

MADHAV INSTITUTE OF TECHNOLOGY AND SCIENCE, GWALIOR – 474005

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to R.G.P.V. Bhopal, M.P.)

BOARD OF STUDIES (BoS) PROCEEDING

IN

INFORMATION TECHNOLOGY

(Meeting Dated – 14th December, 2022)

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute affiliated to RGPV, Bhopal)

DEPARTMENT OF INFORMATION TECHNOLOGY

Summary of Board of Studies (BoS)

Courses where revision was carried out

Subject Name	Course No.	Revision Date	Revision Date	Percentage	Item No.	Page No.
Digital Logic Design	160123/230123/240123 /270123/280123	28/11/2020	14/12/2022	11.11%	ITEM IT - 12	06

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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DEPARTMENT OF INFORMATION TECHNOLOGY

Summary of Board of Studies (BoS)

(Course/subject name)	Course Code	Activities/contents which have adhered to the proposed syllabus		
Data Mining & Warehousing	910102	This course gives an introduction to methods and theory for development of data warehouses and data analysis using data mining. Data quality, methods, and techniques for pre-processing of data. Modelling and design of data warehouses. Algorithms for classification, clustering and association rule analysis. Practical use of software for data analysis.	ITEM IT - 07	05
Computer Networks	160413	Students will able to get knowledge of computer networking, IP-addressing, client server application etc.	ITEM IT - 09	05
Cloud Computing	230402/240402/270402/280402	Students can classify different types of computing and compare with cloud computing. They will also able to categorization of software environment and platform for cloud.	ITEM IT - 09	05
Software Engineering	160412/ 230403/240403 270403/280403	Students would get the ability to develop and designing software in different stage. Also know about the how to test the software before the final deployment.	ITEM IT - 09	05
Machine Learning and Optimization	240404/270404/280404	Students can use their subject knowledge to develop ability to solve real-time challenges that is important for both data scientists and software engineers and essential for machine learning engineers.	ITEM IT - 09	05
Python Programming	160414/ 230406	Python is a general purpose, high-level programming language; other high- level languages you might have heard of C++, PHP, and Java. Virtually all modern programming languages make us of an Integrated Development Environment (IDE), which allows the creation, editing, testing, and saving of programs and modules.	ITEM IT - 09	05

DEPARTMENT OF INFORMATION TECHNOLOGY***Summary of Board of Studies (BoS)******New Courses***

(Course/subject name)	Course Code	Activities/contents which have a bearing on increasing skill and employability	Agenda Item No.	Page No.
Data Mining & Pattern Warehousing	160612/ 230602/ 240602	The course will cover the fundamentals of data mining. It will explain the basic algorithms like data preprocessing, association rules, classification, clustering, sequence mining and visualization. It will also explain implementations in open source software. It is also important in modern scientific endeavors. Data mining is an interdisciplinary topic involving, databases, machine learning and algorithms.	ITEM IT - 05	04
Artificial Intelligence & Machine Learning	160613/ 230603	The course places machine learning in its context within AI and gives an introduction to the most important core techniques.	ITEM IT - 05	04
AI in Robotics	240603	The course will cover the simulation/tool based applications of robotics using AI. A*, AO* algorithms based path planning of agents will be done using Matlab or Python libraries.	ITEM IT - 05	04
Foundation of Cloud IoT Edge ML	230662	This course provides an in-depth understanding of terminologies and the core concepts behind Cloud-IoT-Edge problems, applications, systems and the techniques, that underlie today's cutting-edge technologies. It provides an introduction to some of the start-of-the-art IoT and wireless networks, edge and virtualization technologies, recent trends in computer hardware for artificial intelligence, spatial localization and detection, tensor processing unit for fast and affordable artificial intelligence (AI).	ITEM IT - 06	05
AI: Constraint Satisfaction	AI0623M2	This course will cover the general approaches to solving finite domain Constraint Satisfaction Problems (CSPs), and explore how search can be combined with constraint propagation to find solutions.	ITEM IT - 04	03
Quantum Algorithms and Cryptography	IT0623H1/ IO0623H2	In this course, we will study the foundations of quantum computing and the important role of quantum computers in cryptography. Basics of quantum computing, speedups offered by quantum algorithms, classical cryptography and how it is broken by quantum computers, design of cryptosystems resilient to quantum attacks and cryptographic protocols using quantum physics, such as quantum key distribution, quantum public key encryption and quantum fully homomorphic encryption.	ITEM IT - 04	03

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Programming in Modern C++	IO0623M3	This course builds up on the knowledge of C programming and basic data structure (array, list, stack, queue etc.) to create a strong familiarity with C++98 / C++03. Besides the constructs, syntax and semantics of C++ (over C), this course will focus on various idioms of C++ and attempt to go to depth with every C++ feature justifying and illustrating them with several examples and assignment problems. The course also covers important advances in C++11.	ITEM IT - 04	03
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DEPARTMENT OF INFORMATION TECHNOLOGY

Summary of Board of Studies (BoS)

Feedback on curriculum received from stakeholders: Analysis & ATR

Stakeholder	Student	Faculty		
No. of responses	394 March to July 2022 (2 nd Semester)	08	46	67
	700 July to November 2022 (3 rd Semester)	16		
	455 July to November 2022 (5 th Semester)	12		
	19 July to November 2022 (7 th Semester)	03		
Link of Analysis	Link	Link	Link	Link
ATR Link	Link	Link	Link	Link
Link showing Excel sheet of Google Form details of stakeholders	March to July 2022 (2 nd Semester) Link	March to July 2022 (2 nd Semester) Link	Link	Link
	July to November 2022 (3 rd Semester) Link	July to November 2022 (3 rd Semester) Link		
	July to November 2022 (5 th Semester) Link	July to November 2022 (5 th Semester) Link		
	July to November 2022 (7 th Semester) Link	July to November 2022 (7 th Semester) Link		

D No 101

06.03.2023

Madhav Institute of Technology & Science, Gwalior-474 005

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)

Department of Information Technology

Date: 14/12/2022

Minutes of Meeting of Board of Studies (BoS) in Information Technology

The Meeting of Board of Studies (BoS) in Information Technology was held on 14th December 2022 at 01:00 P.M. onwards in offline/online mode (through video conferencing). During the meeting following were present.

1.	Dr. Akhilesh Tiwari, Professor & Head	Chairman
2.	Dr. Surya Prakash Discipline of Computer Science and Engineering, School of Engineering, Indian Institute of Technology Indore Indore-453552, Madhya Pradesh, India	External Member (Academics) (Nominee of Hon'ble Vice Chancellor RGPV Bhopal)
3.	Dr. Deepak Garg, Dean, School of Computer Science Engineering and Technology, Bennett University, Greater Noida, Uttar Pradesh	External Member (Academics)
4.	Dr. Nisha Chaurasia, Assistant Professor, Department of Information Technology, Dr. B. R. Ambedkar National Institute of Technology, Jalandhar (Punjab)	External Member (Alumnus)
5.	Dr. Vivek Tiwari, Department of Computer Science Engineering, International Institute of Information Technology, Naya Raipur (IIIT-NR)	Invitee Member (Academics)
6.	Dr. Sanjiv Sharma, Assistant Professor	Member
7.	Mr. Punit Kumar Johari, Assistant Professor	Member
8.	Mr. Vikas Sejwar, Assistant Professor	Member
9.	Mr. Abhilash Sonker, Assistant Professor	Member
10.	Dr. Saumil Maheshwari, Assistant Professor	Member
11.	Dr. Vikram Rajpoot, Assistant Professor	Member
12.	Dr. Dhananjay Bisen, Assistant Professor	Member
13.	Dr. Tej Singh, Assistant Professor	Member
14.	Dr. Pawan Dudey, Assistant Professor	Member
15.	Mr. Abhishek Dixit, Assistant Professor	Member
16.	Dr. Bhagat Singh Raghuwansi, Assistant Professor	Member
17.	Dr. Nidhi Saxena, Assistant Professor	Member
18.	Mr. Aditya Dubey, Assistant Professor	Member
19.	Dr. Anshika Srivastava, Assistant Professor	Member
20.	Dr. Ana Kumar, Assistant Professor	Member
21.	Dr. Kritika Bansal, Assistant Professor	Member

In addition to above, faculty members under contractual engagement were also present.

Handwritten signatures and initials of the attendees, including names like Akhilesh, Surya, Deepak, Nisha, Vivek, Sanjiv, Punit, Vikas, Abhilash, Saumil, Vikram, Dhananjay, Tej, Pawan, Abhishek, Bhagat, Nidhi, Aditya, Anshika, Ana, and Kritika.

The following external and internal members could not attend the meeting.

1.	Dr. Dinesh Kumar Vishwakarma, Professor, Department of Information Technology, Delhi Technological University (DTU), Delhi	External Member (Academics)
2.	Mr. Abhinav Mishra, Sr. Director, Persistent System Limited	External Member (Industry)
3.	Mr. Rajeev Kumar Singh, Assistant Professor	Internal Member
4.	Ms. Neha Bhardwaj, Assistant Professor	Internal Member

The following student members/ representatives were also present in the meeting.

1.	Amrit Kaur (0901EC191020)	B. Tech IT Fourth year
2.	Harshita Vishwakarma (0901IT191026)	B. Tech IT Fourth year
3.	Akshat Kothavade (0901IT201005)	B. Tech IT Third year
4.	Praveen Singh Bhadouriya (0901IO201049)	B. Tech IoT Third year
5.	Ashutosh kawat Manjhi (0901AI201014)	B. Tech AIR Third year
6.	Ayush Hurkat (0901IT211013)	B. Tech IT Second year
7.	Rashi Trivedi (0901IO211047)	B. Tech IoT Second year
8.	Kanishka Jain (0901AD211023)	B. Tech AIDS Second year
9.	Piyush Kushwah (0901AM211036)	B. Tech AIML Second year
10.	Rahul Lalwani (0901AM211045)	B. Tech AIML Second year

The following deliberation took place in the meeting:

ITEM IT-1:	To confirm the minutes of previous BoS meeting held in the month of May 2022. The minutes of previous Board of Studies (BoS) meeting held on 28th May 2022 were presented, discussed and confirmed.		
ITEM IT-2:	To propose the scheme structure of VIII Semester with the provision of ONE DE & ONE OC course to be offered in online mode with credit transfer for the batch admitted in 2019-20. (The total credits from I-VIII semester should be 170 for this batch) The scheme structure of VIII Semester were discussed, finalized and recommended with the provision of ONE DE & ONE OC (to be offered in online mode) with credit transfer. The same is Annexed as Annexure-I.		
ITEM IT-3:	To propose the list of courses which the students can opt from SWAYAM/NPTEL/ other MOOC Platforms/Institution (MITS) MOOC, to be offered in online mode under Departmental Elective (DE) category courses (DE-5) and open category (OC-4) for credit transfer in the VIII Semester under the flexible curriculum (Batch admitted in 2019-20) The list of Departmental Elective (DE) category courses (DE-5) and open category (OC-4) to be offered from SWAYAM/NPTEL/MOOC based learning platform/ Institutional MOOC (in online mode) for B. Tech VIII Semester IT discipline (under flexible curriculum) were discussed and recommended, as per the following detail <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">DE-5 (B. Tech IT):</td> </tr> <tr> <td> <ul style="list-style-type: none"> • Blockchain and its Applications (12 Weeks) • Advanced Graph Theory (8 Weeks) • Natural Language Processing (12 Weeks) • Foundation of Cloud IoT Edge ML (8 Weeks) </td> </tr> </table>	DE-5 (B. Tech IT):	<ul style="list-style-type: none"> • Blockchain and its Applications (12 Weeks) • Advanced Graph Theory (8 Weeks) • Natural Language Processing (12 Weeks) • Foundation of Cloud IoT Edge ML (8 Weeks)
DE-5 (B. Tech IT):			
<ul style="list-style-type: none"> • Blockchain and its Applications (12 Weeks) • Advanced Graph Theory (8 Weeks) • Natural Language Processing (12 Weeks) • Foundation of Cloud IoT Edge ML (8 Weeks) 			

(Handwritten signatures and initials)

OC-4 (Offered by IT Department):

- Information Security - 5 - Secure Systems Engineering (8 Weeks)
- Social Networks (12 Weeks)
- Foundation of Cloud IoT Edge ML (8 Weeks)

In continuation, it is also discussed and recommended that the above mentioned list of Departmental Elective (DE) category courses (DE-5) and open category (OC-4) may be kept dynamic and newly emerging courses may be inducted in line with the industrial need and emerging developments (as and when desired).

ITEM IT-4:

To propose the list of "Additional Courses" which can be opted for getting an

- (i) **Honours (for students of the host department)**
- (ii) **Minor Specialization (for students of other departments)**

[These will be offered through SWAYAM/NPTEL/MOOC based Platforms for the VI semester (for the batch admitted in 2020-21) and for VIII semester students (for the batch admitted in 2019-20)] The list should be additive; such that those MOOCs which were offered in previous semesters are also included provided they are being offered on the platform during Jan-June 2023 semester]

The courses available on SWAYAM/NPTEL/MOOC based learning platforms for Honours and Minor Specialization were discussed and identified. The Same has been listed, as mentioned below

B. Tech-IT VI Semester (2020-21 admitted batch)

Additional Courses for "Honours" (Parent Department)

- Quantum Algorithms and Cryptography (12 Weeks)
- Object Oriented System Development Using UML, Java And Patterns (12 Weeks)
- GPU Architectures And Programming (12 Weeks)
- The Joy of Computing using Python (12 Weeks)
- Advanced Computer Architecture (12 Weeks)

Additional Courses for Minor Specialization (Other Departments)

- Programming, Data Structures and Algorithms in Python (8 Weeks)
- Programming in Java (12 Weeks)
- Design and analysis of algorithms (8 Weeks)
- Introduction to Database Systems (12 Weeks)

B. Tech-IoT VI Semester (2020-21 admitted batch)

Additional Courses for "Honours" (Parent Department)

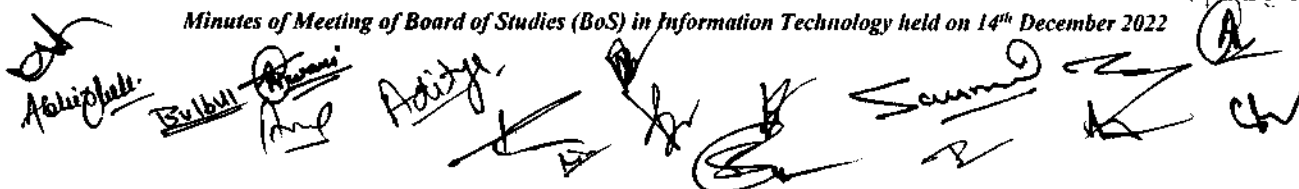
- Introduction To Industry 4.0 And Industrial Internet Of Things (12 Weeks)
- Quantum Algorithms and Cryptography (12 Weeks)
- Object Oriented System Development Using UML, Java And Patterns (12 Weeks)
- Advanced Computer Architecture (12 Weeks)
- The Joy of Computing using Python (12 Weeks)

Additional Courses for Minor Specialization (Other Departments)

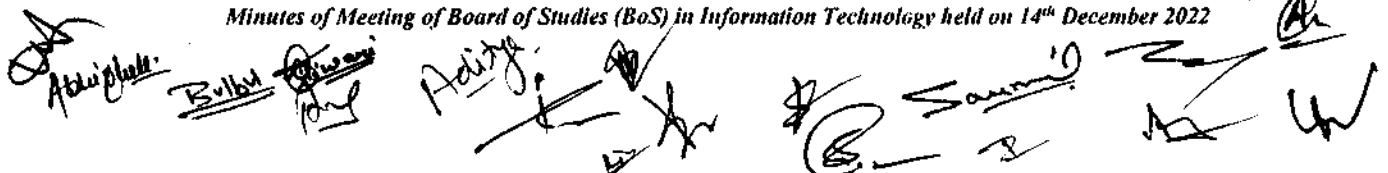
- Programming, Data Structures and Algorithms in Python (8 Weeks)
- Design and analysis of algorithms (8 Weeks)
- Programming in Modern C++ (12 Weeks)
- Introduction to Internet of Things (12 Weeks)

[Handwritten signatures and initials of board members]

	<p align="center">B. Tech AIR VI Semester (2020-21 admitted batch)</p> <p align="center">Additional Courses for "Honours" (Parent Department)</p> <ul style="list-style-type: none"> • Artificial Intelligence: Knowledge Representation And Reasoning (12 Weeks) • GPU Architectures And Programming (12 Weeks) • Advanced Computer Architecture (12 Weeks) • The Joy of Computing using Python (12 Weeks) <p align="center">Additional Courses for "Minor Specialization" (Other Departments)</p> <ul style="list-style-type: none"> • Programming, Data Structures and Algorithms in Python (8 Weeks) • AI: Constraint Satisfaction (8 Weeks) • Design and analysis of algorithms (8 Weeks) • Introduction to Machine Learning (12 Weeks) <p align="center">B. Tech IT VIII Semester (2019-20 admitted batch)</p> <p align="center">Additional Courses for "Honours" (Parent Department)</p> <ul style="list-style-type: none"> • User-centric Computing for Human-Computer Interaction (8 Weeks) • Affective Computing (12 Weeks) • Ethical Hacking (12 Weeks) <p align="center">Additional Courses for "Minor Specialization" (Other Departments)</p> <p>Provision of Domain Specific Courses for minor specialization (as available on the SWAYAM/NPTEL platform), as follows:</p> <p>Domain 1: Programming</p> <ul style="list-style-type: none"> • Introduction to parallel programming with OpenMP and MPI (8 Weeks) • Ethical Hacking (12 Weeks) <p>Domain 2: Systems</p> <ul style="list-style-type: none"> • Advanced computer architecture (12 Weeks) • Foundation of Cloud IoT Edge ML (8 Weeks) <p>In continuation, it is discussed that the above list must be kept dynamic and additional courses may be inducted (as per the requirement).</p>
ITEM IT-5:	<p>To review and finalize the scheme & syllabi for all <i>Departmental Core (DC) Courses</i> of VI Semester (for batches admitted in 2020-21) under the flexible curriculum along with their COs</p> <p>The Scheme & Syllabi of all the Departmental Core (DC) Courses, to be offered during VI Semester (B. Tech. Programmes [Information Technology/Internet of Things(IoT)/ Information Technology (Artificial Intelligence and Robotics)]) along with their COs under flexible curriculum were discussed and recommended. The same is Annexed as Annexure-II.</p>
ITEM IT-6:	<p>To propose the list of courses from SWAYAM/NPTEL/MOOC Platforms to be offered (for batches admitted in 2020-21) in online mode under <i>Departmental Elective (DE-1) Courses</i> with credit transfer, in the VI Semester</p> <p>The list of Departmental Elective (DE-1) courses to be offered from SWAYAM/NPTEL/MOOC based learning platforms with credit transfer (in online mode) for B. Tech. VI Semester IT, IoT, AIR discipline (under flexible curriculum) were discussed and recommended, as per the following detail</p>



