	25	10		Two CCA methods to be adopted. If CCA chosen is Project Based Learning, then one assessment method may be adopted
		CCA-2- Pedagogical Initiatives / Activity Based learning		50					
	Total CIE Theory						50		

SEE		Theory exam	Entire theory syllabus including questions from lab Component in respective Modules	100	----	50	20	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
CIE + SEE				100	----	----	40	



Dayananda Sagar Academy of Technology & Management
(Autonomous Institute under VTU)

Semester	:	III			
Course Title	:	Cyber Security			
Course Code	:	23MCA341			
Course Type (Theory/ Practical/ Integrated)	:	Theory			
Category	:	PEC			
Stream	:	MCA	CIE	:	50 Marks
Teaching hours/ week (L:T:P:S)	:	3:0:0:0	SEE	:	50 Marks
Total Hours	:	40 Hrs	SEE	:	3 Hours
Credits	:	3	Duration	:	

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Understand the various Cyber Offenses and Botnets
2	Learn the knowledge on tools and methods used in cybercrimes
3	To know the cybercrime terminologies and perspectives
4	Understand the concepts of phishing and computer forensics
5	To study an appropriate tool for the chosen problem.

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three HOTS (Higher-order Thinking Skills) module-wise questions to promote critical thinking.
- Adopt Problem-Based Learning (PBL), which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.
- Devise innovative pedagogy to improve Teaching-Learning Process (TLP).



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Scheme of Teaching and Examinations for MCA Programme -2024-25
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2024-25)

COURSE CURRICULUM

Module No.	Topics	Hours
1	Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security, Who are Cybercriminals? Classifications of Cybercrimes, An Indian Perspective, Hacking and Indian Laws., Global Perspectives, OWASP	8
Pedagogy	Blended Learning	
2	How Criminals Plan Them: Introduction, How Criminals Plan Attacks, Social Engineering, Cyber Stalking, Cyber Cafe & cybercrimes, Identify and Access Management. Botnets: The fuel for cybercrime, Attack Vector	8
Pedagogy	Tool exploration	
3	Tools and Methods used in Cybercrime: Introduction, Proxy Servers, Anonymizers, Phishing, Password Cracking, Key Loggers and Spyways, Virus and Worms, Trozen Horses and Backdoors, Steganography, DoS and DDOS Attackes, Attacks on Wireless networks,Threat Modelling.	8
Pedagogy	Case Study	
4	Phishing and Identity Theft: Introduction, methods of phishing, phishing, phishing techniques, spear phishing, types of phishing scams, phishing toolkits and spy phishing, counter measures, Identity Theft	8
Pedagogy	Hands on Session	
5	Understanding Computer Forensics: Introduction, Historical Background of Cyber Forensics, Digital Forensics Science, Need for Computer Forensics, Cyber Forensics and Digital Evidence, Digital Forensic Life cycle, Chain of Custody Concepts, network forensics.	8
Pedagogy	Collaborative Learning	
Textbooks		
SL No.	Title of the Books/Name	

1	Sunit Belapure and Nina Godbole, "Cyber Security: Understanding Cyber Crimes, Computer Forensics And Legal Perspectives", Wiley India Pvt Ltd, ISBN: 978-81- 265-21791, 2011, First Edition (Reprinted 2018)
2	Cyber Security by Nina Godbole, Sunit Belapure, edition 2, Wiley 2020

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understand the cyber threats, and vulnerabilities	Understand	L1,L2
CO2	Apply the knowledge of cybersecurity to create software that is less vulnerable to cybersecurity attacks.	Apply	L3
CO3	Analyse the effectiveness of cybersecurity controls in protecting against specific threats.	Analyze	L4
CO4	Assess the legal and ethical implications of cybersecurity incidents.	Evaluate	L5
CO5	Design a cybersecurity strategy for an organization.	Implement	L6

Mapping of Course Outcomes to Program Outcomes:

CO/PO	P01	P02	P03	P04	P05	P06	P07	P08	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-
CO4	-	-	3	-	-	-	-	-	3	-
CO5	-	-	-	3	3	-	-	-	-	3

Weblinks and Video Lectures (e-Resources)

1	extension://elhekieabhbkmcefcobjddigjcaadp/https://booksite.elsevier.com/samplechapters/9781597495868/Front_Matter.pdf
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2	extension://elhekieabhbkmcefcobjdjgcaadp/https://booksite.elsevier.com/samplechapters/9781597495868/Front_Matter.pdf
3	https://www.taylorfrancis.com/books/mono/10.4324/9780429343223/cybercrime-digital-forensicsthomas-holt-adam-bossler-kathryn-seigfried-spellar?refId=88a2a46a-c48a-42a9-be5b2a24c4c0ed3b&context=ubx
4	https://www.youtube.com/watch?v=yC_hFm0BX28&list=PLxApjaSnQGi6Jm7LLSxvmNQjS_rt9swsu

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory				Practical
	Continuous Assessment Tests (IAT)		Continuous Comprehensive Assessment (CCA)		
	IAT-1	IAT-2	CCA-1	CCA-2	
	50 Marks	50 Marks	50 Marks	50 Marks	
Remember	10	-	10	-	-
Understand	-	10	-	10	-
Apply	20	20	-	-	-
Analyse	20	20	-	-	10
Evaluate	-	-	20	20	20
Create	-	-	20	20	20

CIE Course Assessment Plan

CO's	Marks Distribution						Total Marks	Weightage
	Test-1			Test-2				
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5	10	-	5	5	5	30	25%
CO2	10	5	5	-	10	10	50	50%
CO3	5	10	5	5	5	5	35	25%
CO4	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-
Total	20	20	10	10	20	20	100	100%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	20%
Understand	20%
Apply	30%

Analyse	30%
Evaluate	-
Create	-

SEE Course Plan

CO's	Marks Distribution						Total Marks	Weightage
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5	10	-	5	5	5	30	25%
CO2	10	5	5	-	10	10	50	50%
CO3	5	10	5	5	5	5	35	25%
CO4	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-
Total	20	20	10	10	20	20	100	100%



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	IV			
Course Title	:	Software Project Management			
Course Code	:	23MCA344			
Course Type (Theory/ Practical/ Integrated)	:	Theory			
Category	:	PEC			
Stream	:	MCA	CIE	:	50 Marks
Credits (L: T:P:S)	:	3:0:0:0	SEE	:	50 Marks
Total Hours	:	40 Hrs	SEE Duration	:	3 Hours

Course Learning Objectives: Students will be taught

Sl.No	Course Objectives
1	Understand the activities Covered by Software Project Management
2	Apply the practices and methods for successful software project management
3	Analyze the techniques for requirements, policies and decision making for effective resource
4	Evaluate a framework for software project management plan for activities, risk, monitoring and control
5	Develop a framework to manage people

Teaching-Learning Process

These are sample Strategies; which teachers can use to accelerate the attainment of the various course outcomes.

1. Lecture method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.

Pedagogy (General Instructions):

- Show Video/animation films to explain the infrastructures and the mechanism involved in the principle.
- Encourage collaborative (Group) Learning in the class.
- Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking.
- Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
- Topics will be introduced in multiple representations.
- Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
- Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.
- Individual teachers can device innovative pedagogy to improve teaching-learning.