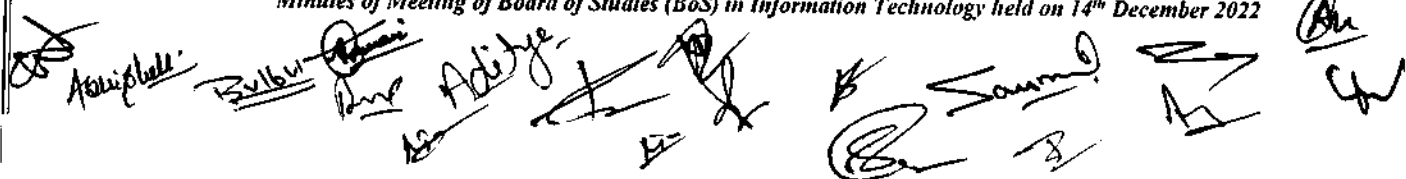
	<table border="1" style="width: 100%;"> <tr> <td style="text-align: center;">DE-1 (B. Tech IT):</td> </tr> <tr> <td> <ul style="list-style-type: none"> • Introduction To Internet Of Things (12 Weeks) • Information Security - 5 - Secure Systems Engineering (8 Weeks) • Advanced Graph Theory (8 Weeks) • Foundation of Cloud IoT Edge ML (8 Weeks) </td> </tr> <tr> <td style="text-align: center;">DE-1 (B. Tech IoT):</td> </tr> <tr> <td> <ul style="list-style-type: none"> • Programming In Java (12 Weeks) • Foundation of Cloud IoT Edge ML (8 Weeks) • Information Security - 5 - Secure Systems Engineering (8 Weeks) </td> </tr> <tr> <td style="text-align: center;">DE-1 (B. Tech AIR):</td> </tr> <tr> <td> <ul style="list-style-type: none"> • Programming In Java (12 Weeks) • Introduction To Internet Of Things (12 Weeks) • Advanced Graph Theory (8 Weeks) • Foundation of Cloud IoT Edge ML (8 Weeks) </td> </tr> </table>	DE-1 (B. Tech IT):	<ul style="list-style-type: none"> • Introduction To Internet Of Things (12 Weeks) • Information Security - 5 - Secure Systems Engineering (8 Weeks) • Advanced Graph Theory (8 Weeks) • Foundation of Cloud IoT Edge ML (8 Weeks) 	DE-1 (B. Tech IoT):	<ul style="list-style-type: none"> • Programming In Java (12 Weeks) • Foundation of Cloud IoT Edge ML (8 Weeks) • Information Security - 5 - Secure Systems Engineering (8 Weeks) 	DE-1 (B. Tech AIR):	<ul style="list-style-type: none"> • Programming In Java (12 Weeks) • Introduction To Internet Of Things (12 Weeks) • Advanced Graph Theory (8 Weeks) • Foundation of Cloud IoT Edge ML (8 Weeks)
DE-1 (B. Tech IT):							
<ul style="list-style-type: none"> • Introduction To Internet Of Things (12 Weeks) • Information Security - 5 - Secure Systems Engineering (8 Weeks) • Advanced Graph Theory (8 Weeks) • Foundation of Cloud IoT Edge ML (8 Weeks) 							
DE-1 (B. Tech IoT):							
<ul style="list-style-type: none"> • Programming In Java (12 Weeks) • Foundation of Cloud IoT Edge ML (8 Weeks) • Information Security - 5 - Secure Systems Engineering (8 Weeks) 							
DE-1 (B. Tech AIR):							
<ul style="list-style-type: none"> • Programming In Java (12 Weeks) • Introduction To Internet Of Things (12 Weeks) • Advanced Graph Theory (8 Weeks) • Foundation of Cloud IoT Edge ML (8 Weeks) 							
ITEM IT-7:	<p>To review and finalize the courses & syllabi to be offered (<i>for batches admitted in 2020-21</i>) under the Open Category (OC) Courses (in traditional mode) for VI semester students of other departments along with their COs</p> <p>The courses to be offered under Open Category (OC) Courses for B. Tech. VI Semester (for the students of other departments) were discussed and recommended as per the following detail</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">Offered by IT Department</td> </tr> <tr> <td>OC-1:</td> </tr> <tr> <td> <ul style="list-style-type: none"> • Data Mining & Warehousing • Software Engineering </td> </tr> </table> <p><i>Further, considering the fact that the Open Category (OC) courses are meant only for the students of other departments, it is discussed and recommended that the above list of courses may be expanded (as per the need and demand from other departments). The detailed syllabi (along with their COs) is Annexed as Annexure-III.</i></p>	Offered by IT Department	OC-1:	<ul style="list-style-type: none"> • Data Mining & Warehousing • Software Engineering 			
Offered by IT Department							
OC-1:							
<ul style="list-style-type: none"> • Data Mining & Warehousing • Software Engineering 							
ITEM IT-8:	<p>To review and finalize the Experiment list/ Lab manual for Laboratory Courses to be offered in VI semester (<i>for batches admitted in 2020-21</i>)</p> <p>The experiment list / lab manual for the Laboratory Courses for VI semester of B. Tech Programme (IT, IoT, AIR) were discussed and finalized. The same is annexed as Annexure-IV.</p>						
ITEM IT-9:	<p>To review and finalize the scheme and syllabi of B. Tech. IV Semester (<i>for batches admitted in 2021-22</i>) under the flexible curriculum along with their COs</p> <p>The Scheme Structure and Syllabi of B. Tech. IV Semester [Information Technology / Internet of Things (IoT)/ Information Technology (Artificial Intelligence & Robotics)/ Artificial Intelligence and Data Science(AI&DS)/ Artificial Intelligence and Machine Learning (AI&ML)] (for batches admitted in 2021-22) under the flexible curriculum were discussed, finalized and recommended.</p>						



	The Scheme Structure & syllabi (along with their COs) is annexed as Annexure-V.
ITEM IT-10:	To review and finalize the Experiment list/ Lab manual for Laboratory Courses to be offered in IV (for batch admitted in 2021-22) The experiment list / lab manual for the Laboratory Courses for IV semester were discussed and finalized. The same is annexed as Annexure-VI.
ITEM IT-11:	To review and finalize the suggestive list of projects under the 'Skill based mini-project' category in various laboratory courses to be offered in Jan - June 2023 semester during IV Semester (for the batch admitted in 2021-22). The list of "skill based mini project" for the Laboratory Courses of B. Tech. IV Semester (for 2021-22 admitted batch) was discussed and finalized. It is also discussed that the list must be treated as dynamic and more projects can be added by the course faculty. The same is annexed as Annexure-VII.
ITEM IT-12:	To ratify the <i>Scheme & Syllabi, list of experiments and skill based mini projects of First Semester & Second Semester B. Tech. programmes</i> [admitted batch 2022-23 Session] The Scheme, Syllabi, List of experiments and Skill based mini projects of B. Tech. I & II semester (IT, IoT, IT(AIR), AI&ML, AI&DS) was discussed and recommended in its present form for further ratification in the Academic Council. The same is annexed as Annexure-VIII.
ITEM IT-13:	To review the CO attainments, to identify gaps and to suggest corrective measures for the improvement in the CO attainment levels for Jan-June 2022. The attainment level of Course Outcomes (COs) for all the courses pertaining to January - June 2022 Session for I to IV Year was presented. In continuation, it was discussed that the courses (if any) where the set target value has not been attained, should be critically analyzed to identify the difficulty level and other causes. The analysis must be followed by corrective measures, such as arrangement of extra / remedial classes, proper coverage of COs in the Question Paper and interaction with the students for possible improvement. The same is annexed as Annexure-IX.
ITEM IT-14:	To review curricula feedback from various stakeholders, its analysis and impact The summarized report of curricula feedback from various stakeholders (students, faculty members and alumni etc.) (for March - July 2022 Semester (I Year) and July - November 2022 Semester (II to IV Year)) was presented and discussed. This was based on various considered parameters. The report is annexed as Annexure-X.
ITEM IT-15:	To review Course Outcomes (COs) feedback of various courses, its analysis and impact The detailed analysis and impact report of Course Outcomes (COs) feedback of various courses from students [for January - June 2022 Semester (I to IV year)] was presented and discussed. The same is enclosed as Annexure -XI.

Suggestions by External Experts / Members:

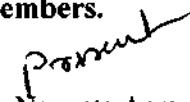
- It was suggested to reorient the contents of course/subject- "AI in Robotics".

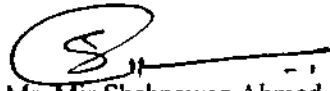


The meeting ended with the vote of thanks to all the members.

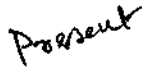

Ms. Akanchha Tiwari

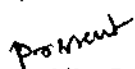

Ms. Bulbul Agrawal


Ms. Namrata Agrawal


Mr. Mir Shahnawaz Ahmad


Dr. Kritika Bansal

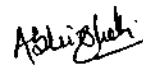

Dr. Ana Kumar


Dr. Anshika Srivastava


Mr. Aditya Dubey


Dr. Nidhi Saxena


Dr. Bhagat Singh Raghuwansi

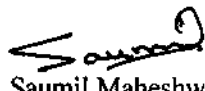

Mr. Abhishek Dixit


Dr. Pawan Dubeey


Dr. Tej Singh


Dr. Dhananjay Bisen


Dr. Vikram Rajpoot


Dr. Saumil Maheshwari


Mr. Abhilash Sonkar


Mr. Vikas Sejwar


Mr. Punit Kumar Johri


Dr. Sanjiv Sharma

Absent.
Mr. Abhinav Mishra
Sr. Director,
Persistent System Limited

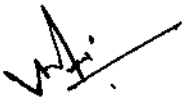
Attended online
Dr. Nisha Chaurasia
Assistant Professor,
Department of Information
Technology, Dr. B. R. Ambedkar
National Institute of Technology,
Jalandhar (Punjab)


Attended online
Dr. Vivek Tiwari, Assistant
Professor,
Department of Computer Science
Engineering,
International Institute of
Information Technology,
Naya Raipur (IIIT-NR)

Absent
Dr. Dinesh Kumar Vishwakarma
Professor,
Department of Information
Technology,
Delhi Technological University
(DTU), Delhi

Present (on-line)
Dr. Deepak Garg
Professor & Head,
Department of Computer Science
Engineering
Bennett University, Greater Noida,
Uttar Pradesh

Attended online
Dr. Surya Prakash
Professor
Discipline of Computer Science
and
Engineering, School of
Engineering,
Indian Institute of Technology
Indore


(Dr. Akhilesh Tiwari)
Professor & Head,
Department of IT,
MITS Gwalior
[Chairman, BoS]


09.12.2023
DEAN (ACADEMICS)
MITS
GWALIOR

*Scheme
of
B. Tech VIII Semester
(Batch Admitted in 2019-20)
(Information Technology)
Under Flexible Curriculum
[ITEM IT -2]*

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute Affiliated to RGPV, Bhopal)

Scheme of Examination

B. Tech. VIII Semester (Information Technology)

For batch admitted in Academic Session 2019-20

S. No.	Subject Code	Category	Subject Name & Title	Maximum Marks Allotted						Total Marks	Contact Hours per week			Total Credits	
				Theory Slot			Practical Slot		MOOCs		L	T	P		
				End Sem.	Mid Sem. Exam	Quiz/Assignm ent	End Sem.	Term Work Lab Work & Sessional	Assignment						Exam
1.	DE	DE	Departmental Elective* (DE-5)	-	-	-	-	-	25	75	100	3	-	-	3
2.	OC	OC	Open Category* (OC-4)	-	-	-	-	-	25	75	100	2	-	-	2
3.	160801	DLC	Internship/Project (DLC-9)	-	-	-	250	150	-	-	400	-	-	12	6
4.	160802	-	Professional Development #	-	-	-	-	50	-	-	50	-	-	2	1
Total				-	-	-	250	200	50	150	650	5	-	14	12
Additional Course for Honours or minor Specialization				Permitted to opt for maximum two additional courses for the award of Honours or Minor specialization											

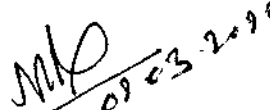
*All of these courses will run through SWAYAM/NPTEL/ MOOC

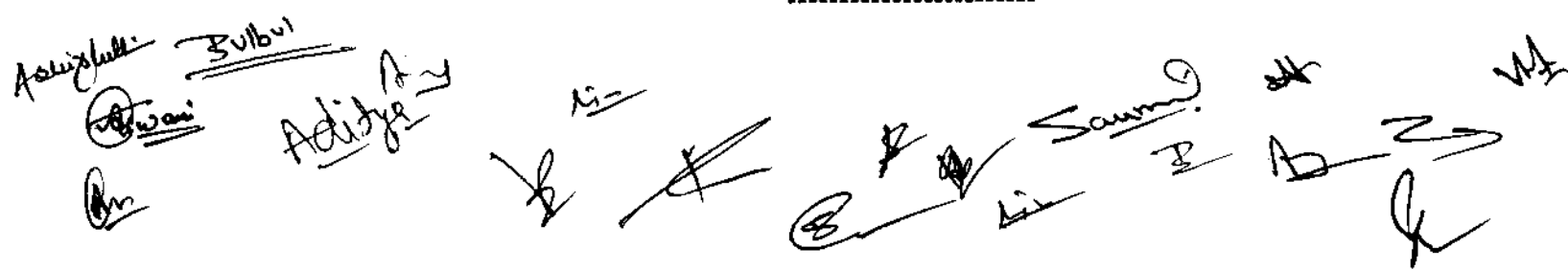
* Evaluation will be based on participation/laurels brought by the students to the institution in national/state level technical and other events during the complete tenure of the UG programme (participation in professional chapter activities, club activities, cultural events, sports, personality development activities, collaborative events, MOOCs and technical events)

DE -5*		
S. No.	Subject Code	Subject Name
1.	160854	Blockchain and its Applications (12 Weeks)
2.	160857	Advanced Graph Theory (8 Weeks)
3.	160859	Natural Language Processing (12 Weeks)
4.	160860	Foundation of Cloud IoT Edge ML (8 Weeks)

OC-4*		
S. No.	Subject Code	Subject Name
1.	900632	Information Security - 5 - Secure Systems Engineering (8 Weeks)
2.	900621	Social Networks (12 Weeks)
3.	900636	Foundation of Cloud IoT Edge ML (8 Weeks)

* Course run through SWAYAM/NPTEL/ MOOC Learning Based Platform.


 DEAN (ACADEMICS)
 M.I.T.S
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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute Affiliated to RGPV, Bhopal)

List of courses to be opted for Honours or Minor specialization in VIII Semester

Code	Honours* (to be opted by students of Parent Department)
IT0820H1	User-centric Computing for Human-Computer Interaction (8 Weeks)
IT0823H1	Affective Computing (12 Weeks)
IT0823H2	Ethical Hacking (12 Weeks)

DOMAIN SPECIFIC COURSES FOR MINOR SPECIALIZATION

Domain 1: Programming*	
Course Code	Course Name
IT0823M1	Introduction to parallel programming with OpenMP and MPI (8 Weeks)
IT0823M2	Ethical Hacking (12 Weeks)

Domain 2: Systems*	
Course Code	Course Name
IT0823M3	Advanced computer architecture (12 Weeks)
IT0823M4	Foundation of Cloud IoT Edge ML (8 Weeks)

* Course run through SWAYAM/NPTEL/ MOOC Learning Based Platform.