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**Scheme of Teaching and Examinations for MCA Programme -2023-24
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2023-24)**

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	INTRODUCTION Importance of project and software project management, Contract Management, Activities Covered by Software Project Management, Plans, Methods and Methodologies, Some ways of categorizing software projects, Stakeholders, Setting Objectives, Business Case, Project Success and Failure, What is Management? Management Control, Traditional versus Modern Project Management Practices	8
Pedagogy	Demonstration	
2	PROJECT EVALUATION & FINANCE Evaluation of Individual Projects, Cost Benefit Evaluation Techniques, Risk Evaluation, Programme Management, Managing allocation of Resources within Programmes, Financial Accounting–An overview– Accounting concepts, Principles & Standards, Ledger posting, Trial balance, Profit and Loss account Balance sheet	8
Pedagogy	Problem-solving	
3	ACTIVITY PLANNING Objectives of Activity Planning, When to Plan, Project Schedules, Sequencing and Scheduling Activities, Network Planning Models, Forward Pass– Backward Pass, Identifying critical path, Activity Float, Shortening Project Duration, Activity on Arrow Networks Risk Management, Nature of Risk, Categories of Risk, A framework for dealing with Risk, Risk Identification, Risk analysis and prioritization, risk planning and risk monitoring.	8
Pedagogy	Hands-on session	
4	MONITORING AND CONTROL Creating the Framework, Collecting the Data, Review, Project Termination Review, Visualizing Progress, Cost Monitoring, Earned Value Analysis, Prioritizing Monitoring, Getting Project Back To Target, Change Control, Software Configuration Management, Visualizing Progress, Earned value analysis, managing people and organizing teams- organizational structures- Planning for small projects. Case Study: PMBOK , Agile Development	8
Pedagogy	Hands-on session	

5	MANAGING PEOPLE AND WORKING IN TEAMS Introduction, Understanding Behaviour, Organizational Behavioural Background, Selecting the Right Person for the Job, Instruction in the Best Methods, Motivation, The Oldham–Hackman Job Characteristics Model, Stress–Health and Safety Working In Teams, Becoming a Team, Decision Making	8
Pedagogy	Demonstration	

Text Books	
1	Bob Hughes, Mike Cotterell, Rajib Mall, “Software Project Management”, Fifth Edition, Tata McGraw Hill, 2011.
2	“Accounting for Management” Jawahar Lal, 5th Edition, Wheeler Publications, Delhi.
Reference Books	
1	Jack Marchewka, “Information Technology-Project Management”, Wiley Student Version, 4th Edition, 2013.
2	James P Lewis, “Project Planning, Scheduling & Control”, McGraw Hill, 5th Edition, 2011.
3	Pankaj Jalote, “Software Project Management in Practise”, Pearson Education, 2012

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	Level Indicator
CO1	Understand the activities Covered by Software Project Management	Understand	L1,L2
CO2	Apply the practices and methods for successful software project management	Apply	L3
CO3	Analyze the techniques for requirements, policies and decision-making for effective resource	Analyze	L4
CO4	Evaluate a framework for software project management plan for activities, risk, monitoring and control	Evaluate	L5
CO5	Develop a framework to manage people	Implement	L6

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	–	–	–	–	–	–	–	–	–	–
CO2	3	–	–	–	–	–	–	–	3	–
CO3	–	3	–	–	–	–	–	–	–	3
CO4	–	–	3	–	3	–	–	–	–	–
CO5	–	–	–	3	–	–	–	3	–	–

Weblinks and Video Lectures (e-Resources)

1	https://www.youtube.com/watch?v=hCmf20BUWUg
2	https://www.youtube.com/watch?v=tMZrra-5jS4

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory				Practical Practical Test
	Continuous Assessment Tests (IAT)		Continuous Comprehensive Assessment (CCA)		
	IAT-1 50 Marks	IAT-2 50 Marks	CCA-1 50 Marks	CCA-2 50 Marks	
Remember	10	-	10		-
Understand	-	10	-	10	-
Apply	20	20	-	-	-
Analyse	20	20	-	-	10
Evaluate	-	-	20	20	20
Create	-	-	20	20	20

CIE Course Assessment Plan

CO's	Marks Distribution						Total Marks	Weightage
	Test-1			Test-2				
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5	10	-	5	5	5	30	25%
CO2	10	5	5	-	10	10	50	50%
CO3	5	10	5	5	5	5	35	25%
CO4	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-
Total	20	20	10	10	20	20	100	100%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	20%
Understand	20%
Apply	30%
Analyse	30%
Evaluate	-
Create	-

SEE Course Plan

CO's	Marks Distribution						Total Marks	Weightage
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5	10	-	5	5	5	30	25%
CO2	10	5	5	-	10	10	50	50%
CO3	5	10	5	5	5	5	35	25%
CO4	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-
Total	20	20	10	10	20	20	100	100%



Dayananda Sagar Academy of Technology & Management
(Autonomous Institute under VTU)

Semester	:	III			
Course Title	:	Blockchain Technology			
Course Code	:	23MCA351			
Course Type (Theory/ Practical/ Integrated)	:	Theory			
Category	:	PEC			
Stream	:	MCA	CIE	:	50 Marks
Teaching hours/ week (L:T:P:S)	:	3:0:0:0	SEE	:	50 Marks
Total Hours	:	40 Hrs	SEE	:	3 Hours
Credits	:	3	Duration	:	

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	To give an overview of the basics of Blockchain concepts using modern tools and technologies.
2	Understand the various applications of blockchain in different domains.
3	Learn the architecture and functions of Blockchain.
4	Exemplify the usage of bitcoins and its impact on the economy.
5	Understand the concepts of Ethereum and Smart Contracts

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
- Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.
- Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.



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Scheme of Teaching and Examinations for BE Programme -2024-25
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2024-25)

COURSE CURRICULUM

Module No.	Topics	Hours
1	Introduction to Blockchain, How Blockchain works, Blockchain vs Bitcoin, Practical applications, public and private key basics, pros and cons of Blockchain, Myths about Bitcoin. Requirements for the consensus protocols-Proof of Work (POW)-Scalability aspects of Block chain consensus protocols: Permissioned Block chains-Design goals.	8
Pedagogy	Group discussions on various Blockchain applications.	
2	Blockchain: Architecture, versions, variants, use cases, Life use cases of blockchain, Blockchain vs shared Database, Introduction to cryptocurrencies, Types, Applications. Concept of Double Spending, Hashing, Mining, Proof of Work. Introduction to Merkel tree, Privacy , payment verification , Resolving Conflicts, Creation of Blocks	8
Pedagogy	Case studies on various Blockchain applications	
3	Block chain for Government: Digital identity, land records, and other kinds of record-keeping between government entities, public distribution systems / social welfare systems. Blockchain in Financial Software and Systems (FSS): -Settlements, -KYC, -Capital markets-Insurance	8
Pedagogy	Hands-on exercises with cryptographic tools, and blockchain simulations.	
4	Introduction to Bitcoin, key concepts of Bitcoin, Merits and De Merits Fork and Segwits, Sending and Receiving bitcoins, choosing Bitcoin wallet, Converting Bitcoins to Fiat Currency. Blockchain Science: Grid coin, Folding coin, Blockchain Genomics, Bitcoin MOOCs.	8
Pedagogy	Hands-on Session	
5	Introduction to Ethereum, Advantages and Disadvantages, Ethereum Virtual Machine (EVM), Ethereum client APIs(JavaScript , JSON, Backend), Ethereum vs Bitcoin, Introduction to Smart contracts, Libraries usage, Languages usage, Anatomy usage, Smart contracts application, working principle, Law and Regulations. Case Study.	8
Pedagogy	Hands-on coding sessions with Solidity, developing and deploying smart contracts	

Textbooks

SL No.	Title of the Books/Name
1	Beginning Block chain: A Beginner's Guide to Building Blockchain Solutions by Arshdeep Bikram aditya Signal, Gautam Dhameja (Priyanshu Sekhar Panda., A Press.) 2018

2	Block chain Applications: A Hands-On Approach by Arshdeep Bagha, Vijay Madi setti ,2017
3	Block chain by Melanie Swan, OReilly 2015.
4	Bitcoin and Cryptocurrency Technologies by Aravind Narayan. Joseph Bonneau, princeton, edition 1, 2015
5	Bitcoin and Blockchain Basics: A non-technical introduction for beginners by Arthu.T Books, edition 2, 2022

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understand the basics concepts of Blockchain technology	Understand	L1,L2
CO2	Apply blockchain API's to interact with Blockchain networks.	Apply	L3
CO3	Analyze the potential impact of blockchain on various industries	Analyze	L4
CO4	Assess the ethical implications of blockchain technology.	Evaluate	L5
CO5	Design a blockchain-based solution for a specific real-world problem or industry application.	Implement	L6

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-
CO4	-	-	3	-	3	-	-	-	3	-
CO5	-	-	-	3	-	-	-	-	-	3

Weblinks and Video Lectures (e-Resources)

1	Coursera : Bitcoin and Cryptocurrency Technologies by Princeton University
2	Khan Academy : Bitcoin and Cryptocurrencies
3	Simplilearn : Blockchain Expert Course

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory				Practical
	Continuous Assessment Tests (IAT)		Continuous Comprehensive Assessment (CCA)		
	IAT-1	IAT-2	CCA-1	CCA-2	
	50 Marks	50 Marks	50 Marks	50 Marks	
Remember	10	-	10	-	-
Understand	-	10	-	10	-
Apply	20	20	-	-	-
Analyse	20	20	-	-	10
Evaluate	-	-	20	20	20
Create	-	-	20	20	20

CIE Course Assessment Plan

CO's	Marks Distribution						Total Marks	Weightage
	Test-1			Test-2				
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5	10	-	5	5	5	30	25%
CO2	10	5	5	-	10	10	50	50%
CO3	5	10	5	5	5	5	35	25%
CO4	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-
Total	20	20	10	10	20	20	100	100%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	20%
Understand	20%
Apply	30%
Analyse	30%
Evaluate	-
Create	-

SEE Course Plan

CO's	Marks Distribution						Total Marks	Weightage
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5	10	-	5	5	5	30	25%
CO2	10	5	5	-	10	10	50	50%
CO3	5	10	5	5	5	5	35	25%
CO4	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-
Total	20	20	10	10	20	20	100	100%



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	III		
Course Title	:	Agile Software Development		
Course Code	:	23MCA353		
Course Type (Theory/ Practical/ Integrated)	:	Theory		
Category	:	PEC		
Stream	:	MCA	CIE	: 50 Marks
Teaching hours/ week (L:T:P:S)	:	3:0:0:0	SEE	: 50 Marks
Total Hours	:	40 Hrs	SEE	: 3 Hrs
Credits	:	3	Duration	

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	To learn the Agile technologies, methods ,XP lifecycle and concepts
2	To understand the Informative workspace, Root Cause analysis
3	To know the collaborating and Releasing in Agile
4	To understand the concepts of planning and developing in Agile

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
- Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.
- Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.



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**Scheme of Teaching and Examinations for MCA Programme -2024-25
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2024-25)**

COURSE CURRICULUM

Module No.	Topics	Hours
1	Introduction to Agile: Understanding Success, Beyond Deadlines, The Importance of Organizational Success, Enter Agility, How to Be Agile?: Agile Methods, Don't Make Your Own Method, The Road to Mastery, Find a Mentor. Understanding XP: The XP Lifecycle, The XP Team, XP Concepts	8
Pedagogy	Assignment	
2	Adopting XP: Is XP Right for Us?, Go!, Assess Your Agility, Thinking: Pair Programming, Energized Work, Informative Workspace, Root Cause Analysis, Retrospectives Jira : what is Jira, uses of jira, features, schemes, projects, issues.	8
Pedagogy	Collaborative learning	
3	Collaborating: Trust, Sit Together, Real Customer Involvement, Ubiquitous Language, Stand- Up Meetings, Coding Standards, Iteration Demo, Reporting, Releasing: "Done Done", No Bugs, Version Control, Ten-Minute Build, Continuous Integration, Collective Code Ownership, Documentation.	8
Pedagogy	Hands-on Session	
4	Planning: Vision, Release Planning, The Planning Game, Risk Management, Iteration Planning, Slack, Stories, Estimating. Developing: Incremental requirements, Customer Tests, Test-Driven Development, Refactoring, Simple Design, Incremental Design and Architecture, Spike Solutions, Performance Optimization, Exploratory Testing	8
Pedagogy	Hands-on Session	
5	Mastering Agility: Values and Principles: Commonalities, About Values, Principles, and Practices, Further Reading, Improve the Process: Understand Your Project, Tune and Adapt, Break the Rules Rely on People: Build Effective Relationships, Let the Right People Do the Right Things, Build the Process for the People Testing: An Agile Approach to Testing, The Good Enough Approach Testing as the Best Defense, Sharing a Code Base with another Project Team, Sharing Common Components with another Project Team, Depending upon Code or Components Produced by Another Project Team	10
Pedagogy	Hands-on Session	

Text Books

Sl. No.	Title of the Book/Name of the author/Name of the publisher/Edition and Year
1	"The Art of Agile Development" James shore, Chromatic, O'Reilly, 2 nd edition, 2021

2	Agile Software Development, Principles, Patterns, and Practices, Robert C. Martin, Prentice Hall, 1st edition,2002
3	Ken Schwaber And Mike Beedle, Agile Software Development With Scrum, Pearson Education, 2015. ISBN-13: 9780132074896

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understand the core principles Agile methodologies and Xtreme Programming.	Understand	L1,L2
CO2	Apply the concept of Coding Standards, Iteration Demo, Reporting.	Apply	L3
CO3	Analyse the impact of Agile on project management practices compared to traditional methods.	Analyze	L4
CO4	Evaluate the effectiveness of Agile implementation in real-time scenarios. .	Evaluate	L5
CO5	Develop an Agile project plan incorporating best practices and tools	Implement	L6

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-
CO4	-	-	3	-	-	-	-	-	3	-
CO5	-	-	-	3	3	-	-	-	-	3

Weblinks and Video Lectures (e-Resources)

1	https://www.youtube.com/watch?v=MBI-3Yb30FA
2	https://6b.f7.7e4b.ip4.static.sl-reverse.com/video/901/a-to-z-rpa-i-process-automation-course
3	https://www.youtube.com/watch?v=uPMmpmyp64g
4	https://www.youtube.com/watch?v=T3gssUSHonI

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory				Practical
	Continuous Assessment Tests (IAT)		Continuous Comprehensive Assessment (CCA)		Practical Test
	IAT-1	IAT-2	CCA-1	CCA-2	
	50 Marks	50 Marks	50 Marks	50 Marks	
Remember	10	-	10		-
Understand	-	10	-	10	-
Apply	20	20	-	-	-
Analyse	20	20	-	-	10
Evaluate	-	-	20	20	20
Create	-	-	20	20	20

CIE Course Assessment Plan

CO's	Marks Distribution						Total Marks	Weightage
	Test-1			Test-2				
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5	10	-	5	5	5	30	25%
CO2	10	5	5	-	10	10	50	50%
CO3	5	10	5	5	5	5	35	25%
CO4	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-
Total	20	20	10	10	20	20	100	100%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	20%
Understand	20%
Apply	30%
Analyse	30%
Evaluate	-
Create	-

SEE Course Plan

CO's	Marks Distribution						Total Marks	Weightage
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5	10	-	5	5	5	30	25%
CO2	10	5	5	-	10	10	50	50%
CO3	5	10	5	5	5	5	35	25%
CO4	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-
Total	20	20	10	10	20	20	100	100%

ABILITY ENHANCEMENT COURSE (AEC)

AEC Course – Ability Enhancement Course

Teaching Hours/Week (L: T:P: S)	0:0:2:0
Total Hours of Pedagogy	24 hours Practical
Credits:	01
Programs / Experiments	12
CIE Marks	50
SEE Marks	50
Total Marks	100
Exam Hours	3
Examination nature (SEE)	Practical (Internal Examiners only)



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	III			
Course Title	:	Smart systems Laboratory			
Course Code	:	23MCA36			
Course Type (Theory/ Practical/ Integrated)	:	Practical			
Category	:	AEC			
Stream	:	MCA	CIE	:	50
Teaching hours/ week (L:T:P:S)	:	0:0:2:0	SEE	:	50
Total Hours	:	15	SEE	:	3
Credits	:	1	Duration		

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Integrate various IOT components, including sensors, actuators, networks, and data processing systems.
2	To understand the efficient data collection, storage, and analysis methods for IOT-generated data.
3	Test and evaluate IOT products and technologies.
4	Understand how to develop practical IOT solutions for real-world problems.
5	Providing the practical experience in designing, developing, and deploying IOT systems.

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
- Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.
- Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.