Aditya
Bulbul
Ravi

Arjun

Aditya

Sanjay

Arjun

Arjun

Arjun

M.K.
82.03.2023
DEAN (ACADEMICS)
M.I.T.S
GWALIOR

***Scheme & Syllabi
of
B. Tech VI Semester
(Batch Admitted in 2020-21)
(Information Technology (IT) / Internet of Things (IoT) /
Artificial Intelligence & Robotics (AIR))
Under Flexible Curriculum
[ITEM IT - 5]***

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A Govt. Aided UGC Autonomous & NAAC Accredited Institute affiliated to RGPV, Bhopal)

Scheme of Examination

GROUP Y: I Semester

B. Tech. I Semester (Information Technology)

For batches admitted in academic session 2020 - 21 onwards

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Total Marks	Contact Hours per Week			Total Credits	Mode of Exam
				Theory Slot			Practical Slot				L	T	P		
				End Sem.	Mid Sem.	Quiz/Assignment	End Sem.	Lab work & Sessional	Skill Based Mini Project						
1.	230102	DC	Introduction to Computer Programming	60	20	20	60	20	20	200	2	1	2	4	AO
2.	100022	ESC	Basic Electrical & Electronics Engineering	60	20	20	60	20	20	200	2	1	2	4	MCQ
3.	100020	ESC	Basic Civil Engineering & Mechanics	60	20	20	-	-	-	100	2	1	-	3	PP
4.	100021	ESC	Basic Mechanical Engineering	60	20	20	-	-	-	100	2	1	-	3	MCQ
5.	100015	HSMC	Energy, Environment, Ecology & Society	60	20	20	-	-	-	100	3	-	-	3	MCQ
6.	160111	DLC	IT workshop	-	-	-	60	20	20	100	-	-	4	2	A+O
Total				300	100	100	180	60	60	800	11	04	09	19	

Induction Programme of three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations.

NSI/NCC

Qualifier

GROUP X: (Civil, Mechanical, Electrical, Chemical, and Automobile)

GROUP Y: (Electronics, Computer Science & Engineering, Information Technology, Electronics & Telecommunication)

01 Theory Period = 1 Credit; 02 Practical Periods = 1 Credit

MCQ: Multiple Choice Question; AO: Assignment + Oral; OIB: Open Book; PP: Pen Paper

MKS
15/07/2021
LEADER (ACADEMICS)
M.I.T.S
GWALIOR

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A Govt. Aided UGC Autonomous & NAAC Accredited Institute affiliated to IITGPV, Bhopal)

Scheme of Examination
GROUP Y: II Semester
B. Tech. II Semester (Information Technology)

For batches admitted in academic session 2020 - 21 onwards

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Total Marks	Contact Hours per Week			Total Credits	Mode of Exam
				Theory Slot			Practical Slot				L	T	P		
				End Sem.	Mid Sem.	Quiz/Assignment	End Sem.	Lab work & Sessional	Skill Based Mini Project						
1.	100011	BSC	Engineering Mathematics -I	60	20	20	-	-	-	100	3	1	-	4	PP
2.	160211	DC	Data Structures	60	20	20	60	10 20	20	200	2	1	2	4	PP
3.	160212	DC	Object Oriented Programming & Methodology	60	20	20	60	20	20	200	3	-	2	4	AO
4.	160213	DC	Digital Electronics	60	20	20	-	-	-	100	2	1	-	3	PP
5.	100016	HSMC	Technical Language	60	20	20	-	-	-	100	3	-	-	3	PP MCQ
6.	100017	HSMC	Language Lab	-	-	-	60	10 20	20	100	-	-	2	1	A+O
Total				300	100	100	180	100	20	800	13	03	06	19	-

Summer Internship Project - I (Institute Level) (Qualifier): Minimum two-week duration: Evaluation in III Semester.

NSS / NCC



Qualifier









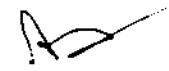
GROUP X: (Civil, Mechanical, Electrical, and Automobile)

GROUP Y: (Electronics, Computer Science & Engineering, Information Technology, Electronics & Telecommunication, Chemical)

01 Theory Period = 1 Credit; 02 Practical Periods = 1 Credit

MCQ: Multiple Choice Question; AO: Assignment + Oral; OB: Open Book; PP: Pen Paper



 15/11/2021
 ACADEMICS
 M.I.T.S
 GWALIOR

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A Govt. Aided UGC Autonomous & NAAC Accredited Institute affiliated to RGPV, Bhopal)

Department of Information Technology
Scheme of Evaluation
B. Tech. IV Semester (Information Technology)

For batches admitted in academic session 2020-21 onwards

Sl. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allowed							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Offline/Online)	Mode of Exam.
				Theory Slot				Practical Slot				L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation								
				End Sem. Exam	Proficiency in subject course	Mid Sem Exam	Quiz Assignment		Lab work & Sessional	Skill Based Mini Project							
1.	100003	BSC	Engineering Mathematics- III	50	10	20	20	-	-	-	100	2	1	-	3	Offline	PP
2.	160411	DC	Computer Graphics & Multimedia	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP
3.	160412	DC	Software Engineering	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	MCQ
4.	160413	DC	Computer Networks	50	10	20	20	-	-	-	100	2	1	-	3	Blended (2/1)	PP
5.	100006	MC	Cyber Security	50	10	20	20	-	-	-	100	2	-	-	2	Online	MCQ
6.	160414	DLC	Python Programming Lab	-	-	-	-	60	20	20	100	-	1	2	-	Online	PP
7.	000000	CLC	Workshop Practice	-	-	-	-	50	-	-	50	-	-	2	-	Online	PP
Total				250	50	100	100	230	60	60	850	10	5	8			
8.	000000	MAC	Industrial Constitution and Traditional Knowledge	50	10	20	20	-	-	-	100	2	-	-	2	Online	PP

Summer Internship Project-II (Soft skill Based) for two weeks duration: Evaluation in V Semester

*Proficiency in course/subject includes the weightage towards ability/skill/competence/knowledge level/expertise attained etc. in that particular course/subject.
MCQ: Multiple Choice Question AO: Assignment + Oral OB: Open Book PP: Pen Paper SO: Submission + Oral

Mode of Teaching						Mode of Examination				
Theory		Blended		Lab	NEC	Theory			Lab	NEC
Offline	Online	Offline	Online	Offline	Interactive	PP	AO	MCQ	SO	SO
04	02	06	03	03	01	09		05	04	01
11.80%	10.45%	13.64%	11.36%	11.80%	5.26%	42.11%		26.32%	21.05%	8.26%

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LIBRARY (ACADEMICS)
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GWALIOR

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(A Govt. Aided UGC Autonomous & NAAC Accredited Institute affiliated to RGPV, Bhopal)

Department of Information Technology

Scheme of Evaluation

B. Tech. V Semester (IT)

(for batch admitted in academic session 2020-21)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact (hours) per week			Total Credits	Mode of Teaching (Offline/Online)	Mode of Exam.
				Theory Slot				Practical Slot				L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation								
				End Sem. Exam.	Proficiency in subject course	Mid Sem. Exam.	Quiz Assignment		Lab work & Sessional	Skill Based Mini Project							
1.	160511	BSC	Discrete Structures	30	10	20	20	-	-	-	100	3	1	-	4		
2.	160512	DC	Data Science using Python	50	10	20	20	60	20	20	200	3	-	2	4		
3.	160513	DC	Theory of Computation	50	10	20	20	60	20	20	200	2	1	2	4		
4.	160514	DC	Micromicroprocessor & Interfacing	50	10	20	20	60	20	20	200	3	-	2	4		
5.	160515	DC	Soft Computing Techniques	50	10	20	20	-	-	-	100	3	-	-	3		
6.	160516	DLC	Minor Project-I**	-	-	-	-	60	40	-	100	-	-	4	2		
7.	160517	CLC	Novel Engaging Course (Informal Learning) (SWAYAM/NPTEL/MOOC)	-	-	-	-	-	40	-	40	-	-	2	1		
8.	200XXX	CLC	Novel Engaging Course (Informal Learning)	-	-	-	-	50	-	-	50	-	-	2	1		
9.	160518	DLI	Summer Internship Project-II (Evaluation)	-	-	-	-	60	-	-	60	-	-	4	2		
Total				250	50	100	100	350	140	60	1050	14	02	18			
10.	1000003	NIAC	Project Management & Financing	30	10	20	20	-	-	-	100	2	-	-	GRADE	Online	MCQ
11.	1000005	NIAC	Disaster Management	30	10	20	20	-	-	-	100	2	-	-	GRADE	Online	MCQ
Additional Course for Honours or minor Specialization				Permitted to opt for maximum two additional courses for the award of Honours or Minor specialization													

* proficiency in course/subject includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject.

MCQ: Multiple Choice Question AO: Assignment + Oral PP: Pen Paper SO: Submission + Oral

** The minor project-I may be evaluated by an internal committee for awarding sessional marks.

** Compulsory registration for one online course using SWAYAM/NPTEL/MOOC, evaluation through attendance, assignments and presentation

Mode of Teaching				Mode of Examination							
Offline	Online	Blended		Lab	NEC			Theory		Lab	NEC
		Offline	Online		Offline	Interactive	PP	A+O	MCQ		
04	-	08	04	08	01	13	-	01	01	01	01
16.67%	-	32.00%	16.00%	32.00%	4.00%	32.00%	-	12.00%	12.00%	12.00%	12.00%

M.I.T.S
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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute affiliated to RGPV, Bhopal)

List of courses to be opted for Honours or Minor specialization in V Semester

Honours* <i>(to be opted by students of Parent Department)</i>	
Course Code	Course Name
IT0522H1	Software Project Management (12 Weeks)
IT0522H2	Distributed Systems (8 Weeks)
IT0519H3	The Joy of Computing using Python (12 Weeks)

Minor specialization * <i>(to be opted by students of Other Department)</i>	
Course Code	Course Name
IT0521M1	Programming, Data Structures and Algorithms in Python (8 Weeks)
IT0521M2	Programming in Java (12 Weeks)
IT0520M1	Introduction to Operating Systems (8 Weeks)

* Course run through SWAYAM/NPTEL/ MOOC Learning Based Platform

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Department of Information Technology

Scheme of Evaluation

B. Tech. VI Semester (IT)

(for batch admitted in academic session 2020 – 21)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted									Contact Hours per week			Total Credits	Mode of Teaching	Mode of Exam.	
				Theory Slot				Practical Slot			MOOCs		Total Marks	L	T				P
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation		Assignment	Exam							
				End Sem. Exam.	Proficiency in subject /course	Mid Sem. Exam.	Quiz/ Assignment		Lab work & Sessional	Skill Based Mini Project									
1.	160611	DC	Compiler Design	50	10	20	20	60	20	20	-	-	200	2	1	2	4	Blended	PP
2.	160612	DC	Data Mining & Pattern Warehousing	50	10	20	20	60	20	20	-	-	200	3	-	2	4	Blended	PP
3.	160613	DC	Artificial Intelligence & Machine Learning	50	10	20	20	60	20	20	-	-	200	3	-	2	4	Blended	PP
4.	DE	DE	Departmental Elective* (DE-1)	-	-	-	-	-	-	-	25	75	100	3	-	-	3	Online	MCQ
5.	OC	OC	Open Category (OC-1)	50	10	20	20	-	-	-	-	-	100	3	-	-	3	Blended	PP
6.	160614	DLC	Minor Project-II**	-	-	-	-	60	40	-	-	-	100	-	-	4	2	Offline	SO
7.	200XXX	CLC	Novel Engaging Course (Informal Learning)	-	-	-	-	50	-	-	-	-	50	-	-	2	1	Interactive	SO
Total				200	40	80	80	290	100	60	25	75	950	14	01	12		-	-
8.	1000007	MAC	Intellectual Property Rights (IPR)	50	10	20	20	-	-	-	-	-	100	2	-	-	GRADE	Online	MCQ

Summer Internship-III (On Job Training) for Four weeks duration: Evaluation in VII Semester

Additional Course for Honours or minor Specialization

Permitted to opt for maximum two additional courses for the award of Honours or Minor specialization

^s proficiency in course/subject-includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject.

MCQ: Multiple Choice Question AO: Assignment + Oral PP: Pen Paper SO: Submission + Oral

** The minor project-II may be evaluated by an internal committee for awarding sessional marks.

Mode of Teaching					Mode of Examination					Total Credits
Theory			Lab	NEC	Theory			Lab	NEC	
Offline	Online	Blended	Offline	Interactive	PP	AO	MCQ	SO	SO	
00	03	12	05	01	12	00	03	05	01	
00%	14.29%	57.14%	23.81%	4.76%	57.14%	00%	14.29%	23.81%	4.76%	Credits %

* Course run through SWAYAM/NPTEL/ MOOC Learning Based Platform

NMD
 09.03.2023
 DEAN (ACADEMICS)
 MITS
 GWALIOR


DE -1*		
S. No.	Subject Code	Subject Name
1.	160661	Introduction To Internet Of Things (12 Weeks)
2.	160662	Information Security - 5 - Secure Systems Engineering (8 Weeks)
3.	160663	Advanced Graph Theory (8 Weeks)
4.	160664	Foundation of Cloud IoT Edge ML (8 Weeks)

OC-1		
S. No.	Subject Code	Subject Name
1.	910102	Data Mining & Warehousing
2.	910103	Software Engineering

List of courses to be opted for Honours or Minor specialization in VI Semester

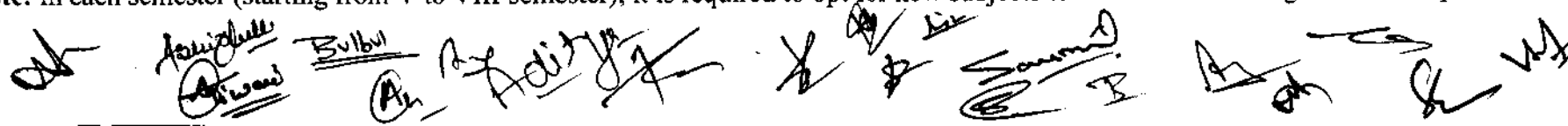
Honours*	
<i>(to be opted by students of Parent Department)</i>	
Course Code	Course Name
IT0623H1	Quantum Algorithms and Cryptography (12 Weeks)
IT0623H2	Object Oriented System Development Using UML, Java And Patterns (12 Weeks)
IT0620H2	GPU Architectures And Programming (12 Weeks)
IT0623H3	The Joy of Computing using Python (12 Weeks)
IT0623H4	Advanced Computer Architecture (12 Weeks)

Minor specialization *	
<i>(to be opted by students of Other Department)</i>	
Course Code	Course Name
IT0620M2	Programming, Data Structures and Algorithms in Python (8 Weeks)
IT0620M3	Programming in Java (12 Weeks)
IT0621M1	Design and analysis of algorithms (8 Weeks)
IT0623M1	Introduction to Database Systems (12 Weeks)


 01-03-2023
DEAN (ACADEMICS)
M.I.T.S
GWALIOR

* Course run through SWAYAM/NPTEL/ MOOC Learning Based Platform

Note: In each semester (starting from V to VIII semester), it is required to opt for new subjects towards Honours Degree/ Minor Specialization.



MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)

Scheme of Examination

B.Tech. in Internet of Things (IoT) (Offered by Department of Information Technology)

I Semester

For batches admitted in Academic Session 2020-21 Onwards

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Total Marks	Contact Hours per week			Total Credits	Mode of Exam
				Theory Slot			Practical Slot				L	T	P		
				End Sem.	Mid Sem Exam.	Quiz/Assignment	End Sem.	Lab work & Sessional	Skill Based Mini Project						
1.	230101	DC	Introduction to Internet of Things (IoT)	60	20	20	-	-	-	100	-	-	-	4	MCO
2.	230102	DC	Introduction to Computer Programming	60	20	20	60	20	20	200	3	1	2	4	AO
3.	100022	ESC	Basic Electrical & Electronics Engineering	60	20	20	60	20	20	200	3	1	2	4	MCO
4.	250100	BSC	Linear Algebra	60	20	20	-	-	-	100	3	1	-	4	PP
5.	100015	BSSMC	Energy, Environment, Ecology & Society	60	20	20	-	-	-	100	3	-	-	3	MCO
Total				300	100	100	120	40	40	700	14	03	04	19	
NSS/NCC				Qualifier Induction program of first three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visit / Virtual Visit to local Areas, Familiarization to Dept./Branch & Institutions											

MCO: Multiple Choice Question; AO: Assignment + Oral; OB: Open Book; PP: Pen Paper

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)

Scheme of Examination
B.Tech.in Internet of Things (IoT) (Offered by Department of Information Technology)
II Semester

For batches admitted in Academic Session 2020-21 Onwards

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Total Marks	Contact Hours per week			Total Credits	Mode of Exam
				Theory Slot			Practical Slot				D	T	P		
				End Sem.	Mid Sem.	Quiz/ Assignment	End Sem.	Lab work & Sessions	Skill Based Mini Project						
1.	230201	DC	Digital Logic Design	60	20	20	-	-	-	100	2	1	-	3	PP
2.	230202	DC	Sensor Technology	60	20	20	60	20	20	200	3	-	2	4	PP
3.	230202	DC	Data Structures	60	20	20	60	40 20	20	200	3	-	2	4	PP
4.	230203	DC	Object Oriented Programming and Methodology	60	20	20	60	20	20	200	3	-	2	4	AO
5.	100016	HSMC	Technical Language	60	20	20	-	-	-	100	3	-	-	3	AO PP
6.	100017	HSMC	Language Lab	-	-	-	60	40 20	20	100	-	-	2	1	AO
Total				300	100	100	240	120	40	900	14	1	8	19	
NSS/NCC				Qualifier											
Summer Internship Project - I (Institute Level) (Qualifier): Minimum two-week duration (Evaluation in III Semester)															

MCQ: Multiple Choice Question; AO: Assignment - Oral; OB: Open Book ; PP: Pen Paper

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)