DSATM

Scheme of Teaching and Examinations for MCA Programme -2024-25

Outcome Based Education and Choice Based Credit System (CBCS)

(Effective from the Academic Year 2024-25)

COURSE CURRICULUM

Module No.	Topics	Hours
1	Receive input from two switches and activate the corresponding LEDs based on the input from each switch. Implement sensor of actuator to flash an LED according to specified on-time and off-time cycles, dynamically reading these durations from a file.	3
Pedagogy	Hands on session-Sensors	
2	Switch on a relay at a given time using cron, where the relay's contact terminals are connected to a load. Access an image through a Pi web cam	3
Pedagogy	Hands On Session-Piwebcamera	
3	Control a light source using web page Implement an intruder system that sends an alert to the given email.	3
Pedagogy	Hands On Session-Relay	
4	Get the status of a bulb at a remote place (on the LAN) through web. Get an alarm from a remote area (through LAN) if smoke is detected. The student should have hands on experience in using various sensors like temperature, humidity, smoke, light, etc. and should be able to use control web camera, network, and relays connected to the Pi.	3
Pedagogy	Hands On Session-Pi sensor	
5	Set up DHT11 Sensor to interact with the Blynk Server. Utilize ESP8266 as an HTTP server to monitor temperature using the DHT11 sensor.	3
	Pedagogical Initiatives (Not limited to): <ul style="list-style-type: none">• Think Pair and Share (Blended Learning): provides an opportunity for students to learn from one another• Problem Solving: encourages cognitive thinking and enables creative problem solving• Poster Presentation: allows students to represent the concepts visually in order to understand the topics easily.• Case studies: maps different domains in real time applications• Demonstration: exhibits the implementation process	

Text Books	
Sl. No.	Title of the Book/Name of the author/Name of the publisher/Edition and Year
1	Arshdeep Bahga, Vijay Madiseti"Internet of Things: A Hands-On Approach", Virtual Publishing Technologies, 2014
2	Maciej Kranz,Building the Internet of Things: Implement New Business Models, Disrupt Competitors, Transform Your Industry, first edition John Wiley & Sons, 2017
Reference Books	
1	The Internet of Things: A Survey: Luigi Atzori, Antonio Iera, Giacomo Morabito, Journal <i>Computer Networks</i> .,2017
2	Designing the Internet of Things: Adrian McEwen, Hakim Cassimally, Wiley, 2017

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understand the basic concepts and components of IOT, including sensors, actuators, communication protocols, and data processing.	L1	U/R
CO2	Apply data analytics techniques to interpret IOT data and derive meaningful insights.	L2	A
CO3	Analyse strategies for optimizing the performance and efficiency of IOT system	L3	AN
CO4	Implement, design, and integrate IOT systems and solutions to acquire necessary skills.	L4	E
CO5	Develop skills to stay current with the latest trends and advancements in IOT.	L5	C

Mapping of Course Outcomes to Program Outcomes:

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

Weblinks and Video Lectures (e-Resources)	
1	https://www.youtube.com/channel/UCqvW6FLrQdPukK0fhRSp71g
2	https://www.coursera.org/specializations/internet-of-things

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory			
	Continuous Assessment Tests (IAT)		Continuous Comprehensive Assessment (CCA)	
	IAT-1	IAT-2	CCA-1	CCA-2
	50 Marks	50 Marks	50 Marks	50 Marks
Remember	5	5	-	-
Understand	5	5	-	-
Apply	10	20	20	20
Analyse	10	10	10	10
Evaluate	10	10	10	10
Create	10	10	10	10

CIE Course Assessment Plan

CO's	Marks Distribution						Total Marks	Weightage
	Test-1			Test-2				
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5			5		-	10	10%
CO2	10		10				20	20%
CO3		10		10			20	20%
CO4	10		10		10		30	30%
CO5	10					10	20	20%
Total	35	10	20	15	10	10	100	100

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks
Remember	5
Understand	10
Apply	10

Analyse	20
Evaluate	30
Create	30

SEE Course Plan

CO's	Marks Distribution						Total Marks	Weightage
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5			5		-	10	10%
CO2	10		10				20	20%
CO3		10		10			20	20%
CO4	10		10		10		30	30%
CO5	10					10	20	20%
Total	35	10	20	15	10	10	100	100

1 Credit Course – Practical

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum Marks (20 Marks out of 50).

The minimum passing mark for the SEE is 40% of the maximum Marks (20 Marks out of 50).

A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/course if the student secures not less than 50% (25 Marks out of 50) in the Semester-End Examination (SEE), and a minimum of 40% (40 Marks out of 100) in the total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation (CIE):

CIE marks for the practical course are 50 Marks. The split-up of CIE marks for record/ journal and test are in the ratio 60:40.

- Each experiment is to be evaluated for conduction with an observation sheet and record write-up. Rubrics for the evaluation of the journal/write-up for hardware/software experiments are designed by the faculty who is handling the laboratory session and are made known to students at the beginning of the practical session.
- Record should contain all the specified experiments in the syllabus and each experiment write-up will be evaluated for 10 marks.
- Total marks scored by the students are scaled down to 30 marks (60% of maximum marks).
- Weightage to be given for neatness and submission of record/write-up on time.

- Department shall conduct a test of 100 marks after the completion of all the experiments listed in the syllabus.
- In a test, test write-up, conduction of experiment, acceptable result, and procedural knowledge will carry a weightage of 60% and the rest 40% for viva-voce.
- The suitable rubrics can be designed to evaluate each student's performance and learning ability.
- The marks scored shall be scaled down to 20 marks (40% of the maximum marks). The Sum of scaled-down marks scored in the report write-up/journal and marks of a test is the total CIE marks scored by the student.

Semester End Evaluation (SEE):

SEE marks for the practical course are 50 Marks.

- SEE shall be conducted jointly by the two examiners of the same institute; examiners are appointed by the Head of the Institute.
- The examination schedule and names of examiners are informed to the university before the conduction of the examination. These practical examinations are to be conducted between the schedules mentioned in the academic calendar of the University. All laboratory experiments are to be included for practical examination.
- (Rubrics) Breakup of marks and the instructions printed on the cover page of the answer script to be strictly adhered by the examiners or based on the course requirement evaluation rubrics shall be decided jointly by examiners.
- Students can pick one question (experiment) from the questions lot prepared by the examiners jointly.
- Evaluation of test write-up/ conduction procedure and result/viva will be conducted jointly by examiners.
- General rubrics suggested for SEE are mentioned here,
 - Writeup-20%,
 - Conduction procedure and result in -60%,
 - Viva-voce 20% of maximum marks.

SEE for practical shall be evaluated for 100 marks and scored marks shall be scaled down to 50 marks (however, based on course type, rubrics shall be decided by the examiners)

- Change of experiment is allowed only once and 15% of Marks allotted to the procedure part are to be made zero.
- The minimum duration of SEE is 02 hours.

**SOCIETAL IMPACT
PROJECT**



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	III			
Course Title	:	Societal Impact Project			
Course Code	:	23MCA37			
Course Type (Theory/ Practical/ Integrated)	:	Practical			
Category	:	AEC			
Stream	:	MCA	CIE	:	100 Marks
Teaching hours/ week (L:T:P:S)	:	0:0:4:0	SEE	:	--
Total Hours	:	30	SEE	:	---
Credits	:	2	Duration	:	

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Comprehensive understanding of major societal issues, including their causes, effects, and potential solutions.
2	Demonstrate ethical awareness and cultural sensitivity when working with diverse communities and addressing sensitive societal issues
3	Understand the methodology for solving complex issues.

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
- Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.
- Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.



Scheme of Teaching and Examinations for MCA Programme -2024-25
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2024-25)

Societal Impact Project

Some of the domains to choose for societal projects:

- Infrastructure
- Health Care
- Social security
- Security for women
- Transportation
- Business Continuity
- Remote working and Education
- Digital Finance
- Food Security
- Rural employment
- Water and land management
- Pollution
- Financial Independence
- Agricultural Finance
- Primary Health care
- Nutrition
- Child Care
- E-learning
- Distance parenting
- Mentorship etc.,

Continuous Internal Evaluation: 100 Marks

Identifying the real life problems and producing literature report : 20 marks

Data sampling and Cleaning :10 Marks

Establishing the right Objective: 10 Marks

Developing the solution : 20 Marks

Project Presentation: 10 marks

Report : 20 marks

Q & A Session : 10 Marks

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understand the comprehension of societal challenges and their implications	L1/L2	U/R
CO2	Apply knowledge and skills in practical to address real-world project scenarios.	L3	A
CO3	Analyze the various societal issues to understand their root causes and interconnected factors.	L4	AN
CO4	Assess the effectiveness of various approaches and interventions in addressing societal issues.	L5	C
CO5	Develop innovative solutions and strategies to address societal challenges.	L6	E

INTERNSHIP



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	III	
Course Title	:	Internship	
Course Code	:	23MCA38	
Course Type (Theory/ Practical/ Integrated)	:	Practical	
Category	:	INT	
Stream	:	MCA	CIE : 50 Marks
Teaching hours/ week (L:T:P:S)	:	0:0:0:14	SEE : 50 Marks
Total Hours	:		SEE : 3 Hrs
Credits	:	7	Duration

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	To gain in-depth knowledge and understanding of industry-specific practices, tools, and technologies.
2	Acquire familiarity with industry-standard software, methodologies, and best practices relevant to their field
3	Understand potential career paths and gain insights into the professional opportunities available in their field of study

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
- Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.
- Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.



DSATM

Scheme of Teaching and Examinations for MCA Programme -2024-25
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2024-25)

INTERNSHIP

Internship/Professional Practice: Students under the guidance of internal guide/s and external guide shall take part in all the activities regularly to acquire as much knowledge as possible without causing any inconvenience at the place of internship.

Seminar: Each student, is required to

- Present the seminar on the internship orally and/or through power point slides.
- Answer the queries and involve in debate/discussion.
- Submit the report duly certified by the external guide.
- The students shall take part in discussion to foster a friendly and stimulating environment in which the students are motivated to reach high standards and become self-confident.

Continuous Internal Evaluation

CIE marks for the Internship/Professional practice report (20 marks), seminar (20 marks) and question and answer session (10 marks) shall be awarded (based on the quality of report and presentation skill, participation in the question and answer session by the student) by the committee constituted for the purpose by the Head of the Department. The committee shall consist of three faculty from the department with the senior most acting as the Chairperson.

Semester End Examination

SEE marks for the internship report (20 marks), seminar (20 marks) and question and answer session (10 marks) shall be awarded (based on the quality of report and presentation skill, participation in the question and answer session) by the examiners appointed by the University.

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Demonstrate and understanding of the workplace environment, culture, and professional practices.	L1/L2	U/R
CO2	Apply theoretical knowledge and skills to practical tasks in a professional setting.	L3	A
CO3	Analyze problems and challenges encountered during the internship and propose solutions.	L4	AN
CO4	Evaluate their performance and the effectiveness of their contributions in the workplace.	L5	C
CO5	Develop a project plan for a new initiative that addresses a specific need identified during their internship.	L6	E

4th SEMESTER

**PROFESSIONAL
ELECTIVE COURSE
(PEC)**

PEC Course - Professional Elective Course

Teaching Hours/Week (L: T:P: S)	3:0:0:0
Total Hours of Pedagogy	40 hours
Credits:	03
Each Module	8 Hrs
CIE Marks	50
SEE Marks	50
Total Marks	100
Exam Hours	3
Examination nature (SEE)	Theory

3 Credit Course – Professional Elective Course (PEC)

Assessment Details (both CIE and SEE)

- The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%.
- The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 45% of the maximum marks (25 out of 50 marks).
- A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

Internal Assessment Test (IAT):

- For the Internal Assessment Test component of CIE, there are 25 marks and for Assignment component of the CIE, there are 25 marks. Two Tests, each of 50 Marks with 01-hour 30 minutes' duration, are to be conducted and average of two tests to be reduced to 25 marks
 - The first test will be administered after 40-50% of the syllabus has been covered, and
 - The second test will be administered after 85-90% of the syllabus has been covered
- Any two assignment methods, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.
- For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

- Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

The IA test questions are to be framed to map the Course Outcomes (COs), Program Outcomes (POs) and the Blooms RBT Levels. Emphasis to be given for higher order RBT levels

Semester-End Examination:

Theory SEE will be conducted as per the scheduled timetable (duration 03 hours).

- The question paper will have ten questions. Each question is set for 20 marks.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module.
- The students have to answer 5 full questions, selecting one full question from each module.
- Marks scored shall be proportionally reduced to 50 marks.

Continuous and Comprehensive Assessment (CCA):

Two of continuous and comprehensive assessment (CCA) to be conducted to attain COs and POs, evaluated each for **50 Marks**. Total Marks scored will be CCA1+CCA2 and scaled down to **10 Marks**.

- CCA1 after 4th week and CCA2 after 9th week. The evaluation includes either through quiz or rubrics
- CCA as project-based learning,
 - CCA is evaluated for **50 Marks** with review 1 of **20 Marks** after and review 2 of **30 Marks** includes project demonstration/competition and report submission.
 - The evaluation of review 1 after 6th weeks of semester and review 2 after 12th week of semester with project demonstration and submission of the report

Total score for CCA is **10 Marks**

Total Marks scored for theory component of CIE (IAT+ CCA) is **25 Marks**

Possible Continuous and Comprehensive Assessment (CCA):

- Project based, Problem Based, Building Models, Lab-to-Land, Mobile Studio, Design and Programming Contest, Certification, Concept Map (Collage presentation/poster presentation), Case studies, Think-Pair-Share, Flipped classroom,
- The assessment of these techniques shall be in rubrics.
- The faculty can adopt any other CCA method of implementation and its assessment with prior approval of Program Assessment Committee (PAC).

Professional Core Course (PCC) – 3 Credit course – Theory

Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Average	Reduced Marks	Minimum Passing Marks	Evaluation Details
Total CIE Theory + Practical				50	----	----	20	
	Theory	Internal Assessment Test (IAT) - II	Module – 1 to 2.5	50	$(50+50) / 2$	25	10	Average of Two Internal test each of 50 Marks scale down the marks to 25
		Internal Assessment Test (IAT) - II	Module – 2.5 to 5	50				
	Continuous Comprehensive Assessment (CCA)	CCA-1- Pedagogical Initiatives / Activity Based learning	Considering all the Modules	50	$(50+50) / 2$	25	10	Two CCA methods to be adopted. If CCA chosen is Project Based Learning, then one assessment method may be adopted
		CCA-2- Pedagogical Initiatives / Activity Based learning		50				
	Total CIE Theory						50	20

SEE		Theory exam	Entire theory syllabus including questions from lab Component in respective Modules	100	---	50	20	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks
CIE + SEE				100	---	---	40	



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	IV			
Course Title	:	Big Data Analytics			
Course Code	:	23MCA411			
Course Type (Theory/ Practical/ Integrated)	:	Theory			
Category	:	PEC			
Stream	:	MCA	CIE	:	50 Marks
Teaching hours/ week (L:T:P:S)	:	3:0:0:0	SEE	:	50 Marks
Total Hours	:	40 Hrs	SEE	:	3 Hours
Credits	:	3	Duration	:	

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Understand the business problem for a given context and frame the objectives to solve it through data analytic tools.
2	Learn the various algorithms for handling large volumes of data.
3	Know the architecture of HDFS and explain functioning of HDFS clusters.
4	Study the usage of Map-Reduce techniques for solving big data problems.
5	Conduct experiment with various datasets for analysis / visualization and arrive at valid conclusions.

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
- Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.
- Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.



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**Scheme of Teaching and Examinations for MCA Programme -2024-25
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2024-25)**

COURSE CURRICULUM

Module No.	Topics	Hours
1	Big Data and Analytics: Big Data, Scalability and Parallel Processing, Designing Data Architecture, Data Sources, Quality, Pre-Processing and Storing, Data Storage and Analysis, Big Data Analytics Applications and Case Studies.	8
Pedagogy	Assignment	
2	Introduction: Hadoop and its Ecosystem, Hadoop Distributed File System, MapReduce Framework and Programming Model, Hadoop Yarn, Hadoop Ecosystem Tools. Apache Spark : Spark Architecture, Architecture abstractions. Redis- Cluster Architecture ,different types of redid architecture. Scala – Architecture of scala collections.	8
Pedagogy	Case study	
3	NoSQL Big Data Management, MongoDB and Cassandra: Introduction, NoSQL Data Store, NoSQL Data Architecture Patterns, NoSQL to Manage Big Data, Shared-Nothing Architecture for Big Data Tasks, MongoDB, Databases, Cassandra Databases.	8
Pedagogy	Case study	
4	MapReduce, Hive and Pig: Introduction, MapReduce Map Tasks, Reduce Tasks and MapReduce Execution, Composing MapReduce for Calculations and Algorithms, Hive, HiveQL, Pig.	8
Pedagogy	Case study	
5	Machine Learning Algorithms for Big Data Analytics: Introduction, Estimating the relationships, Outliers, Variances, Probability Distributions, and Correlations, Regression analysis, Finding Similar Items, Similarity of Sets and Collaborative Filtering, Frequent Itemsets and Association Rule Mining. Text, Web Content, Link, and Social Network Analytics: Introduction, Text mining, Web Mining, Web Content and Web Usage Analytics, Page Rank, Structure of Web and analyzing a Web Graph, Social Network as Graphs and Social Network Analytics:	8
Pedagogy	Demonstration	

Text Books

Sl. No.	Title of the Book/Name of the author/Name of the publisher/Edition and Year
1	Raj Kamal and Preeti Saxena, “Big Data Analytics Introduction to Hadoop, Spark, and Machine-Learning”, McGraw Hill Education, 2018 ISBN: 9789353164966, 9353164966
2	Chris Eaton, Dirk Deroos et al., “Understanding Big data”, McGraw Hill, 2012.