Department of Information Technology

Scheme of Evaluation

B. Tech. Internet of Things (IoT)

III Semester


for batches admitted in academic session 2020 - 21 onwards

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Offline/ Online)	Mode of Exam.
				Theory Slot				Practical Slot				L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation								
				End Sem. Exam.	Proficiency in subject course	Mid Sem. Exam.	Quiz/ Assignment		Lab work & Sessional	Skill Based Mini Project							
1.	250106	BSC	Probability and Random Process	50	10	20	20	-	-	-	100	3	1	-	4	Offline	PT
2.	230101	DC	Design & Analysis of Algorithms	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PT
3.	210101	DU	Operating System	50	10	20	20	-	-	-	100	3	-	-	3	Blended (2/1)	PT
4.	210102	DC	Computer Networks and Protocols	50	10	20	20	-	-	-	100	3	-	-	3	Blended (2/1)	PT
5.	210104	DC	Database Management Systems	50	10	20	20	60	20	20	200	3	-	2	4	Blended (2/1)	PT
6.	210105	DLC	Design and Thinking Lab	-	-	-	-	60	20	20	100	-	-	2	1	Offline	PT
7.	210107	DLC	Self-learning Presentation (SWAYAM NPTEL MOOCs)	-	-	-	-	-	40	-	40	-	-	2	1	Online and Mentoring	PT
8.	200103	CLC	Set of Engaging Creative Informal Learnings	-	-	-	-	50	-	-	50	-	-	2	1	Engaging	PT
9.	200107	DLC	Summer Internship Project I (Institute Level)	-	-	-	-	60	-	-	60	-	-	4	2	Online	PT
Total				250	50	100	100	290	100	60	950	14	2	14			
10.	200002	MAC	Biology for Engineers	50	10	20	20	-	-	-	100	2	-	-	2	GRADE	Online

* Proficiency in course/subject includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject

MCQ: Multiple Choice Question AQ: Assignment Oral: Oral OB: Open Book PP: Pen Paper SC: Submission Oral: Oral

Mode of Teaching						Mode of Examination					
Theory		Blended		Lab	NEC	Theory		Lab	NEC		
Offline	Online	Offline	Online	Offline	Interactive	PP	A+O	MCQ	SO	SO	
04	-	08	04	06	01	10	-	-	06	01	
100%	-	24.78%	17.39%	20.00%	100%	69.44%	-	-	26.67%	63%	


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Department of Information Technology

Scheme of Evaluation

B. Tech. Internet of Things (IoT)

IV Semester

(for batches admitted in academic session 2020 - 21 onwards)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Offline/Online)	Mode of Exam.	
				Theory Slot				Practical Slot			L	T	P				
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation								
				End Sem. Exam	Proficiency in subject course	Mid Sem. Exam.	Quiz/Assignment		Lab Work & Sessional								Skill Based Mini Project
1.	230401	DC	Computer Architecture and Microprocessor	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP
2.	230402	DC	Cloud Computing	50	10	20	20	-	-	-	100	3	-	-	3	Blended (2/1)	PP
3.	230403	DC	Software Engineering	50	10	20	20	60	20	20	200	3	-	2	4	Blended (2/1)	MCO
4.	230404	DC	IoT Architecture and Protocols	50	10	20	20	-	-	-	100	3	-	-	3	Blended (2/1)	PP
5.	230405	DC	Network & Web Security	50	10	20	20	-	-	-	100	3	-	-	3	Blended (2/1)	PP
6.	230406	DLC	Python Programming Lab	-	-	-	-	60	20	20	100	-	1	2	2	Offline	SO
7.	200555A	CLC	Novel Engaging Course (Informal Learning)	-	-	-	-	50	-	-	50	-	-	2	1	Interactive	SO
Total				250	50	100	100	250	60	60	850	14	02	08			
8.	(230400)	MAC	Industrial Automation and PLC/SCADA Knowledge	50	10	20	20	-	-	-	100	2	-	-	2	GRADE	Online

Summer Internship Project-II (Soft skills Based) for two weeks duration; Evaluation in V Semester

* Proficiency in course subject includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject.

NEQ: Multiple Choice Question MCQ: Multiple Choice Question OB: Open Book PP: Pen Paper SO: Submission - Oral

Mode of Teaching						Mode of Examination				
Theory		Blended		Lab		Theory		Lab		NEC
Offline	Online	Offline	Online	Offline	Interactive	PP	A-O	MCQ	SO	SO
01	01	10	05	03	01	12	-	03	04	01
50.00%	50.00%	50.00%	25.00%	15.00%	5.00%	60%	-	15.00%	20.00%	5.00%

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Department of Information Technology

Scheme of Evaluation

B. Tech. Internet of Things (IoT) V Semester *(for batch admitted in academic session 2020-21)*

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Offline/ Online)	Mode of Exam.
				Theory Slot				Practical Slot				L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation								
				End Sem. Exam.	Proficiency in subject /course	Mid Sem Exam	Quiz/ Assignment		Lab work & Sessional	Skill Based Mini Project							
1.	230501	BS	Discrete Structures	50	10	20	20	-	-	-	100	2	1	-	3		
2.	230502	DC	Data Services in IoT	50	10	20	20	60	20	20	200	3	-	2	4		
3.	230503	DC	Theory of Computation	50	10	20	20	60	20	20	200	2	1	2	4		
4.	230504	DC	Embedded System & IoT	50	10	20	20	60	20	20	200	3	-	2	4		
5.	230505	DC	Soft Computing Techniques	50	10	20	20	-	-	-	100	3	-	-	3		
6.	230506	DLC	Minor Project-I**	-	-	-	-	60	40	-	100	-	-	4	2		
7.	230507	Summer Self-Study	Self-learning/Presentation (SWAYAM/NPTEL/ MOOC)*	-	-	-	-	-	40	-	40	-	-	2	1		
8.	200XXX	CLC	Novel Engaging Course (Informal Learning)	-	-	-	-	50	-	-	50	-	-	2	1		
9.	230508	DLC	Summer Internship Project-II (Evaluation)	-	-	-	-	60	-	-	60	-	-	4	2		
Total				250	50	180	100	350	140	60	1050	13	02	18			
10.	1000005	MAC	Project Management & Financing	50	10	20	20	-	-	-	100	2	-	-	GRADE	Online	MCQ
11.	1000006	MAC	Disaster Management	50	10	20	20	-	-	-	100	2	-	-	GRADE	Online	MCQ
Additional Course for Honours or minor Specialization				Permitted to opt for maximum two additional courses for the award of Honours or Minor specialization													

* proficiency in course/subject includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject.

MCQ: Multiple Choice Question AO: Assignment - Oral PP: Pen Paper SO: Submission + Oral

** The minor project-I may be evaluated by an internal committee for awarding sessional marks.

* Compulsory registration for one online course using SWAYAM/NPTEL/ MOOC, evaluation through attendance, assignments and presentation

Mode of Teaching				Mode of Examination							Total Credits	
Theory		Blended		Lab	NEC		Theory			Lab		NEC
Offline	Online	Offline	Online	Offline	Interactive	PP	A+I	MCQ	SO	SO		
03	-	01	04	08	01	12	-	03	08	01		
33.33%	-	16.67%	33.33%	4.17%	58.60%	-	12.50%	33.33%	84.17%		24	
											Credits: 24	

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List of courses to be opted for Honours or Minor specialization in V Semester

Honours* <i>(to be opted by students of Parent Department)</i>	
IO0522H1	Hardware Modeling Using Verilog (8 Weeks)
IO0522H2	Design & Implementation of Human-Computer Interfaces (12 Weeks)
IO0522H3	The Joy of Computing using Python (12 Weeks)

Minor specialization * <i>(to be opted by students of Other Department)</i>	
Course Code	Course Name
IO0522M1	Introduction to Internet of Things (12 Weeks)
IO0522M2	Introduction to Operating Systems (8 Weeks)
IO0522M3	Programming, Data Structures and Algorithms in Python (8 Weeks)

* Course run through SWAYAM/NPTEL/ MOOC Learning Based Platform

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Department of Information Technology

Scheme of Evaluation

B. Tech. Internet of Things (IoT) VI Semester (for batch admitted in academic session 2020 – 21)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted									Contact Hours per week			Total Credits	Mode of Teaching	Mode of Exam.		
				Theory Slot				Practical Slot			MOOCs		Total Marks	L	T				P	
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation		Assignment	Exam								
				End Sem. Exam.	Proficiency in subject /course	Mid Sem. Exam.	Quiz/ Assignment		Lab work & Sessional	Skill Based Mini Project										
1.	230601	DC	Compiler Design	50	10	20	20	60	20	20	-	-	200	2	1	2	4	Blended	PP	
2.	230602	DC	Data Mining & Pattern Warehousing	50	10	20	20	60	20	20	-	-	200	3	-	2	4	Blended	PP	
3.	230603	DC	Artificial Intelligence & Machine Learning	50	10	20	20	60	20	20	-	-	200	3	-	2	4	Blended	PP	
4.	DE	DE	Departmental Elective* (DE-1)	-	-	-	-	-	-	-	25	75	100	3	-	-	3	Online	MCQ	
5.	OC	OC	Open Category (OC-1)	50	10	20	20	-	-	-	-	-	100	3	-	-	3	Blended	PP	
6.	230604	DLC	Minor Project-II**	-	-	-	-	60	40	-	-	-	100	-	-	4	2	Offline	SO	
7.	200XXX	CLC	Novel Engaging Course (Informal Learning)	-	-	-	-	50	-	-	-	-	50	-	-	2	1	Interactive	SO	
Total				200	40	80	80	290	100	60	25	75	950	14	01	12				
8.	1000007	MAC	Intellectual Property Rights (IPR)	50	10	20	20	-	-	-	-	-	100	2	-	-	GRADE	Online	MCQ	

Summer Internship-III (On Job Training) for Four weeks duration: Evaluation in VII Semester

Additional Course for Honours or minor Specialization

Permitted to opt for maximum two additional courses for the award of Honours or Minor specialization

⁵ proficiency in course/subject-includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject.

MCQ: Multiple Choice Question AO: Assignment + Oral PP: Pen Paper SO: Submission + Oral

** The minor project-II may be evaluated by an internal committee for awarding sessional marks.

Mode of Teaching					Mode of Examination					Total Credits
Theory		Lab	NEC		Theory			Lab	NEC	
Offline	Online	Blended	Offline	Interactive	PP	AO	MCQ	SO	SO	
00	03	12	05	01	12	00	03	05	01	21
00%	14.29%	57.14%	23.81%	4.76%	57.14%	00%	14.29%	23.81%	4.76%	Credits %

* Course run through SWAYAM/NPTEL/ MOOC Learning Based Platform



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DE -I*		
S. No.	Subject Code	Subject Name
1.	230661	Programming In Java (12 Weeks)
2.	230662	Foundation of Cloud IoT Edge ML (8 Weeks)
3.	230663	Information Security - 5 - Secure Systems Engineering (8 Weeks)

OC-I		
S. No.	Subject Code	Subject Name
1.	910102	Data Mining & Warehousing
2.	910103	Software Engineering

List of courses to be opted for Honours or Minor specialization in VI Semester

Honours*	
<i>(to be opted by students of Parent Department)</i>	
Course Code	Course Name
IO0623H1	Introduction To Industry 4.0 And Industrial Internet Of Things (12 Weeks)
IO0623H2	Quantum Algorithms and Cryptography (12 Weeks)
IO0623H3	Object Oriented System Development Using UML, Java And Patterns (12 Weeks)
IO0623H4	Advanced Computer Architecture (12 Weeks)
IO0623H5	The Joy of Computing using Python (12 Weeks)

Minor specialization *	
<i>(to be opted by students of Other Department)</i>	
Course Code	Course Name
IO0623M1	Programming, Data Structures and Algorithms in Python (8 Weeks)
IO0623M2	Design and analysis of algorithms (8 Weeks)
IO0623M3	Programming in Modern C++ (12 Weeks)
IO0623M4	Introduction to Internet of Things (12 Weeks)

* Course run through SWAYAM/NPTEL/ MOOC Learning Based Platform

Note: In each semester (starting from V to VIII semester), it is required to opt for new subjects towards Honours Degree/ Minor Specialization

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Scheme of Examination

B.Tech. in Information Technology (Artificial Intelligence and Robotics)

(Offered by Department of Information Technology)


I Semester

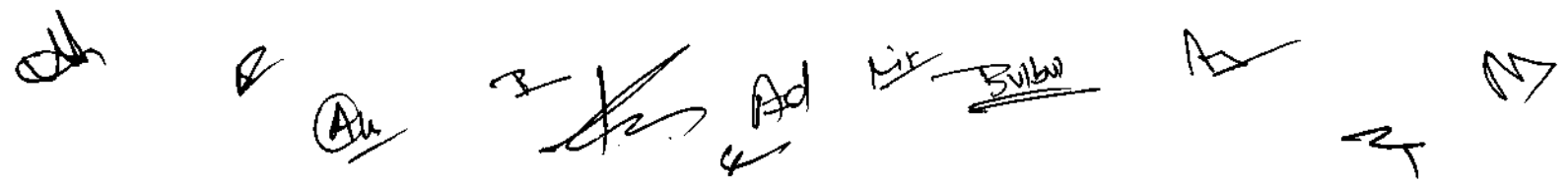
For batches admitted in Academic Session 2020-21 Onwards

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Total Marks	Contact Hours per week			Total Credits	Mode of Exam
				Theory Slot			Practical Slot				L	T	P		
				End Sem.	Mid Sem Exam.	Quiz/Assignment	End Sem.	Lab work & Sessional	Skill Based Mini Project						
1	240101	DC	Introduction to Artificial Intelligence	60	20	20	-	-	-	100	4	-	-	4	MCO
2	230102	DC	Introduction to Computer Programming	60	20	20	60	20	20	200	2	1	2	4	AO
3	100022	ESC	Basic Electrical & Electronics Engineering	60	20	20	60	20	20	200	2	1	2	4	MCO
4	250100	HSC	Linear Algebra	60	20	20	-	-	-	100	3	1	-	4	PP
5	100015	HSMC	Energy, Environment, Ecology & Society	60	20	20	-	-	-	100	3	-	-	3	MCO
Total				300	100	100	120	40	40	700	14	3	04	19	-
NSS/NCC				Qualifier											

Induction program of first three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visit / Virtual Visit to local Areas, Familiarization to Dept./Branch & Innovations

MCO: Multiple Choice Questions; AO: Assignment + Oral; OB: Open Book; PP: Pen Paper


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Scheme of Examination


B.Tech. in Information Technology (Artificial Intelligence and Robotics)
(Offered by Department of Information Technology)

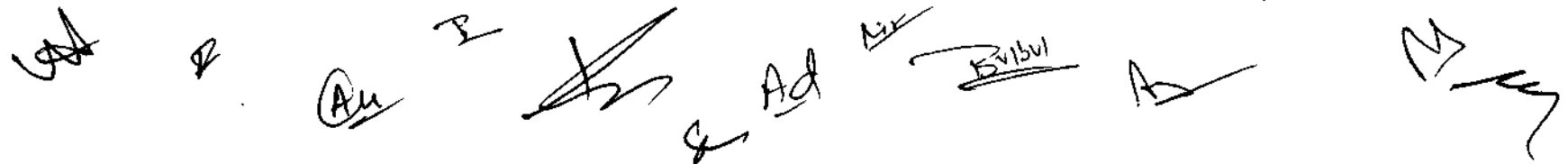
II Semester

For batches admitted in Academic Session 2020-21 Onwards

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Total Marks	Contact Hours per week			Total Credits	Mode of Exam
				Theory Slot			Practical Slot				L	T	P		
				End Sem.	Mid Sem.	Quiz/Assignment	End Sem.	Lab work & Sessional	Skill Based Mini Project						
1.	230201	DC	Digital Logic Design	60	20	20	-	-	-	100	2	1	-	3	PP
2.	220202	DC	Sensor Technology	60	20	20	60	20	20	200	3	-	2	4	PP
3.	230202	DC	Data Structures	60	20	20	60	40 20	20	200	3	-	2	4	PP
4.	230203	DC	Object Oriented Programming and Methodology	60	20	20	60	20	20	200	3	-	2	4	AO
5.	100016	HSMC	Technical Language	60	20	20	-	-	-	100	3	-	-	3	MCQ PP.
6.	100017	HSMC	Language Lab	-	-	-	60	40 20	20	100	-	-	2	1	AO
Total				300	100	100	240	120	40	900	14	1	8	19	-
NSS/NCC				Qualifier											
Summer Internship Project -I (Institute Level) (Qualifier): Minimum two-week duration (Evaluation in III Semester)															

MCQ: Multiple Choice Question; AO: Assignment + Oral; OB: Open Book ; PP: Pen Paper


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Department of Information Technology

Scheme of Evaluation

B. Tech. in Information Technology (Artificial Intelligence and Robotics)

III Semester

for batches admitted in academic session 2020 - 21 onwards

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Contact Hours per week			Total Credits	Mode of Teaching (Offline/Online)	Mode of Exam.		
				Theory Slot			Practical Slot			Total Marks	L	T				P	
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation								
				End Sem Exam	Proficiency in subject course	Mid Sem. Exam.	Quiz/Assignment		Lab Work & Sessional								Skill Based Mini Project
1.	240106	BSC	Probability and Random Process	50	10	20	20	-	-	-	100	3	1	-	4	Offline	PP
2.	240301	DC	Design & Analysis of Algorithms	50	10	30	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP
3.	240302	DC	Operating System	50	10	20	20	-	-	-	100	3	-	-	3	Blended (2/1)	PP
4.	240303	DC	Computer Networks and Protocols	50	10	20	20	-	-	-	100	3	-	-	3	Blended (2/1)	PP
5.	240304	DC	Database Management System	50	10	20	20	60	20	20	200	3	-	2	4	Blended (2/1)	PP
6.	240305	DI3	Python Programming Lab	-	-	-	-	50	20	20	100	-	-	2	1	Offline	SO
7.	240306	DI3	Software Project on PYTHON AND PHP/MySQL	-	-	-	-	-	10	-	40	-	-	2	1	Online and Mentoring	SO
8.	240307	CI3	Cloud Computing (Theory, Practical, Lab)	-	-	-	-	50	-	-	50	-	-	2	1	Interactive	SO
9.	240308	DI3	Web Application Project (Theory, Lab)	-	-	-	-	60	-	-	60	-	-	4	2	Offline	SO
Total				250	50	100	100	290	100	60	950	14	2	14	23		
10.	080802	MSC	Biotechnology	50	10	20	20	-	-	-	100	2	-	-	GRADE	Online	MCQ

* Proficiency in course/subject includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject.

MCQ: Multiple Choice Question AQ: Assignment - Oral OB: Open Book PP: Pen Paper SO: Submission - Oral

Mode of Teaching						Mode of Examination					
Theory		Blended		Lab	NEC	Theory		Lab	NEC		Total Marks
Offline	Online	Offline	Online	Offline	Interactive	PP	AQ	SO	SO		
04	08	04	04	06	01	10	-	06	01		
15.00%	30.00%	15.00%	15.00%	16.00%	01.00%	33.33%	-	26.67%	13.33%		

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Department of Information Technology Scheme of Evaluation

B. Tech. in Information Technology (Artificial Intelligence and Robotics)

IV Semester

for batches admitted in academic session 2020-21 onwards

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Contact Hours per week			Total Credits	Mode of Teaching (Offline/Online)	Mode of Exam.		
				Theory Slot			Practical Slot			Total Marks	L	T				P	
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation								
				End Sem Exam	Proficiency in subject/course	Mid Sem. Exam.	Quiz/Assignment		Lab Work & Sessional								Skill Based Mini Project
1	240401	DC	Computer Architecture and Microprocessor	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP
2	240402	DC	Cloud Computing	50	10	20	20	-	-	-	100	3	-	-	3	Blended (2/1)	PP
3	240403	DC	Software Engineering	50	10	20	20	60	20	20	200	3	-	2	4	Blended (2/1)	MCQ
4	240404	DC	Machine Learning and Optimization	50	10	20	20	60	20	20	200	3	-	2	4	Blended (2/1)	PP
5	240405	DC	Network & Web Security	50	10	20	20	-	-	-	100	3	-	-	3	Blended (2/1)	PP
6	240406	DLC	Design and Thinking Lab	-	-	-	-	60	20	20	100	-	-	2	1	Offline	SO
7	700XXX	DC	Novel Engaging Course (Informal Learning)	-	-	-	-	30	-	-	30	-	-	12	-	Interactive	SO
Total				250	50	100	100	290	80	80	950	14	01	10			
8.	1000001	MAC	Indian Constitution and Traditional Knowledge	50	10	20	20	-	-	-	100	2	-	-	GRADE	Online	NCO

Summer Internship Project-II (Soft skills Based) for two weeks duration: Evaluation in V Semester

* proficiency in course/subject includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject.
 MCQ: Multiple Choice Questions AO: Assignment - Oral OH: Open Book PP: Pen Paper SO: Submission + Oral

Mode of Teaching					Mode of Examination					Total Credits
Theory		Lab		NEC	Theory		Lab	NEC		
Offline	Online	Blended	Offline	Interactive	PP	A+O	MCQ	SO		
10	85	64	01	12	-	03	04	01		
100%	100%	100%	20.00%	5.00%	60%	-	15.00%	20.00%	5.00%	20
										Credits %

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Department of Information Technology
Scheme of Evaluation

B. Tech. in Information Technology (Artificial Intelligence and Robotics)

V Semester

(for batch admitted in academic session 2020-21)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Offline/ Online)	Mode of Exam.	
				Theory Slot			Practical Slot				L	T	P				
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation								
				End Sem. Exam.	Proficiency in subject/course	Mid Sem. Exam.	Quiz/Assignment		Lab work & Sessional								Skill Based Mini Project
1.	240501	BS*	Discrete Structures	50	10	20	20	-	-	-	100	2	1	-	3	Offline	PP
2.	240502	DC	Data Science using Python	50	10	20	20	60	20	20	200	3	-	2	4	Blended (2/1)	MCQ
3.	240503	DC	Theory of Computation	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP
4.	240504	DC	Robotics System and Control	50	10	20	20	60	20	20	200	3	-	2	4	Blended (2/1)	PP
5.	240505	DC	Soft Computing Techniques	50	10	20	20	-	-	-	100	3	-	-	3	Blended (2/1)	PP
6.	240506	DLC	Minor Project-I**	-	-	-	-	60	40	-	100	-	-	4	2	Offline	SO
7.	240507	Seminar/ Self-Study	Self-learning Presentation (SWAYAM/NPTEL/ MOOC)	-	-	-	-	-	40	-	40	-	-	2	1	Online and Blended	SO
8.	2005XX	CLC	Newspaper/Current Course (Informal Learning)	-	-	-	-	50	-	-	50	-	-	2	1	Interactive	SO
9.	240508	TEJ	Seminar/Workshop/Project-II (Extracurricular)	-	-	-	-	60	-	-	60	-	-	4	2	Offline	SO
Total				250	50	100	100	350	140	60	1050	13	02	18	-	-	-
10.	1000005	MAC	Project Management & Financing	50	10	20	20	-	-	-	100	2	-	-	GRADE	Online	MCQ
11.	1000006	MAC	Disaster Management	50	10	20	20	-	-	-	100	2	-	-	GRADE	Online	MCQ

Additional Course for Honours or minor Specialization

Permitted to opt for maximum two additional courses for the award of Honours or Minor specialization

* proficiency in course/subject-includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject.

MCQ: Multiple Choice Question AO: Assignment - Oral PP: Pen Paper SO: Submission - Oral

** The minor project-I may be evaluated by an internal committee for awarding sessional marks.

* Compulsory registration for one online course using SWAYAM/NPTEL/ MOOC, evaluation through attendance, assignments and presentation

Mode of Teaching				Mode of Examination							Total Credits
Theory		Lab	NEC	Theory			Lab	NEC	SO		
Offline	Online			Offline	Interactive	PP				A+O	
03	-	08	01	08	01	12	-	03	08	01	24
12.50%	-	33.33%	16.67%	33.33%	4.17%	50.00%	-	12.50%	33.33%	8.17%	Credits %

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24/07/2022
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Department of Information Technology
Scheme of Evaluation

B. Tech. in Information Technology (Artificial Intelligence and Robotics)

VI Semester

(for batch admitted in academic session 2020 – 21)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted									Contact Hours per week			Total Credits	Mode of Teaching	Mode of Exam.	
				Theory Slot				Practical Slot			MOOCs		Total Marks	L	T				P
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation		Assignment	Exam							
				End Sem. Exam.	Proficiency in subject /course	Mid Sem. Exam.	Quiz/ Assignment		Lab work & Sessional	Skill Based Mini Project									
1.	240601	DC	Compiler Design	50	10	20	20	60	20	20	-	-	200	2	1	2	4	Blended	PP
2.	240602	DC	Data Mining & Pattern Warehousing	50	10	20	20	60	20	20	-	-	200	3	-	2	4	Blended	PP
3.	240603	DC	AI in Robotics	50	10	20	20	60	20	20	-	-	200	3	-	2	4	Blended	PP
4.	DE	DE	Departmental Elective* (DE-1)	-	-	-	-	-	-	-	25	75	100	3	-	-	3	Online	MCQ
5.	OC	OC	Open Category (OC-1)	50	10	20	20	-	-	-	-	-	100	3	-	-	3	Blended	PP
6.	240604	DLC	Minor Project-II**	-	-	-	-	60	40	-	-	-	100	-	-	4	2	Offline	SO
7.	200XXX	CLC	Novel Engaging Course (Informal Learning)	-	-	-	-	50	-	-	-	-	50	-	-	2	1	Interactive	SO
Total				200	40	80	80	290	100	60	25	75	950	14	01	12		-	-
8.	1000007	MAC	Intellectual Property Rights (IPR)	50	10	20	20	-	-	-	-	-	100	2	-	-	GRADE	Online	MCQ

Summer Internship-III (On Job Training) for Four weeks duration: Evaluation in VII Semester

Additional Course for Honours or minor Specialization

Permitted to opt for maximum two additional courses for the award of Honours or Minor specialization

* proficiency in course/subject-includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject.
MCQ: Multiple Choice Question AO: Assignment + Oral PP: Pen Paper SO: Submission + Oral

** The minor project-II may be evaluated by an internal committee for awarding sessional marks.

Mode of Teaching					Mode of Examination					Total Credits
Theory			Lab	NEC	Theory			Lab	NEC	
Offline	Online	Blended	Offline	Interactive	PP	AO	MCQ	SO	SO	
00	03	12	05	01	12	00	03	05	01	21
00%	14.29%	57.14%	23.81%	4.76%	57.14%	00%	14.29%	23.81%	4.76%	Credits %

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DE -1*		
S. No.	Subject Code	Subject Name
1.	240661	Programming In Java (12 Weeks)
2.	240662	Introduction To Internet Of Things (12 Weeks)
3.	240663	Advanced Graph Theory (8 Weeks)
4.	240664	Foundation of Cloud IoT Edge ML (8 Weeks)


OC-1		
S. No.	Subject Code	Subject Name
1.	910102	Data Mining & Warehousing
2.	910103	Software Engineering

* Course run through SWAYAM/NPTEL/ MOOC Learning Based Platform

List of courses to be opted for Honours or Minor specialization in VI Semester

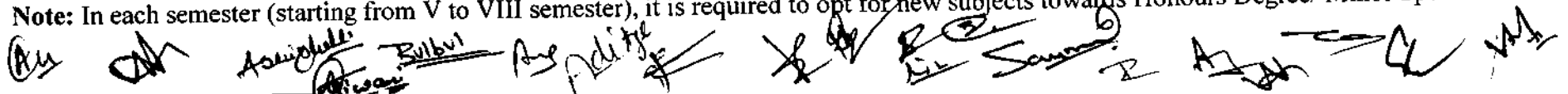
Honours*	
<i>(to be opted by students of Parent Department)</i>	
Course Code	Course Name
AI0623H1	Artificial Intelligence: Knowledge Representation And Reasoning (12 Weeks)
AI0623H2	GPU Architectures And Programming (12 Weeks)
AI0623H3	Advanced Computer Architecture (12 Weeks)
AI0623H4	The Joy of Computing using Python (12 Weeks)

Minor specialization *	
<i>(to be opted by students of Other Department)</i>	
Course Code	Course Name
AI0623M1	Programming, Data Structures and Algorithms in Python (8 Weeks)
AI0623M2	AI: Constraint Satisfaction (8 Weeks)
AI0623M3	Design and analysis of algorithms (8 Weeks)
AI0623M4	Introduction to Machine Learning (12 Weeks)


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* Course run through SWAYAM/NPTEL/ MOOC Learning Based Platform

Note: In each semester (starting from V to VIII semester), it is required to opt for new subjects towards Honours Degree/ Minor Specialization.



Syllabi of
Departmental Core (DC) Courses
B. Tech VI Semester
(Batch Admitted in 2020-21)
(Information Technology/Internet of Things
(IoT)/ Information Technology (Artificial
Intelligence and Robotics))
Under Flexible Curriculum
[ITEM IT - 5]

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)

DEPARTMENT OF INFORMATION TECHNOLOGY

COMPILER DESIGN

160611/230601/240601

L	T	P	Total Credits
2	1	2	4

COURSE OBJECTIVES

- To learn finite state machines and context free grammar.
- To learn, various phases of compiler
- To understand process of compiler implementation.

Unit-I

Overview of Translation Process: Introduction to Compiler, Translator, Interpreter and Assembler, Overview and use of Linker and Loader, Major Data Structures in Compiler, Other Issues in Compiler Structure, BOOT Strapping and Porting, Compiler Structure: Analysis-Synthesis Model of Compilation, Various Phases of a Compiler, Tool Based Approach to Compiler Construction.

Unit-II

Lexical Analysis: Input Buffering, Symbol Table, Token, Recognition of Tokens, Lexeme and Patterns, Difficulties in Lexical Analysis, Error Reporting and Implementation. Regular Grammar & Language Definition, Transition Diagrams, Design of a Typical Scanner using LEX.

Unit-III

Syntax Analysis: Context Free Grammars (CFGs), Ambiguity, Basic Parsing Techniques: Top Down Parsing, Recursive Descent Parsing, Transformation on the Grammars, Predictive Parsing LL(1) Grammar. Bottom-UP Parsing, Operator Precedence Parsing, LR Parsers (SLR, CLR, LALR), Design of a Typical Parser Using YACC.

Unit-IV

Semantic Analysis: Compilation of Expression, Control, Structures, Conditional Statements, Various Intermediate Code Forms, Syntax Directed Translation, Memory Allocation and Symbol Table Organizations, Static and Dynamic Array Allocation, String Allocation. Structure Allocation etc., Error Detection Indication and Recovery, Routines or Printing Various Lexical, Syntax and Semantic Errors.

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DEPARTMENT OF INFORMATION TECHNOLOGY

Unit-V

Code Generation and Code Optimization: Issues, Basic Blocks and Flow Graphs, Register Allocation, Code Generation, DAG Representation of Programs, Code Generation from DAGS, Peep-hole Optimization, Code Generator Generators, Specification of Machine. **Code Optimization:** Source of Optimizations, Optimization of Basic Blocks, Loops, Global Data Flow Analysis, Solution to Iterative Data Flow Equations, Code Improving Transformations, Dealing with Aliases, Data Flow Analysis of Structured Flow Graphs.

RECOMMENDED BOOKS

- Compilers: Principles, Techniques and Tools, V. Aho, R. Sethi and J. D. Ullman, Pearson Education.
- Compiler Construction: Principles and Practice, K.C. Louden, Cengage Learning.

COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. define the concepts of finite automata and context free grammar.
- CO2. build the concept of working of compiler.
- CO3. examine various parsing techniques and their comparison.
- CO4. compare various code generation and code optimization techniques.
- CO5. analyze different tools and techniques for designing a compiler.
- CO6. design various phases of compiler.

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DEPARTMENT OF INFORMATION TECHNOLOGY
DATA MINING & PATTERN WAREHOUSING
160612/230602/240602

L	T	P	Total Credits
3	-	2	4

COURSE OBJECTIVES

- To understand the significance of data mining in real-world perspective.
- To gain understanding of data mining techniques, algorithms and commonly used tools.
- To develop ability for applying data mining techniques and tools for solving real-world problems.

Unit - I

Introduction: Motivation, importance, Data type for Data Mining: Relational Databases, Data Ware-Houses. Transactional Databases, Advanced Database System and Its Applications, Data Mining Functionalities, Concept/Class Description, Association Analysis Classification & Prediction, Cluster Analysis, Outliner Analysis, Classification of Data Mining Systems, Major Issues in Data Mining.

Unit - II

Data Pre-processing: Data Cleaning, Data Integration and Transformation and Data Reduction. Discretization and Concept Hierarchy Generation. Data Mining Primitives Languages and System Architectures, Concept Description, Characterization and Comparison Analytical, Characterization.

Data Warehouse and OLTP Technology for Data Mining: Differences between Operational Database Systems & Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Data Cube Technology.

Unit - III

Mining Association Rules in Large Databases: Association Rule Mining: Market Basket Analysis, Basic Concepts, Mining Single Dimensional Boolean Association Rules from Transactional Databases: The Apriori Algorithm, Generating Association Rules from Frequent Items, Improving the Efficiency of Apriori, other Algorithms & their Comparison, Mining Multilevel Association Rules, Multidimensional Association Rules, Constraint Based Association Rule Mining.

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DEPARTMENT OF INFORMATION TECHNOLOGY

Unit - IV

Classification & Prediction and Cluster Analysis: Issues Regarding Classification & Prediction, Different Classification Methods, Prediction, Cluster Analysis, Major Clustering Methods, Currently Available Tools.

Unit - V

Pattern Warehousing System: Pattern Warehouse, Process flow for Pattern Warehouse, Benefits of Pattern Warehousing, Difference between Pattern Warehousing and Data Warehousing, Architectural aspects of Pattern Warehousing, Types of Pattern Warehouses, Challenging Issues in Pattern Warehouse, Profitable Pattern Mining, Hesitation Mining, Case Study in Stock Market, Super Market.

RECOMMENDED BOOKS

- Data Mining: Concepts and Techniques, Han and Kamber, Morgan Kaufmann Publications.
- Data Mining Techniques, A. K. Pujari, Universities Press Pvt. Ltd.

COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. explain various basic concept of data mining and data warehousing.
 - CO2. classify various database systems and data models / schemas of data warehouse.
 - CO3. compare various methods for storing & retrieving data from different data sources/repository.
 - CO4. apply data mining techniques for knowledge extraction from large amount of data .
 - CO5. analyze data for knowledge discovery & prediction using appropriate algorithms.
 - CO6. develop real world application using data mining techniques.
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DEPARTMENT OF INFORMATION TECHNOLOGY

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

160613/230603

L	T	P	Total Credits
3	-	2	4

COURSE OBJECTIVES:

- To provide the fundamental knowledge of Artificial Intelligence and Machine Learning.
- To present the basic representation and reasoning paradigms used in AI & ML.
- To understand the working of techniques used in AI & ML.

Unit I

Introducing Artificial Intelligence: Definition, Goals of AI, Task of AI, Computation, Psychology and Cognitive Science, Perception, Understanding and Action. Artificial Intelligence vs Machine Learning vs Deep Learning and other related fields. Applications of Artificial intelligence and Machine Learning in real world.

Unit II

Problem, Problem Space and Search:

Production System, Blind Search: BFS & DFS, Heuristic Search, Hill Climbing, Best First Search.

Introduction to Neural Networks:

History, Biological Neuron, Artificial Neural Network, Neural Network Architectures, Classification, & Clustering.