Reference Books

1	Vignesh Prajapati, "Big Data Analytics with R and Hadoop", Packet Publishing 2013.
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Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understand the fundamental concepts, characteristics and challenges associated with Big data	Understand	L1,L2
CO2	Apply analytical tools to identify and solve the business problem for a given context.	Apply	L3
CO3	Analyze Big Data using and machine learning techniques to derive meaningful insights.	Analyze	L4
CO4	Evaluate the effectiveness of Big Data analytics solutions in solving real-world business problems.	Evaluate	L5
CO5	Develop predictive models using Big Data analytics to forecast trends or make recommendations.	Implement	L6

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-
CO4	-	-	3	-	-	-	-	-	3	-
CO5	-	-	-	-	3	-	-	3	-	3

Weblinks and Video Lectures (e-Resources)

1	https://www.youtube.com/watch?v=BBpAmxUNQo
2	https://www.youtube.com/watch?v=8hly31xKliO
3	https://archive.nptel.ac.in/courses/106/106/106106127/
4	https://archive.nptel.ac.in/courses/106/106/106106131/

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory			
	Continuous Assessment Tests (IAT)		Continuous Comprehensive Assessment (CCA)	
	IAT-1	IAT-2	CCA-1	CCA-2
	50 Marks	50 Marks	50 Marks	50 Marks
Remember			5	5

Understand	10	20	5	5
Apply	20	10	10	10
Analyse	20	20	10	10
Evaluate	-	-	10	10
Create	-	-	10	10

CIE Course Assessment Plan

CO's	Marks Distribution						Total Marks	Weightage
	Test-1			Test-2				
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	-	5	5	5	-	-	15	15%
CO2	10	5	5	10	5	10	45	45%
CO3	-	10	10	5	5	10	40	40%
CO4	-	-	-	-	-	-		
CO5	-	-	-	-	-	-		
Total	10	20	20	20	10	20	100	100%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	15
Understand	-
Apply	45
Analyse	40
Evaluate	-
Create	-

SEE Course Plan

CO's	Marks Distribution						Total Marks	Weightage
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	-	5	5	5	-	-	15	15%
CO2	10	5	5	10	5	10	45	45%
CO3	-	10	10	5	5	10	40	40%
CO4	-	-	-	-	-	-		
CO5	-	-	-	-	-	-		
Total	10	20	20	20	10	20	100	100%



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	IV			
Course Title	:	Advanced Web Technologies			
Course Code	:	23MCA414			
Course Type (Theory/ Practical/ Integrated)	:	Theory			
Category	:	PEC			
Stream	:	MCA	CIE	:	50 Marks
Credits (L: T:P:S)	:	3:0:0:0	SEE	:	50 Marks
Total Hours	:	40 Hrs	SEE Duration	:	3 Hours

Course Learning Objectives: Students will be taught

Sl.No	Course Objectives
1	Understand the Web Applications using advanced Javascript for the given problem
2	Learn to design the Web Pages using Ruby for the given problem.
3	Learn the advances in Web 5.0 and demonstrate its usage
4	Understand the web services and demonstrate its usage
5	Know to design responsive web applications using Golang

Teaching-Learning Process

These are sample Strategies; which teachers can use to accelerate the attainment of the various course outcomes.

1. Lecture method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.

Pedagogy (General Instructions):

2. Show Video/animation films to explain the infrastructures and the mechanism involved in the principle.
3. Encourage collaborative (Group) Learning in the class.
4. Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking.
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
6. Topics will be introduced in multiple representations.
7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.
9. Individual teachers can device innovative pedagogy to improve teaching-learning.



DSATM

Scheme of Teaching and Examinations for BE Programme -2023-24
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2023-24)

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	Advanced Javascript: JavaScript Window and Frame Objects, Top-level Objects, Window Object, Location Object, Document Object, The Navigator Object, Screen Object, Working with Frames. Microservices: Introduction, Microservices Architecture, Functions, Benefits, Limitations,	8
Pedagogy	Hands on session- Javascript	
2	Introduction to React.js : Creating Your First React Application, Understanding Components and Props, State and Lifecycle, React Hooks, Handling Events, Asynchronous Programming and API Integration	8
Pedagogy	Create an application using react	
3	Introduction to Node.js: : Introduction to Node JS, Setup Development Environment, Node JS Modules, Node Package Manager, Creating Web Server, File System, Debugging Node JS Application	8
Pedagogy	Create an application using Node	
4	Introduction to Ruby and Introduction to Rails: Origins and uses of Ruby, Scalar types and their operations, Simple input and output, Control statements, Arrays, Hashes, Methods, Classes, Codeblocks and iterates, Pattern matching. Overview of Rails, Document requests, Processing forms, Layouts. Rails applications with Databases.	8
Pedagogy	Mini Project	
5	Web 5.0: Introduction to Web 5.0, Applications, Difference between Web 5.0 from Web 1.0, Web 2.0, & Web 3.0, Distributed Ledger Technology (DLT), Various Generations of Web, Challenges Related to Web 5.0, The Importance of Web 5.0. Golang: Introduction to Golang, Terminal Environment, Variables, Functions and Packages, Variadic functions, Servers, HTTP-PC, Servers and Concurrency, Goro Channels.	8
Pedagogy	Hands on session - Web 5.0	

Text Books	
Sl. No.	Title of the Book/Name of the author/Name of the publisher/Edition and Year
1	Robert W.Sebesta: Programming the Worldwide Web, 4thEdn, Pearson, 2021
2	Beginning React (incl. Redux and React Hooks) by Greg Lim ,01-09-2020
3	Node .js shared By Dhruvi Shah, 1-1-2018
4	Ruby on Rails Tutorial : Hartl, Michae, 04-07-2020
5	Web Programming with Go: Building and Scaling Interactive Web Applications with Go's Robust Ecosystem eBook : Taylor, 30-11-2023
5	Web Development and Design Foundations with HTML5 by Terry Felke-Morris (Author),1-11-2019
Reference Books	
1	Thomas A. Powell: Ajax The Complete reference, McGraw Hill,2008.
2	AravindShenoy, Ulrich Sossou: Learning Bootstrap, Packt, Dec 2014.
3	Dana Moore, Raymond Budd, Edward Benson: Professional Rich Internet Applications: AJAX and Beyond, Wiley 2012.

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	Level Indicator
CO1	Understand the Web Applications using Advanced Javascript for the given problem	Understand	L1,L2
CO2	Apply the Web Pages using Ruby for the given problem.	Apply	L3
CO3	Analyze the advances in Web 5.0 and demonstrate its usage for the problem considered.	Analyze	L4
CO4	Evaluate the web services and demonstrate its usage for the problem considered.	Evaluate	L5
CO5	Implement responsive web applications using Golang for the given problem.	Implement	L6

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-
CO4	-	-	3	-	-	-	-	-	3	-
CO5	-	-	-	3	3	-	-	-	-	3

Weblinks and Video Lectures (e-Resources)

1	https://youtu.be/OGImfxO2TEU
2	https://youtu.be/T3q6QcCQZQg
3	https://www.youtube.com/watch?v=9QsAbhL0jcc
4	https://www.youtube.com/watch?v=Mja1GbB2YHo
5	https://www.youtube.com/watch?v=B3Fbujmgo60
6	https://www.youtube.com/watch?v=Oe421EPjeBE
7	https://www.youtube.com/watch?v=b9eMGE7QtTk

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory			
	Continuous Assessment Tests (IAT)		Continuous Comprehensive Assessment (CCA)	
	IAT-1	IAT-2	CCA-1	CCA-2
	50 Marks	50 Marks	50 Marks	50 Marks

Remember			10	5
Understand	10	20		5
Apply	20	20	10	10
Analyse	20	10	10	10
Evaluate	-	-	10	10
Create	-	-	10	10

CIE Course Assessment Plan

CO's	Marks Distribution						Total Marks	Weightage
	Test-1			Test-2				
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	-	5	5	5	-	-	15	15%
CO2	10	5	5	10	5	10	45	45%
CO3	-	10	10	5	5	10	40	40%
CO4	-	-	-	-	-	-		
CO5	-	-	-	-	-	-		
Total	10	20	20	20	10	20	100	100%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
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Remember	15
Understand	-
Apply	45
Analyse	40
Evaluate	-
Create	-

SEE Course Plan

CO's	Marks Distribution						Total Marks	Weightage
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	-	5	5	5	-	-	15	15%
CO2	10	5	5	10	5	10	45	45%
CO3	-	10	10	5	5	10	40	40%
CO4	-	-	-	-	-	-		
CO5	-	-	-	-	-	-		
Total	10	20	20	20	10	20	100	100%



Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Semester	:	III			
Course Title	:	Ethical Hacking			
Course Code	:	23MCA422			
Course Type (Theory/ Practical/ Integrated)	:	Theory			
Category	:	PEC			
Stream	:	MCA	CIE	:	50 Marks
Teaching hours/ week (L:T:P:S)	:	3:0:0:0	SEE	:	50 Marks
Total Hours	:	40 Hrs	SEE	:	3 Hours
Credits	:	3:0:0:0	Duration		

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Understand the basics and significance of tools and techniques to carry out a penetration testing
2	To understand different security techniques used to protect system and user data.
3	Explore the basic attacks against network and computer systems
4	Understand different methods for evading security controls

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
- Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.
- Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.