Unit III

Introduction to Machine Learning: Traditional Programming vs Machine Learning.

Key Elements of Machine Learning: Representation, Process (Data Collection, Data Preparation, Model Selection, Model Training, Model Evaluation and Prediction), Evaluation and Optimization. **Types of Learning:** Supervised, Unsupervised and Reinforcement Learning. Regression vs Classification Problems.

Unit IV

Supervised Machine Learning: Linear Regression: Implementation. Applications & Performance Parameters, Decision Tree Classifier, Terminology, Classification vs Regression Trees, Tree Creation with Gini Index and Information Gain. IDE3

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DEPARTMENT OF INFORMATION TECHNOLOGY

Algorithms, Applications and Performance Parameters. Random Forest Classifier, Case Study on Regression and Classification for solving real world problems.

Unit V

Unsupervised Machine Learning: Introduction, Types: Partitioning, Density Based, DBSCAN, Distribution Model-Based, Hierarchical, Agglomerative and Divisive, Common Distance Measures, K-Means Clustering Algorithms, Case Study on Clustering for solving real world problems.

RECOMMENDED BOOKS:

- Artificial Intelligence: A Modern Approach by Stuart J. Russell and Peter Norvig, Prentice Hall.
- Artificial Intelligence: Elaine Rich, Kevin Knight, Mc-Graw Hill.
- Introduction to AI & Expert System: Dan W. Patterson, PHI.
- Pattern Recognition and Machine Learning, Christopher M. Bishop
- Introduction to Machine Learning using Python: Sarah Guido
- Machine Learning in Action: Peter Harrington

COURSE OUTCOMES

after completing the course, the student will be able to:

- CO1. define basic concepts of Artificial Intelligence & Machine Learning.
 - CO2. illustrate various techniques for search and processing.
 - CO3. identify various types of machine learning problems and techniques.
 - CO4. analysis various techniques in Artificial Intelligence, ANN & Machine Learning.
 - CO5. apply AI and ML techniques to solve real world problems.
 - CO6. build AI enabled intelligent systems for solving real world problems.
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DEPARTMENT OF INFORMATION TECHNOLOGY

AI IN ROBOTICS

240603

L	T	P	Total Credits
3	-	2	4

COURSE OBJECTIVES

- To study the concepts of Artificial Intelligence in Robotics.
- To learn the methods of solving problems in Robotics using Artificial Intelligence.
- To learn about planning, strategies and algorithms.

Unit I

Artificial Intelligence Brief History, Thinking and acting humanly, Categorization of Intelligent Systems, AI Program Components, AI Foundations, Sub-areas of AI, Applications, Artificial Intelligence in Robotics, AI-Language development, Current AI Trends, Future potential of AI.

Unit II

Need for Image processing in AI, Image Sensing and Acquisition, Image Enhancement: Histogram processing, Smoothing and Sharpening Spatial Filtering, Noise removal, Image Restoration: Mean Filters, Wiener filtering, Image Segmentation: Edge detection, Thresholding, Region-based segmentation and Recognition: descriptor, classification.

Unit III

Intelligent Robot Control, Vision, Planning Approach, Algorithm for Intelligent Robot System, Continuous Path Control, Control System for Robot Joint, Control Actions, Feedback Device.

Unit IV

Planning with forward and backward state space search, Partial order planning, Planning graphs, Planning with propositional logic, Planning and acting in the real world.

Unit V

Uninformed Search Strategies: Breadth-First Search, Uniform Cost Search, Depth-First Search, Analysis of Search Methods. Informed Search Strategies: Heuristic Functions. Best-First Search, Greedy Search. A* Algorithm, Optimal Solution by AO* Algorithm. Applications of AI-based Robotic system.

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DEPARTMENT OF INFORMATION TECHNOLOGY

RECOMMENDED BOOKS

- Artificial Intelligence – A Modern Approach. Second Edition, Stuart Russel, Peter Norvig, PHI, Pearson Education.
- Artificial Intelligence – Structures and Strategies for Complex Problem Solving , George F Luger, Addison Wesley, Fifth Edition
- Artificial Intelligence, 3rd Edition, Patrick Henry Winston., Pearson Edition
- Saeed B. Niku, Introduction to Robotics Analysis, Application, Pearson Education Asia, 2001.
- Rafael C. Gonzalez, Richard E. Woods, Digital Image Processing', Pearson, Third Edition, 2010.

COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. define different basic terms related to artificial intelligence.
 - CO2. tell the fundamentals of the intelligent robot control system.
 - CO3. infer the basics of image processing used in robotics.
 - CO4. explain the basics of planning in robotics.
 - CO5. apply the concept of an algorithm for an intelligent system.
 - CO6. implement artificial intelligence in robotics.
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Syllabi
of
Open Category (OC) Courses
B. Tech VI Semester
(Batch Admitted in 2020-21)
(offered by department of Information
Technology)
Under Flexible Curriculum
[ITEM IT - 7]

DEPARTMENT OF INFORMATION TECHNOLOGY

DATA MINING & WAREHOUSING

910102 (OC-1)

L	T	P	Total Credits
3	-	-	3

COURSE OBJECTIVES

- To understand the significance of data mining in real-world perspective.
- To gain understanding of data mining techniques, algorithms and commonly used tools.
- To develop ability for applying data mining techniques and tools for solving real-world problems.

Unit - I

Introduction: Motivation, important, Data type for Data Mining: Relational Databases, Data Ware-Houses. Transactional Databases, Advanced Database System and Its Applications, Data Mining Functionalities Concept/Class Description, Association Analysis Classification & Prediction, Cluster Analysis, Outliner Analysis Classification of Data Mining Systems, Major Issues in Data Mining.

Unit - II

Data Warehouse and OLTP Technology for Data Mining: Differences between Operational Database Systems & Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Data Cube Technology, Emerging Scenario of Pattern Warehousing System.

Unit - III

Data Pre-processing: Data Cleaning, Data Integration and Transformation, Data Reduction Discretization and Concept Hierarchy Generation. Data Mining Primitives Languages and System Architectures, Concept Description, Characterization and Comparison Analytical Characterization.

Unit - IV

Mining Association Rules in Large Databases: Association Rule Mining: Market Basket Analysis, Basic Concepts, Mining Single Dimensional Boolean Association Rules from Transactional Databases: The Apriori Algorithm, Generating Association Rules from Frequent Items, Improving the Efficiency of Apriori, other Algorithms & their Comparison, Mining Multilevel Association Rules, Multidimensional Association Rules, Constraint Based Association Rule Mining.

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DEPARTMENT OF INFORMATION TECHNOLOGY

Unit - V

Classification & Predication and Cluster Analysis: Issues Regarding Classification & Predication, Different Classification Methods, Predication, Cluster Analysis, Major Clustering Methods, Currently Available Tools, Case Study.

RECOMMENDED BOOKS

- Data Mining: Concepts and Techniques, Han and Kamber, Morgan Kaufmann Publications.
 - Data Mining Techniques, A. K. Pujari, Universities Press Pvt. Ltd.
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COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. explain various data mining tasks.
 - CO2. classify various databases systems and data models / schemas of data warehouse.
 - CO3. compare various methods for storing & retrieving data from different data sources/repository.
 - CO4. apply pre-processing techniques for construction of data warehouse.
 - CO5. analyze data for knowledge discovery & prediction using appropriate algorithms.
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DEPARTMENT OF INFORMATION TECHNOLOGY

SOFTWARE ENGINEERING

910103 (OC-1)

L	T	P	Total Credits
3	-	-	3

COURSE OBJECTIVES

- To understand the nature of software development and software life cycle process models, agile software development, scrum and other agile practices.
- To understand project management and risk management associated with various types of projects.
- To know basics of testing and understanding concept of software quality assurance and software configuration management process.

Unit - I

Introduction to Software Engineering: Definition, Software Engineering-Layered Technology, Software Characteristics and Components, Software Model: Software Development of Life Cycle Model (SDLC), Waterfall Model, Iterative Waterfall Model, Prototyping Model, Spiral Model, RAD Model. Selection Criteria of Model: Characteristics of Requirements, Status of Development Team, Users Participation, Type of Project and Associated Risk.

Unit - II

Requirement Engineering: Definition, Requirement Engineering Activity, Types of Requirement- Functional and Non-Functional Requirements, User and System Requirements, Requirement Elicitation Methods, Requirement Analysis Methods, Requirement Documentation (SRS), Requirement Validation, Requirement Management.

Unit - III

Design Concept, Principle and Methods: Design Fundamentals, Design Principles. Effective Modular Design, Design Representations, Architectural Design, Procedural Design, Data Directed Design, Real Time Design, Object Oriented Design, Coupling and Cohesion.

Unit - IV

Software Metrics, Project Management and Estimation: Metrics in Process and Project Domains, Software Measurement. Software Quality Metrics. Project Management- Basics-People. Product. Process. Project, Estimation- Software Project

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DEPARTMENT OF INFORMATION TECHNOLOGY

Estimation, Decomposition Techniques- Function Point Estimation, Line of Code (LOC) Based Estimation, Empirical Estimation, COCOMO Model, Project Scheduling Techniques.

Unit - V

Software Testing: Definitions, Software Testing Life Cycle (STLC), Test Case Design, Strategic Approach to Software Testing- Verification & Validation , Strategic Issues, Criteria for Completion of Testing, Unit Testing, Integration Testing, Validation Testing, System Testing, Black Box Testing Techniques, White Box Testing Techniques, Acceptance Testing.

RECOMMENDED BOOKS

- Software Engineering, Sommerville, Pearson.
- Software Engineering: A Practitioner's Approach, Roger S. Pressman, McGraw Hill.
- Software Engineering, K.K. Agrawal & Yogesh Singh, New Age Publication.
- Software Engineering, Rajib Mall, PHI.

COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. explain the various fundamental concepts of software engineering.
 - CO2. develop the concepts related to software design & analysis.
 - CO3. compare the techniques for software project management & cost estimation.
 - CO4. choose the appropriate model for real life software project.
 - CO5. design the software using modern tools and technologies.
 - CO6. test the software through different approaches.
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***Experiments List / Lab manuals
of
Laboratory Courses
B. Tech VI Semester
(Batch Admitted in 2020-21)
(Information Technology/Internet of Things
(IoT)/ Information Technology (Artificial
Intelligence and Robotics))
Under Flexible Curriculum
[ITEM IT - 8]***

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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DEPARTMENT OF INFORMATION TECHNOLOGY

COMPILER DESIGN LAB

160611/230601/240601

LIST OF PROGRAMS

1. Write a program to convert NFA to DFA.
2. Write a program to minimize DFA.
3. Develop a lexical analyzer to recognize a few patterns.
4. Write a program to parse using Brute force technique of Top down parsing.
5. Develop LL (1) parser (Construct parse table also).
6. Develop an operator precedence parser (Construct parse table also).
7. Develop a recursive descent parser.
8. Write a program for generating for various intermediate code forms.
 - i. Three address code
 - ii. Polish notation
9. Write a program to simulate Heap storage allocation strategy.
10. Generate Lexical analyzer using LEX.
11. Generate YACC specification for a few syntactic categories.
12. Given any intermediate code form implement code optimization techniques.

COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. discuss the knowledge of patterns, tokens & regular expressions in programming for problem solving.
 - CO2. design and Implement various parsing techniques.
 - CO3. operate different types of compiler tools.
 - CO4. develop programs for implementing code optimization techniques.
 - CO5. build symbol table and intermediate codes.
 - CO6. demonstrate the functionalities of different phases of the compilation process.
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DEPARTMENT OF INFORMATION TECHNOLOGY
DATA MINING & PATTERN WAREHOUSING
160612/230602/240602

LIST OF PROGRAMS

1. To perform basic operation for mining data (Preprocessing, Regression, Classification, Association, Clustering and Visualization) using WEKA simulator
 2. Setting up a flow to load an ARFF file (batch mode) and perform a cross validation using J48 (WEKA's C4.5 implementation).
 3. Draw multiple ROC curves in the same plot window for J48 and RandomForest as classifiers using Knowledge flow in weka.
 4. Training and Testing of naive Bayes classifier incrementally using Knowledge flow in weka.
 5. Write a program to count the occurrence frequency of items in the given data set
 6. Write a program to generate frequent itemset from given data set
 7. Write a program to generate Association rules from the generated frequent itemsets.
 8. Write a program to implement of various Association Rule Mining algorithms such as Apriori, Eclat, FP growth and FP Tree.
 9. Write a program to implement different type of clustering algorithms such as Kmean, Heirachical, DBScan and EM Clustering.
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ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
160613/230603

LIST OF PROGRAMS

1. Study of PROLOG programming language and its functions.
2. Write simple fact for the statements using PROLOG
3. WAP to implement factorial, Fibonacci of a given number using PROLOG.
4. Write a program to solve the 4-Queen problem using PROLOG and Python both.
5. Explore numpy, Pandas, SciPy, Matplotlib and Scikit Learn libraries in Python
6. Study and implement various Dimensionality reduction, Feature selection and Normalization techniques in Python
7. Implement Linear Regression model in Python.
8. Implement Logistic Regression model in Python.
9. Implement decision tree Classification Model using C4.5 and CSRT algorithms in Python.
10. Implement K-means clustering technique.
11. Implement Fuzzy C-means clustering technique.
12. Study various performance parameters used for evaluating the performance of various regression, classification and clustering models.

COURSE OUTCOMES

After completing the course, the student will be able to:

- CO1. illustrate the concepts of PROLOG programming language.
 - CO2. implement various techniques for knowledge representation and processing.
 - CO3. explore different AI and ML tools in Python.
 - CO4. analysis various Artificial Intelligence & Machine Learning techniques over various performance parameters.
 - CO5. apply AI and ML techniques to solve real world problems.
 - CO6. build AI enabled intelligent systems for solving real world problems.
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*List of Skill Based Mini Projects
of
Laboratory Courses
B. Tech VI Semester
(Batch Admitted in 2020-21)
(Information Technology/Internet of Things
(IoT)/ Information Technology (Artificial
Intelligence and Robotics))
Under Flexible Curriculum
[ITEM IT - 8]*

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)

DEPARTMENT OF INFORMATION TECHNOLOGY

COMPILER DESIGN LAB

160611/230601/240601

SKILL BASED MINI PROJECTS

1. Design a Lexical scanner to recognize keyword, identifier and its total count presented in source program.
 2. Design a Lexical scanner to identify operators, digits (0-9) and numbers (like integer, floating point, fractional and exponential) in source program.
 3. Design a Lexical scanner to count no. of words, character, small characters, capital characters and capital words within source program.
 4. Design a Lexical analyzer to ignore comments, redundant spaces, tabs and new lines form input source program.
 5. Design a Lexical scanner to recognize and count the number of vowels and consonants in a sentence.
 6. Design a YACC analyzer to implement a Calculator and recognize a valid Arithmetic expression.
 7. Design a YACC analyzer to recognize string with grammar $\{a^n b^n \mid n \geq 0\}$ and $\{a^n b \mid n \geq 5\}$.
 8. Design a YACC that accepts strings that starts and ends with Zero or One.
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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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DEPARTMENT OF INFORMATION TECHNOLOGY

DATA MINING & PATTERN WAREHOUSING

160612/230602/240602

SKILL BASED MINI PROJECTS

1. Application in real estate industries to predict the house prices.
 2. Detecting Phishing website using data mining techniques.
 3. Intelligent Transport System.
 4. Credit Card Fraud Detection System.
 5. Opinion Mining for Social Networking Site.
 6. Weather forecasting using Data mining Technique.
 7. Stock Market Analysis and Prediction.
 8. Online book recommendation system using Collaborative filtering.
 9. Customer behavior prediction using web usage mining.
 10. Secure E Learning Using Data Mining Techniques.
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DEPARTMENT OF INFORMATION TECHNOLOGY

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
160613/230603

SKILL BASED MINI PROJECTS

1. Design and implement Handwritten Digits Recognition system.
 2. Design and implement a Spam classification system using Machine Learning algorithm.
 3. Design and implement a Music Recommendation App.
 4. Design and implement heart disease prediction using different classification algorithm and analyse the best over the dataset.
 5. Design and implementation of Animal Kingdom Classification using CNN with the help of available libraries in python.
 6. Apply the classification algorithms over the time series dataset by transforming the dataset into static values.
 7. With the help of random forest classifier, classify any suitable dataset available over the trusted repository.
 8. Design a program for Number Guessing using random number generator library. Make a play game with the defined library.
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DEPARTMENT OF INFORMATION TECHNOLOGY

AI IN ROBOTICS
240603

SKILL BASED MINI PROJECTS

1. **Remote-controlled Cam-Bot:** prepare a robot that can be controlled by you and can capture live pictures and videos of whatever it can see.
 2. **Wi-Fi-controlled Robot:** prepare a robot that can be controlled with the help of a laptop and which uses raspberry pi as its operating brain.
 3. **Gesture-controlled robot:** prepare a robot that can be controlled using gestures.
 4. **Obstacle detection robot:** prepare a robot that can be controlled using different obstacles.
 5. **Obstacle avoidance robot:** prepare a robot that can be controlled using different obstacles.
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***Scheme & Syllabi
of
B. Tech IV Semester
(Batch Admitted in 2021-22)
(Information Technology (IT) / Internet of Things (IoT) /
Artificial Intelligence & Robotics (AIR) / Artificial Intelligence and
Data Science / Artificial Intelligence and Machine Learning)
Under Flexible Curriculum
[ITEM IT - 9]***

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A Govt. Aided UGC Autonomous & NAAC Accredited Institute affiliated to RGPV, Bhopal)

Department of Information Technology

Scheme of Evaluation

B. Tech. II Semester (Information Technology)

Sl. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Contact Hours per Week			Total Credits	Mode of Teaching (Online/Blended/Offline)	Mode of Exam		
				Theory Slot		Practical Slot		End Sem. Exam.	Lab work & Sessional	Skill Based Mini Project	L	T				P	
				End Term Evaluation	Continuous Evaluation	End Sem. Exam.	Continuous Evaluation										
1.	100011	BSC	Engineering Mathematics -I	50	10	20	20	-	-	-	100	3	1	-	4	Offline	PP
2.	160211	DC	Data Structures	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP
3.	160212	DC	Object Oriented Programming & Methodology	50	10	20	20	60	20	20	200	3	-	2	4	Blended (2/1)	AO
4.	160213	DC	Digital Electronics	50	10	20	20	-	-	-	100	2	1	-	3	Blended (2/1)	PP
5.	100016	HSMC	Technical Language	50	10	20	20	-	-	-	100	3	-	-	3	Blended (2/1)	PP
6.	100017	HSMC	Language Lab	-	-	-	-	60	20	20	100	-	-	2	1	Offline	SO
Total				250	50	100	100	180	60	60	800	13	03	06			

Summer Internship Project - I (Institute Level) (Qualifier): Minimum two-week duration: Evaluation in III Semester.