DSATM

Scheme of Teaching and Examinations for BE Programme -2024-25
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2024-25)

COURSE CURRICULUM

Module No.	Topics	Hours
1	ETHICAL HACKING : Types of Data Stolen From the Organizations, Elements of Information Security, Authenticity and Non-Repudiation, Security Challenges, Effects of Hacking, Hacker – Types of Hacker, Ethical Hacker, Hacktivism - Role of Security and Penetration Tester, Penetration Testing Methodology, Networking & Computer Attacks – Malicious Software (Malware), Protection Against Malware, Intruder Attacks on Networks and Computers, Addressing Physical Security – Key Loggers and Back Doors	8
Pedagogy	Demonstration	
2	FOOT PRINTING AND SOCIAL ENGINEERING : Tools for Foot Printing, Conducting Competitive Intelligence, Google Hacking, Scanning, Enumeration, Trojans & Backdoors, Virus & Worms, Proxy & Packet Filtering, Denial of Service, Sniffer, Social Engineering – shoulder surfing, Dumpster Diving, Piggybacking.	8
Pedagogy	Hands on session	
3	DATA SECURITY 9 Security – Attacks and Protection, Steganography – Methods, Attacks and Measures, Cryptography – Methods and Types of Attacks, Wireless Hacking, Windows Hacking, Linux Hacking.	8
Pedagogy	Demonstration	
4	NETWORK PROTECTION SYSTEM & HACKING WEBSERVERS : Routers, Firewall & Honeypots, IDS & IPS, Web Filtering, Vulnerability, Penetration Testing, Session Hijacking, Web Server, SQL Injection, Cross Site Scripting, Exploit Writing, Buffer Overflow, Reverse Engineering, Email Hacking, Incident Handling & Response, Bluetooth Hacking, Mobiles Phone Hacking	8
Pedagogy	Hands on session	
5	ETHICAL HACKING LAWS AND TESTS : An introduction to the particular legal, professional and ethical issues likely to face the domain of ethical hacking, ethical responsibilities, professional integrity and making appropriate use of the tools and techniques associated with ethical hacking – Social Engineering, Host Reconnaissance, Session Hijacking, Hacking - Web Server, Database, Password Cracking, Network and Wireless, Trojan, Backdoor, UNIX, LINUX, Microsoft, NOVEL Server, Buffer Overflow, Denial of Service Attack, Methodical Penetration Testing.	8
	Experiential learning	

Text Books

Sl. No.	Title of the Book/Name of the author/Name of the publisher/Edition and Year
1	Michael T. Simpson, Kent Backman, James E. "Corley, Hands-On Ethical Hacking and Network Defense", 2nd Edition, CENGAGE Learning, 2010.

Reference Books

1	.. Michael T. Simpson, Kent Backman, James E. "Corley, Hands-On Ethical Hacking and Network Defense", 3rd Edition, CENGAGE Learning, 2017.
2	Steven DeFino, Barry Kaufman, Nick Valenteen, "Official Certified Ethical Hacker Review Guide", 1st edition. CENGAGE Learning.
3	Patrick Engebretson, "The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made Easy", Syngress Basics Series, 1st edition, 2011.

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Classify tools and techniques to carry out a penetration testing.	L1/L2	U/R
CO2	Examine security techniques used to protect system and user data devices.	L3	A
CO3	Compare various types of malware and cyber-attack vectors and players.	L4	AN
CO4	Analyze basic attacks against network and computer systems.	L5	C
CO5	Classify various methods for evading security controls .	L6	E

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	–	–	–	–	–	–	–	–	–	–
CO2	3	–	–	–	–	–	–	–	–	–
CO3	–	3	–	–	–	–	–	–	–	–
CO4	–	–	3	–	3	–	–	–	3	–
CO5	–	–	–	3	–	–	–	3	–	3

Weblinks and Video Lectures (e-Resources)

1	https://www.youtube.com/channel/UCa6eh7gCkpPo5XXUDfygQQA
2	https://www.cybrary.it/

3	https://www.youtube.com/user/Hak5Darren
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CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory			
	Continuous Assessment Tests (IAT)		Continuous Comprehensive Assessment (CCA)	
	IAT-1	IAT-2	CCA-1	CCA-2
	50 Marks	50 Marks	50 Marks	50 Marks
Remember	10	-	-	-
Understand	-	10	-	-
Apply	20	20	25	25
Analyse	20	20	25	-
Evaluate	-	-	-	-
Create	-	-	-	25

CIE Course Assessment Plan

CO's	Marks Distribution						Total Marks	Weightage
	Test-1			Test-2				
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5	5	5	5	5	5	30	20%
CO2	10	10	10	10	10	10	60	40%
CO3	10	10	10	10	10	10	60	40%
CO4	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-
Total	25	25	25	25	25	25	150	100%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	5
Understand	5
Apply	20
Analyse	20
Evaluate	-
Create	-

SEE Course Plan

CO's	Marks Distribution						Total Marks	Weightage
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5	5	5	5	5	5	30	20%
CO2	10	10	10	10	10	10	60	40%
CO3	10	10	10	10	10	10	60	40%
CO4	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-
Total	25	25	25	25	25	25	150	100%



Dayananda Sagar Academy of Technology & Management
(Autonomous Institute under VTU)

Semester	:	IV			
Course Title	:	Enterprise Resource Planning			
Course Code	:	23MCA424			
Course Type (Theory/ Practical/ Integrated)	:	Theory			
Category	:	PEC			
Stream	:	MCA	CIE	:	50 Marks
Credits (L: T:P:S)	:	3:0:0:0	SEE	:	50 Marks
Total Hours	:	40 Hrs	SEE Duration	:	3 Hours

Course Learning Objectives: Students will be taught

Sl.No	Course Objectives
1	Learn the different ERP related Technologies and their benefits
2	Understand the Various Business Modules
3	Know ERP implementation using different Techniques
4	Learn about the different ERP vendors

Teaching-Learning Process

Pedagogy (General Instructions):

These are sample Strategies; which teachers can use to accelerate the attainment of the various Course outcomes.

1. Lecture method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.
2. Show Video/animation films to explain the infrastructures and the mechanism involved in the principle.
3. Encourage collaborative (Group) Learning in the class.
4. Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking.
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
6. Topics will be introduced in multiple representations.
7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.
9. Individual teachers can device innovative pedagogy to improve teaching-learning.