*proficiency in course/subject includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject.

MCQ: Multiple Choice Question

AO: Assignment - Oral

OB: Open Book

PP: Pen Paper

SO: Submission - Oral

Mode of Teaching				Mode of Examination				
Theory		Blended		Lab	Theory			Lab
Offline	Online	Offline	Online	Offline	PP	A+O	MCQ	SO
04	-	08	04	03	13	03	-	03
21.05%	-	21.05%	21.05%	15.79%	68.42%	15.79%	-	15.79%

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DEAN (ACADEMICS)
MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE
GWALIOR

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute affiliated to RGPV, Bhopal)

Department of Information Technology

Scheme of Evaluation

B. Tech. IV Semester (Information Technology)

(for batch admitted in academic session 2021-22)


S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching	Mode of Exam.
				Theory Slot				Practical Slot				L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation								
				End Sem. Exam.	*Proficiency in subject /course	Mid Sem. Exam.	Quiz/ Assignment		Lab work & Sessional	Skill Based Mini Project							
1.	100003	BSC	Engineering Mathematics- III	50	10	20	20	-	-	-	100	2	1	-	3	Offline	PP
2.	160411	DC	Computer Graphics & Multimedia	50	10	20	20	60	20	20	200	2	1	2	4	Blended	PP
3.	160412	DC	Software Engineering	50	10	20	20	60	20	20	200	2	1	2	4	Blended	MCQ
4.	160413	DC	Computer Networks	50	10	20	20	-	-	-	100	2	1	-	3	Blended	PP
5.	100009	MC	Cyber Security	50	10	20	20	-	-	-	100	2	-	-	2	Online	MCQ
6.	160414	DLC	Python Programming Lab	-	-	-	-	60	20	20	100	-	1	2	2	offline	SO
7.	200XXX	CLC	Novel Engaging Course (Informal Learning)	-	-	-	-	50	-	-	50	-	-	2	1	Interactive	SO
Total				250	50	100	100	230	60	60	850	10	05	08	19	-	-
8.	1000001	MAC	Indian Constitution and Traditional Knowledge	50	10	20	20	-	-	-	100	2	-	-	GRADE	Online	MCQ

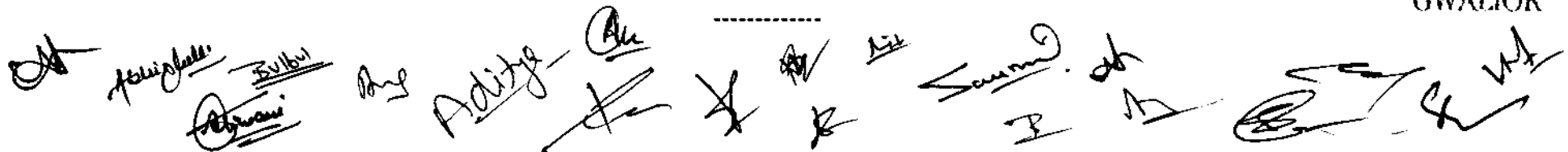
Summer Internship Project-II (Soft skill Based) for two weeks duration: Evaluation in V Semester

* proficiency in course/subject-includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject.

MCQ: Multiple Choice Question AO: Assignment + Oral PP: Pen Paper SO: Submission + Oral

Mode of Teaching					Mode of Examination					Total Credits
Theory			Lab	NEC	Theory			Lab	NEC	
Offline	Online	Blended	Offline	Interactive	PP	A+O	MCQ	SO	SO	
04	02	09	03	01	09	-	05	04	01	19
21.05%	10.53%	47.37%	15.79%	5.26%	47.37%	-	26.32%	21.05%	5.26%	Credits %


 02-03-2022
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Department of Information Technology

Scheme of Evaluation

B. Tech. in Internet of Things (IoT)

I Semester

For batch admitted in academic session 2021 - 22

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Total Marks	Contact Hours per Week			Total Credits	Mode of Teaching (Offline/Online)	Mode of Exam.	
				Theory Slot				Practical Slot			L	T	P				
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation								
				End Sem Exam.	Proficiency in subject/course	Mid Sem Exam.	Quiz Assignment		Lab work & Sessional								Skill Based Mini Project
1.	230101	DC	Introduction to Internet of Things (IoT)	50	10	20	20	-	-	100	4	-	-	4	Blended (3:1)	MCQ	
2.	230102	DC	Introduction to Computer Programming	50	10	20	20	60	20	200	2	1	2	4	Blended (2:1)	AO	
3.	100077	ESC	Basic Electrical & Electronics Engineering	50	10	20	20	60	20	200	2	1	2	4	Blended (2:1)	MCQ	
4.	230100	BSC	Linear Algebra	50	10	20	20	-	-	100	3	1	-	4	Offline	PP	
5.	100078	HSMC	Environment, Ecology & Society	50	10	20	20	-	-	100	-	-	-	4	Offline	AO	
Total				250	50	100	100	120	40	40	700						

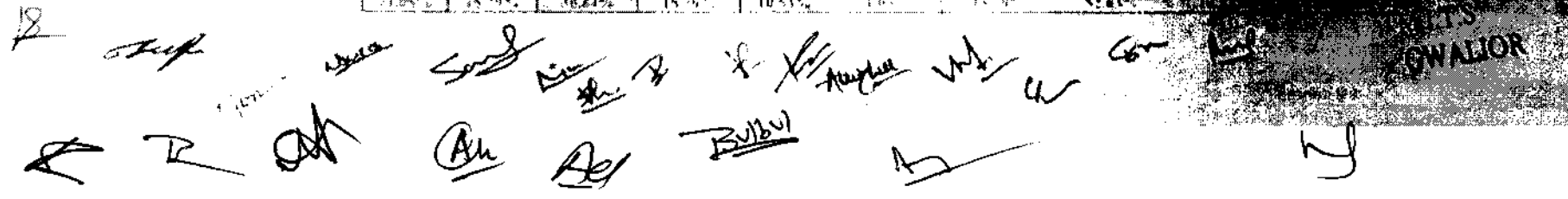
Induction program of first three weeks: MC Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules

Proficiency in course/subject includes the weightage towards ability/skill/competence/knowledge level/expertise attained etc. in the local Areas, Familiarization to Dept/Branch & Innovation

MCQ: Multiple Choice Question AO: Assignment + Oral OB: Open Book PP: Pen Paper SO: Submission + Oral

Mode of Teaching				Mode of Examination			
Theory		Blended		Lab		Theory	
Offline	Online	Offline	Online	Offline	PP	A+O	MCQ
04	03	07	03	02	04	03	10
31.67%	25.00%	38.67%	15.00%	10.53%	10.53%	15.79%	52.63%

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR



MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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Department of Information Technology
Scheme of Evaluation
B. Tech. in Internet of Things (IoT)
II Semester

For batch admitted in academic session 2021-22

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Contact Hours per Week			Total Credits	Mode of Teaching (Offline/Online)	Mode of Exam.		
				Theory Slot				Practical Slot		Total Marks	L	T				P	
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation								
				End Sem Exam.	Proficiency in subject/course	Mid Sem Exam.	Quiz Assignment		Lab work & Sessional								Skill Based Mini Project
1.	220201	DC	Digital Logic Design	50	10	20	20				100	2	1	-	3	Blended (2/1)	PP
2.	220202	DC	Sensor Technology	50	10	20	20	60	20	20	200	3	-	2	4	Blended (2/1)	PP
3.	230202	DC	Data Structures	50	10	20	20	60	20	20	200	3	-	2	4	Blended (2/1)	PP
4.	230203	DC	Object Oriented Programming and Methodology	50	10	20	20	60	20	20	200	3	-	2	4	Blended (2/1)	AO
5.	100016	HSMC	Technical Language	50	10	20	20				100	3			3	Blended (2/1)	PP
6.	100017	HSMC	Language Lab					60	20	20	100			2	1	Offline	SQ
Total				250	50	100	100	240	80	80	900	14	07	08			

Summer Internship Project - I (Institute Level) (Qualifier): Minimum two-week duration: Evaluation in II Semester
 proficiency in course subject includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course.
 AO: Multiple Choice Questions AQ: Assignment / Quiz OB: Open Book PP: Pen Paper SQ: Submission + Oral

Mode of Teaching				Mode of Examination				
Theory		Blended		Lab	Theory			Lab
Offline	Online	Offline	Online	Offline	PP	A+Q	MCO	SQ
		10	05	04	12	03		04
		62.63%	26.32%	31.03%	33.33%	18.75%		16.67%

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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Department of Information Technology

Scheme of Evaluation

B. Tech. Internet of Things (IoT)

III Semester

(for batch admitted in academic session 2021-22)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Offline/Online)	Mode of Exam.	
				Theory Slot				Practical Slot				L	T	P				
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation									
				End Sem. Exam.	Proficiency in subject/course	Mid Sem. Exam.	Quiz Assignment		Lab work & Seasonal	Skill Based Mini Project								
1.	230106	BSC	Probability and Random Process	50	10	20	20	-	-	-	100	3	1	-	4			
2.	230301	DC	Design & Analysis of Algorithms	50	10	20	20	60	20	20	200	2	1	2	4			
3.	230302	DC	Operating System	50	10	20	20	-	-	-	100	2	1	-	3			
4.	230303	DC	Computer Networks and Protocols	50	10	20	20	-	-	-	100	2	1	-	3			
5.	230304	DC	Database Management System	50	10	20	20	60	20	20	200	2	1	2	4			
6.	230305	DLC	Design and Thinking Lab	-	-	-	-	60	20	20	100	-	-	2	1			
7.	230306	DLC	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	-	-	-	-	-	40	-	40	-	-	2	1			
8.	200XXX	DLC	Summer Internship Project-I (Institute Level) (Evaluation)	-	-	-	-	-	-	-	-	-	-	2	1			
9.	230307	DLC	Summer Internship Project-I (Institute Level) (Evaluation)	-	-	-	-	60	-	-	60	-	-	4	2			
Total				250	50	100	100	290	100	60	950	11	5	14				
10.	1000005	MAC	Project Management & Financing	50	10	20	20	-	-	-	100	2	-	-				GRADE

* proficiency in course/subject includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject.
 MCQ: Multiple Choice Question AD: Assignment + Oral PP: Pen Paper SO: Submission + Oral

Mode of Teaching				Mode of Examination								Total Credits		
Theory		Blended		Lab		NEC		Theory		Lab			NEC	
Offline	Online	Offline	Online	Offline	Interactive	PP	A+O	MCQ	SO	SO	SO		SO	SO
04	-	08	04	04	01	16	-	-	05	01	05	01	01	
				4.35%		69.56%				28.07%		4.35%		

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)

Department of Information Technology

Scheme of Evaluation

B. Tech. in Information Technology (Artificial Intelligence and Robotics)

I Semester

For batch admitted in academic session 2021-22

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Total Marks	Contact Hours per Week			Total Credits	Mode of Teaching (Offline/Online)	Mode of Exam.	
				Theory Slot				Practical Slot			L	T	P				
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation								
				End Sem. Exam.	Proficiency in subject/course	Mid Sem. Exam	Quiz/Assignment		Lab work & Sessional								Skill Based Mini Project
1	24101	DC	Introduction to Artificial Intelligence	50	10	20	20	-	-	-	4	-	-	4	Blended (3:1)	MCO	
2	24102	DC	Introduction to Computer Programming	50	10	20	20	60	20	20	2	1	2	4	Blended (2:1)	AO	
3	100022	ESC	Basic Electrical & Electronics Engineering	50	10	20	20	60	20	20	2	1	2	4	Blended (2:1)	MCO	
4	250100	BSC	Linear Algebra	50	10	20	20	-	-	-	3	1	-	4	Offline	PP	
5	100015	HSMC	Energy, Environment, Ecology & Society	50	10	20	20	-	-	-	3	-	-	4	Offline	MCO	
Total				250	50	100	100	120	40	40	14	6	6	26			

Induction program of first three weeks (MCO) Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by eminent persons in local Areas, Familiarization to Dept./Branch & Innovations

* proficiency in course/subject includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject

MCO: Multiple Choice Question AO: Assignment + Oral OB: Open Book PP: Pen Paper SO: Submission + Oral

Mode of Teaching				Mode of Examination				
Theory				Lab		Theory		Lab
Offline	Online	Blended		Offline	PP	A+O	MCQ	SO
04	03	07	01	02	04	01	10	02
15.79%	11.54%	26.32%	15.79%	40.53%	21.88%	11.54%	82.61%	10.53%

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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Department of Information Technology Scheme of Evaluation

B. Tech. in Information Technology (Artificial Intelligence and Robotics)

II Semester

For batch admitted in academic session 2021 - 2022

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Total Marks	Contact Hours per Week			Total Credits	Mode of Teaching (Offline/Online)	Mode of Exam.	
				Theory Slot			Practical Slot				L	T	P				
				End Term Evaluation		Continuous Evaluation	End Sem. Exam.	Continuous Evaluation									
				End Sem Exam.	Proficiency in subject/course	Mid Sem. Exam		Quiz/Assignment	Lab work & Sessional		Skill Based Mini Project						
1.	230201	DC	Digital Logic Design	50	10	20	20	-	-	-	100	2	1	-	3	Blended (2/1)	PP
2.	220202	DC	Sensor Technology	50	10	20	20	60	20	20	200	3	-	2	4	Blended (2/1)	PP
3.	240202	DC	Data Structures	50	10	20	20	60	20	20	200	3	-	2	4	Blended (2/1)	PP
4.	240203	DC	Object Oriented Programming and Methodology	50	10	20	20	60	20	20	200	3	-	2	4	Blended (2/1)	AO
5.	100016	HSMC	Technical Language	50	10	20	20	-	-	-	100	3	-	-	3	Blended (2/1)	PP
6.	100017	HSMC	Language Lab	-	-	-	-	60	20	20	100	-	-	2	1	Offline	SO
Total				250	50	100	100	240	80	80	900	14	01	08			

Summer Internship Project - I (Institute Level) (Qualifier): Minimum two-week duration; Evaluation in III Semester.

Proficiency in course/subject includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject.

MCQ: Multiple Choice Question AO: Assignment + Oral OB: Open Book PP: Pen Paper SO: Submission + Oral

Mode of Teaching				Mode of Continuation				Credits
Theory		Lab		Theory		Lab		
Offline	Online	Blended	Offline	PP	AO	MCQ		
		Offline 10	Online 05	04	12	03	04	19
		33.33%	33.33%	33.33%	66.66%	33.33%	33.33%	Credits

MAN (ACADEMICS)
MITS
GWALIOR

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 Navin Singh 408
 Anshu
 Bulbu
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 Ad
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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, G.WALIOR
(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)

Department of Information Technology
Scheme of Evaluation

B. Tech. in Information Technology (Artificial Intelligence and Robotics)

III Semester

(for batch admitted in academic session 2020-21)

S. No	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Offline/Online)	Mode of Exam.
				Theory Slot				Practical Slot				L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation								
				End Sem. Exam	Proficiency in subject course	Mid Sem. Exam	Quiz/Assignment		Lab Work & Sessional	Skill Based Mini Project							
1.	250106	BSC	Probability and Random Process	50	10	20	20	-	-	-	100	3	1	-	4		
2.	240301	DC	Design & Analysis of Algorithms	50	10	20	20	60	20	20	200	2	1	2	4		
3.	240302	DC	Operating System	50	10	20	20	-	-	-	100	2	1	-	3		
4.	240303	DC	Computer Networks and Protocols	50	10	20	20	-	-	-	100	2	1	-	3		
5.	240304	DC	Database Management System	50	10	20	20	60	20	20	200	2	1	2	4		
6.	240305	DLC	Python Programming Lab	-	-	-	-	60	20	20	100	-	-	2	1		
7.	240306	DLC	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	-	-	-	-	-	40	-	40	-	-	2	1		
8.	200XXX																
9.	24030*	DLC	Summer Internship Project-I (Institute Level) (Evaluation)	-	-	-	-	60	-	-	60	-	-	4	2		
Total				250	50	100	100	290	100	60	950	11	05	14			
10.	1000005	MAC	Project Management & Financing	50	10	20	20	-	-	-	100	2	-	-		GRADE	

* proficiency in course/subject includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject.
MCQ: Multiple Choice Question AO: Assignment + Oral PP: Pen Paper SO: Submission + Oral

Mode of Teaching				Mode of Examination							Total Credits					
Theory		Blended		Lab	Theory			Lab	SLP/SLP/NEC							
Offline	Online	Offline	Online	Offline	Interactive	PP	A+O	MCQ	50	50						
01	-	08	04	06	01	16	-	-	06	01	23					
				-4.36%							69.56%		36.36%		63.74%	

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**Department of Information Technology
Scheme of Evaluation**

B. Tech. in Information Technology (Artificial Intelligence and Robotics)

IV Semester

(for batch admitted in academic session 2021-22)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Offline/ Online)	Mode of Exam.
				Theory Slot				Practical Slot				L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation								
				End Sem. Exam.	Proficiency in subject /course	Mid Sem. Exam.	Quiz/ Assignment		Lab Work & Sessional	Skill Based Mini Project							
1.	240401	DC	Computer Architecture and Microprocessor	50	10	20	20	60	20	20	200	2	1	2	4	Blended	PP
2.	240402	DC	Cloud Computing	50	10	20	20	-	-	-	100	3	-	-	3	Blended	PP
3.	240403	DC	Software Engineering	50	10	20	20	60	20	20	200	3	-	2	4	Blended	MCQ
4.	240404	DC	Machine Learning and Optimization	50	10	20	20	60	20	20	200	3	-	2	4	Blended	PP
5.	240405	DC	Network & Web Security	50	10	20	20	-	-	-	100	3	-	-	3	Blended	PP
6.	240406	DLC	Design and Thinking Lab	-	-	-	-	60	20	20	100	-	-	2	1	Offline	SO
7.	200XXX	CLC	Novel Engaging Course (Informal Learning)	-	-	-	-	50	-	-	50	-	-	2	1	Interactive	SO
Total				250	50	100	100	290	80	80	950	14	01	10	20	-	-
8.	1000001	MAC	Indian Constitution and Traditional Knowledge	50	10	20	20	-	-	-	100	2	-	-	GRADE	Online	MCQ

Summer Internship Project-II (Soft skills Based) for two weeks duration: Evaluation in V Semester

[§] proficiency in course/subject-includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject.