DSATM

Scheme of Teaching and Examinations for MCA Programme -2023-24

Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2023-24)

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	ERP and Related Technologies Business Process Re-engineering: Management Information systems, Decision Support Systems, Executive Information Systems- Advantages of EIS; Disadvantages of EIS, Data Warehousing: Data Mining, On-Line Analytical Processing, Product Life Cycle Management, Supply Chain Management, ERP Security	8
Pedagogy	Problem solving	
2	Benefits of ERP Reduction of Lead-time, On-time shipment, Reduction in cycle time, Improved Resource Utilization, Better Customer Satisfaction, Improved supplier performance, Increased flexibility, Reduced quality costs, improved information Accuracy and Decision-making capability.	8
Pedagogy	Problem solving	
3	Business Modules Business Modules: Business Modules in an ERP Package, Finance, Manufacturing, Human Resource, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution	8
Pedagogy	Demonstration	
4	ERP Implementation Life Cycle ERP Tools and Software: ERP Selection Methods and Criteria, ERP Selection Process, ERP Vendor Selection. ERP Implementation Lifecycle: Pros and cons of ERP implementation, Factors for the Success of an ERP Implementation, Latest ERP Implementation Methodologies.	8
Pedagogy		
5	Different ERP Vendors ERP Vendors: SAP-AG: Products and technology R/3 overview; SAP advantage, Baan Company. Oracle Corporation: Products and technology; Oracle Application; Vertical solutions, Microsoft Corporation, QAD Case Study - hands on exercises using various ERP tools	8
Pedagogy	Hands on session	

Text Books

1	Alexis Leon, Enterprise Resource Planning, McGraw-Hill Education (India), 2014
2	Garg, vinod kumar, venkitakrishnan n. k., Enterprise Resource planning concepts and practice, 2016
3	Ellen F. Monk, Bret J. Wagner, Concepts of Enterprise Planning, Cengage, 2013

Reference Books

1	Enterprise Resource Planning, Mary Sumner, Pearson Education, 8 th edition, 2020.
2	The SAP R /3 Hand book, Jose Antonio Fernandez, , Tata McGraw Hill, 2007
3	Enterprise Resource Planning, Mahadeo Jaiswal & Ganesh Vanapalli, Macmillan, edition 2, 2016

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	Level Indicator
CO1	Understand the knowledge of ERP-related technologies and their benefits	L1/L2	U/R
CO2	Apply ERP implementation in different business organizations	L3	A
CO3	Analyze various Business Modules.	L4	AN
CO4	Evaluate various ERP tools and apply on different models.	L5	C

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2
CO1	–	–	–	–	–	–	–	–	–	–
CO2	3	–	–	–	–	–	–	–	3	–
CO3	–	3	–	–	–	–	–	–	–	3
CO4	–	–	3	–	3	–	–	–	–	–
CO5	–	–	–	3	–	–	–	3	–	–

Weblinks and Video Lectures (e-Resources)

1	https://www.youtube.com/watch?v=c9HfNg4a_Og
2	https://www.youtube.com/watch?v=_H59sWSG0eI
3	https://www.youtube.com/watch?v=ppfBvofxCM0

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory				Practical
	Continuous Assessment Tests (IAT)		Continuous Comprehensive Assessment (CCA)		
	IAT-1	IAT-2	CCA-1	CCA-2	
	50 Marks	50 Marks	50 Marks	50 Marks	
Remember	10	-	10		-
Understand	-	10	-	10	-
Apply	20	20	-	-	-
Analyse	20	20	-	-	10
Evaluate	-	-	20	20	20
Create	-	-	20	20	20

CIE Course Assessment Plan

CO's	Marks Distribution						Total Marks	Weightage
	Test-1			Test-2				
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5	10	-	5	5	5	30	25%
CO2	10	5	5	-	10	10	50	50%
CO3	5	10	5	5	5	5	35	25%
CO4	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-
Total	20	20	10	10	20	20	100	100%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	20%
Understand	20%
Apply	30%
Analyse	30%
Evaluate	-
Create	-

SEE Course Plan

CO's	Marks Distribution						Total Marks	Weightage
	Module-1	Module-2	Module 2 to 2.5	Module-2.5 to 3	Module-4	Module-5		
CO1	5	10	-	5	5	5	30	25%
CO2	10	5	5	-	10	10	50	50%
CO3	5	10	5	5	5	5	35	25%
CO4	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-
Total	20	20	10	10	20	20	100	100%

TECHNICAL SEMINAR



Dayananda Sagar Academy of Technology & Management
(Autonomous Institute under VTU)

Semester	:	IV			
Course Title	:	Technical Seminar			
Course Code	:	23MCA43			
Course Type (Theory/ Practical/ Integrated)	:	SEM			
Category	:	SEM			
Stream	:	MCA	CIE	:	100 Marks
Teaching hours/ week (L:T:P:S)	:	0:0:0:4	SEE	:	-
Total Hours	:	30	SEE	:	-
Credits	:	2	Duration	:	

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	To enhance practical skills such as problem-solving, analysis, critical thinking, and application of technical knowledge.
2	To encourage professional growth and awareness of current trends
3	To prepare participants for future career opportunities by exposing them to industry-relevant topics and skills.
4	To understand specific technical concepts, theories, or methodologies relevant to the seminar topic.

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
- Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.
- Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.



DSATM

Scheme of Teaching and Examinations for MCA Programme -2024-25
Outcome Based Education and Choice Based Credit System (CBCS)

(Effective from the Academic Year 2024-25)

Technical Seminar

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understand the activities Covered by Software Project Management	Apply	L3
CO2	Apply the practices and methods for successful software project management	Analyse	L4
CO3	Analyze the techniques for requirements, policies and decision-making for effective resource	Design	L5
CO4	Evaluate a framework for software project management plan for activities, risk, monitoring and control	Evaluate	L6

Continuous Internal Evaluation

The CIE marks for the seminar shall be awarded (based on the relevance of the topic, presentation skill, participation in the question and answer session and quality of report) by the committee constituted for the purpose by the Head of the Department. The committee shall consist of three faculties from the department with the senior most acting as the Chairperson.

CIE marks for the Technical seminar report (40 marks), seminar (40 marks) and question and answer session (20 marks) shall be awarded (based on the quality of report and presentation skill, participation in the question and answer session by the student) by the committee constituted for the purpose by the Head of the Department. The committee shall consist of three faculty from the department with the senior most acting as the Chairperson.

PROJECT WORK



Dayananda Sagar Academy of Technology & Management
(Autonomous Institute under VTU)

Semester	:	IV			
Course Title	:	Project Work			
Course Code	:	23MCA44			
Course Type (Theory/ Practical/ Integrated)	:	Practical			
Category	:	PROJ			
Stream	:	MCA	CIE	:	100 Marks
Teaching hours/ week (L:T:P:S)	:	0:0:0:32	SEE	:	100 Marks
Total Hours	:	-	SEE	:	3 Hours
Credits	:	18	Duration		

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	To Support independent learning.
2	To guide to select and utilize adequate information from varied resources maintaining ethics..
3	To inspire independent and team working.
4	To guide to organize the work in the appropriate manner and present information (acknowledging the sources) clearly.
5	To train students to present the topic of project work in a seminar without any fear, face audience confidently, enhance communication skill, involve in group discussion to present and exchange ideas.

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

- Adopt different teaching methods to attain the course outcomes.
- Include videos to demonstrate various concepts in C.
- Encourage collaborative (Group) Learning to encourage team building.
- Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
- Adopt **Problem-Based Learning (PBL)**, which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
- Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
- Discuss various case studies to map with real-world scenarios and improve the understanding.
- Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.



DSATM

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(Effective from the Academic Year 2024-25)

Project Work

Each student shall involve in carrying out the project work jointly in constant consultation with internal guide, co-guide, and external guide and prepare the project report as per the norms avoiding plagiarism.

- Follow the Software Development life cycle
- Data Collection ,Planning
- Design the Test cases
- Validation and verification of attained results
- Significance of parameters w.r.t scientific quantified data.
- Publish the project work in reputed Journal.

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understand comprehension of project requirements and underlying principles.	L1/L2	U/R
CO2	Apply knowledge and skills in practical, real-world project scenarios.	L3	A
CO3	Analyze the various project elements to understand their relationships and organizational structure..	L4	AN
CO4	Assess project outcomes and processes based on criteria and standards.	L5	C
CO5	Design and develop an innovative solution to a real-world problem	L6	E

Continuous Internal Evaluation:

Project Report: 10 marks. The basis for awarding the marks shall be the involvement of the student in the project and in the preparation of project report. To be awarded by the internal guide in consultation with external guide if any.

Paper Publication: 10 marks

Project Presentation: 20 marks.

The Project Presentation marks of the Project Work Phase -II shall be awarded by the committee constituted for the purpose by the Head of the Department. The committee shall consist of three faculty from the department with the senior most acting as the Chairperson.

Project Execution: 50 Marks

The Project Execution marks of the Project Work Phase -II shall be awarded by the committee constituted for the purpose by the Head of the Department. The committee shall consist of three faculty from the department with the senior most acting as the Chairperson.

Question and Answer: 10 marks.

The student shall be evaluated based on the ability in the Question and Answer session for 10 marks.

Semester End Examination

SEE marks for the project report (60 marks), seminar (30 marks) and question and answer session (10 marks) shall be awarded (based on the quality of report and presentation skill, participation in the question and answer session) by the examiners appointed by the University.