MCQ: Multiple Choice Question AO: Assignment + Oral OB: Open Book PP: Pen Paper SO: Submission + Oral

Mode of Teaching					Mode of Examination					Total Credits
Theory			Lab	NEC	Theory			Lab	NEC	
Offline	Online	Blended	Offline	Interactive	PP	A+O	MCQ	SO	SO	
-	-	15	04	01	12	-	03	04	01	20
-	-	75%	20%	5%	60%	-	15%	20%	5%	Credit

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 - *Aswajit*
 - *Subbu*
 - *Aditya*
 - *Saurabh*
 - *I.A.*
 - *...*

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Department of Information Technology

Scheme of Evaluation

B. Tech. I Semester (Artificial Intelligence (AI) and Data Science)

(for batches admitted in academic session 2021-22 onwards)

S. No	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Contact Hours per week			Total Credits	Mode of Teaching (Offline/Online)	Mode of Exam.		
				Theory Slot		Continuous Evaluation		End Sem. Exam	Practical Slot		Total Marks	L				T	P
				End Term Evaluation	Proficiency in subject course	Mid Sem. Exam	Quiz/Assignment		Lab Work & Sessional	Skill Based Mini Project							
1	100010	DC	Artificial Intelligence & Data Science	50	10	20	20	-	-	100	4	-	-	4	Blended (3:1)	MCQ	
2	100011	DC	Introduction to Computer Programming	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2:1)	AO
3	100022	ESC	Basic Electrical & Electronics Engineering	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2:1)	MCQ
4	250100	BSC	Linear Algebra	50	10	20	20	-	-	100	3	1	-	4	Offline	PP	
5	100015	HSMC	Energy Environment, Ecology & Society	50	10	20	20	-	-	100	3	-	-	3	Online	MCQ	
Total				250	50	100	100	120	40	40	700	14	03	04	19		

Induction programme of three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations.

Each term/semester/evaluation includes the weightage towards ability, skill, competency, knowledge level, expertise, attainment etc. in that particular course/subject

MCQ: Multiple Choice Question AO: Assignment + Oral OB: Open Book PP: Pen Paper SO: Submission + Oral

Mode of Teaching					Mode of Examination				
Theory		Blended		Lab	Theory			Lab	
Offline	Online	Offline	Online	Offline	PP	A+O	MCQ	SO	
04	01	07	03	02	04	03	10	02	19
71.95%	15.79%	36.81%	15.79%	10.51%	23.05%	18.79%	52.63%	10.51%	1 Credits

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Department of Information Technology

Scheme of Evaluation

B. Tech. II Semester (Artificial Intelligence (AI) and Data Science)

(for batch admitted in academic session 2021-22 onwards)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Offline/Online)	Mode of Exam.
				Theory Slot				Practical Slot				L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation								
				End Sem. Exam	Proficiency in subject /course	Mid Sem. Exam.	Quiz/Assignment		Lab Work & Sessional	Skill Based Mini Project							
1.	270201	DC	Digital Logic Design	50	10	20	20	-	-	-	100	2	1	-	3	Blended (2:1)	PP
2.	250106	BSC	Probability and Random Process	50	10	20	20	-	-	-	100	3	1	-	4	Offline	PP
3.	270202	DC	Data Structures	50	10	20	20	60	20	20	200	3	-	2	4	Blended (2:1)	PP
4.	270203	DC	Object Oriented Programming and Methodology	50	10	20	20	60	20	20	200	3	-	2	4	Blended (2:1)	AO
5.	100016	HSMC	Technical Language	50	10	20	20	-	-	-	100	3	-	-	3	Blended (2:1)	PP
6.	100017	HSMC	Language Lab	-	-	-	-	60	20	20	100	-	-	2	1	Offline	SO
Total				250	50	100	100	180	60	60	800	14	02	06	19		

Induction programme of three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations.

*Proficiency in course/subject – includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in that particular course/subject

MCQ: Multiple Choice Question AO: Assignment + Oral OB: Open Book PP: Pen Paper SO: Submission + Oral

Mode of Teaching				Mode of Examination				Total Credits
Theory			Lab	Theory			Lab	
Offline	Online	Blended	Offline	PP	A+O	MCQ	SO	
04	-	08	04	03	13	03	-	03
21.05%	-	42.11%	21.05%	15.79%	68.42%	15.79%	-	15.79%
								Credits %

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Department of Information Technology

Scheme of Evaluation

B. Tech. III Semester (Artificial Intelligence (AI) and Data Science)

(for batch admitted in academic session 2021-22)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Offline/Online)	Mode of Exam.
				Theory Slot				Practical Slot				L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation								
				End Sem Exam	Proficiency in subject course	Mid Sem. Exam	Quiz/Assignment		Lab Work & Sessional	Skill Based Mini Project							
1.	270301	BSC	Discrete Structure	50	10	20	20	-	-	-	100	2	1	-	3	Offline	PP
2.	270302	DC	Design & Analysis of Algorithms	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP
3.	270303	DC	Operating System	50	10	20	20	-	-	-	100	2	1	-	3	Blended (2/1)	PP
4.	270304	DC	Computer Networks and Protocols	50	10	20	20	-	-	-	100	2	1	-	3	Blended (2/1)	PP
5.	270305	DC	Database Management System	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP
6.	270306	DLC	Python Programming Lab	-	-	-	-	60	20	20	100	-	1	2	2	Offline	SO
7.	270307	DLC	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	-	-	-	-	-	40	-	40	-	-	2	1	Online and Mentoring	SO
8.	200XXX	DLC	Novel Engaging Course (Informal Learning)	-	-	-	-	50	-	-	50	-	-	-	-	Online	SO
9.	270308	DLC	Summer Internship Project-I (Institute Level) (Evaluation)	-	-	-	-	60	-	-	60	-	-	4	2	Online	SO
Total				250	50	100	100	290	100	60	950	10	6	14			
10.	1000005	MAC	Project Management & Financing	50	10	20	20	-	-	-	100	2	-	-		GRADE	SO

* proficiency in course/subject-includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject.

MCQ: Multiple Choice Question AO: Assignment + Oral PP: Pen Paper SO: Submission + Oral

Mode of Teaching						Mode of Examination					Total Credits
Theory				Lab	NEC	Theory			Lab	SIP/SLP/NEC	
Offline	Online	Blended		Offline	Interactive	PP	A+O	MCQ	SO	SO	
04	-	08	04	06	01	15	-	-	07	01	23
17.39%	-	34.78%	17.39%	26.09%	04.35%	65.22%	-	-	30.43%	4.35%	Credibility %

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Department of Information Technology Scheme of Evaluation

B. Tech. IV Semester (Artificial Intelligence (AI) and Data Science)

(for batch admitted in academic session 2021-22)


S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching	Mode of Exam.
				Theory Slot				Practical Slot				L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation								
				End Sem. Exam.	Proficiency in subject /course	Mid Sem. Exam.	Quiz/ Assignment		Lab Work & Sessional	Skill Based Mini Project							
1.	270401	DC	Computer Architecture and Microprocessor	50	10	20	20	60	20	20	200	2	1	2	4	Blended	PP
2.	270402	DC	Cloud Computing	50	10	20	20	-	-	-	100	3	-	-	3	Blended	PP
3.	270403	DC	Software Engineering	50	10	20	20	60	20	20	200	3	-	2	4	Blended	MCQ
4.	270404	DC	Machine Learning and Optimization	50	10	20	20	60	20	20	200	3	-	2	4	Blended	PP
5.	270405	DC	Network & Web Security	50	10	20	20	-	-	-	100	3	-	-	3	Blended	PP
6.	270406	DLC	Design and Thinking Lab	-	-	-	-	60	20	20	100	-	-	2	1	Offline	SO
7.	200XXX	CLC	Novel Engaging Course (Informal Learning)	-	-	-	-	50	-	-	50	-	-	2	1	Interactive	SO
Total				250	50	100	100	290	80	80	950	14	01	10		-	-
8.	1000001	MAC	Indian Constitution and Traditional Knowledge	50	10	20	20	-	-	-	100	2	-	-	GRADE	Online	MCQ

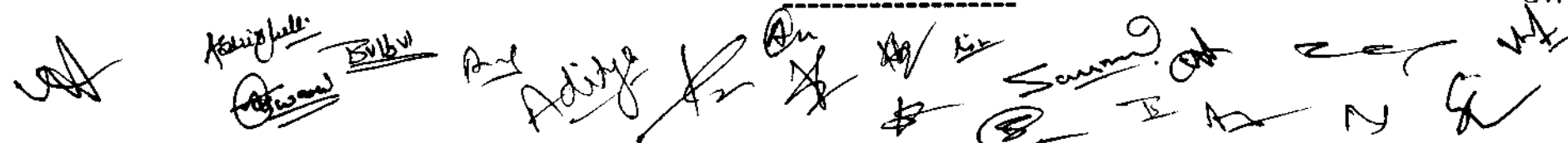
Summer Internship Project-II (Soft skills Based) for two weeks duration: Evaluation in V Semester

⁵ proficiency in course/subject-includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject.

MCQ: Multiple Choice Question AO: Assignment + Oral PP: Pen Paper SO: Submission + Oral

Mode of Teaching					Mode of Examination					Total Credits
Theory			Lab	NEC	Theory			Lab	NEC	
Offline	Online	Blended	Offline	Interactive	PP	A+O	MCQ	SO	SO	
-	-	15	04	01	12	-	03	04	01	20
-	-	75%	20%	5%	60%	-	15%	20%	5%	Credits %


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Department of Information Technology

Scheme of Evaluation

B. Tech. I Semester (B. Tech in Artificial Intelligence and Machine Learning)

(for batches admitted in academic session 2021-22 onwards)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Contact Hours per week			Total Credits	Mode of Teaching (Offline/Online)	Mode of Exam.		
				Theory Slot			Practical Slot			Total Marks	L	T				P	
				End Term Evaluation	Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem. Exam	Proficiency in subject /course	Mid Sem. Exam.	Quiz/ Assignment	End Sem. Exam	Lab Work & Sessional	Skill Based Mini Project							
1.	280101	DC	Introduction to Artificial Intelligence & Machine Learning	50	10	20	20	-	-	-	100	4	-	-	4	Blended (LPO)	MCO
2.	280102	DC	Introduction to Computer Programming	50	10	20	20	60	20	20	200	2	1	2	4	Blended (LPO)	AO
3.	100022	ESC	Basic Electrical & Electronics Engineering	50	10	20	20	60	20	20	200	2	1	2	4	Blended (LPO)	MCO
4.	280100	BSC	Linear Algebra	50	16	20	20	-	-	-	100	3	1	-	4	Online	PP
5.	100015	HSMC	Energy, Environment, Ecology & Society	50	10	20	20	-	-	-	100	3	-	-	4	Online	MCO
Total				250	50	100	100	120	40	40	700	14	14	14	40		

... of three weeks (MC), Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Electives by ...

Familiarization to Dept/Branch & Innovations

... includes the wide range of ... skill/competence/knowledge level/...

... AD ... Govt ... Submiss

Mode of Delivery		Blended		PP	
Online	Offline	Online	Offline	Online	PP
61	03	07	03	04	03
11.54%	11.74%	11.74%	11.74%	21.05%	15.79%

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Department of Information Technology

Scheme of Evaluation

B. Tech. II Semester (Artificial Intelligence (AI) and Data Science)

(This table is submitted in an annexure to the syllabus)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Offline/ Online)	Mode of Exam
				Theory Slot				Practical Slot				L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation								
				End Sem. Exam	*Proficiency in subject /course	Mid Sem. Exam.	Quiz/Assignment		Lab Work & Seasonal	Skill Based Mini Project							
1.	270201	DC	Digital Logic Design	50	10	20	20	-	-	-	100	2	1	-		PP	
2.	250106	BSC	Probability and Random Process	50	10	20	20	-	-	-	100	3	1	-			
3.	270202	DC	Data Structures	50	10	20	20	60	20	20	200	3	-	2			
4.	270203	DC	Object Oriented Programming and Methodology	50	10	20	20	60	20	20	200	3	-	2			
5.	100016	HSMC	Technical Language	50	10	20	20	-	-	-	100	3	-	-			
6.	100017	HSMC	Language Lab	-	-	-	-	60	20	20	100	-	-	2			
Total				250	50	100	100	180	60	60	800	14	4	2			

Induction programme of three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Exposure to Industry, People, Values, Familiarization to Dept./Branch & Innovations.

*Proficiency in course/subject - includes the weightage towards ability/skill/ competency /knowledge level /expertise attained etc. in that particular course/subject.

MCQ: Multiple Choice Question AO: Assignment + Oral OB: Open Book PP: Pen Paper SQ: Submission + Oral

Mode of Teaching				Mode of Examination			
Offline	Online	Hybrid	Other	Offline	Online	Hybrid	Other

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**Department of Information Technology
Scheme of Evaluation**

B. Tech. IV Semester (Artificial Intelligence (AI) and Machine Learning)

(for batch admitted in academic session 2021-22)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching	Mode of Exam.
				Theory Slot				Practical Slot				L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation								
				End Sem. Exam.	Proficiency in subject /course	Mid Sem. Exam.	Quiz/ Assignment		Lab Work & Sessional	Skill Based Mini Project							
1.	280401	DC	Computer Architecture and Microprocessor	50	10	20	20	60	20	20	200	2	1	2	4	Blended	PP
2.	280402	DC	Cloud Computing	50	10	20	20	-	-	-	100	3	-	-	3	Blended	PP
3.	280403	DC	Software Engineering	50	10	20	20	60	20	20	200	3	-	2	4	Blended	MCQ
4.	280404	DC	Machine Learning and Optimization	50	10	20	20	60	20	20	200	3	-	2	4	Blended	PP
5.	280405	DC	Network & Web Security	50	10	20	20	-	-	-	100	3	-	-	3	Blended	PP
6.	280406	DLC	Design and Thinking Lab	-	-	-	-	60	20	20	100	-	-	2	1	Offline	SO
7.	200XXX	CLC	Novel Engaging Course (Informal Learning)	-	-	-	-	50	-	-	50	-	-	2	1	Interactive	SO
Total				250	50	100	100	290	80	80	950	14	01	10			
8.	1000001	MAC	Indian Constitution and Traditional Knowledge	50	10	20	20	-	-	-	100	2	-	-	GRADE	Online	MCQ

Summer Internship Project-II (Soft skills Based) for two weeks duration: Evaluation in V Semester

^s proficiency in course/subject-includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject.

MCQ: Multiple Choice Question AO: Assignment + Oral PP: Pen Paper SO: Submission + Oral

Mode of Teaching					Mode of Examination					Total Credits
Theory			Lab	NEC	Theory			Lab	NEC	
Offline	Online	Blended	Offline	Interactive	PP	A+O	MCQ	SO	SO	
-	-	15	04	01	12	-	03	04	01	20
-	-	75%	20%	5%	60%	-	15%	20%	5%	Credits %

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*Syllabi
of
Departmental Core (DC) Courses
B.Tech IV Semester
(Information Technology/Internet of Things
(IoT)/ Information Technology (Artificial
Intelligence and Robotics)/ Artificial
Intelligence and Data Science/ Artificial
Intelligence and Machine Learning)
(Batch Admitted in 2021-22)
Under Flexible Curriculum*

DEPARTMENT OF INFORMATION TECHNOLOGY
COMPUTER GRAPHICS & MULTIMEDIA
160411

L	T	P	Total Credits
2	1	2	4

COURSE OBJECTIVES

- To become familiar with computer graphics techniques and display devices.
- To enhance the proficiency in image representations, 2D and 3D graphics transformations.
- To develop awareness with various illumination, color models and multimedia system.

Unit-I

Introduction to Computer Graphics: Interactive Computer Graphics, Application of Computer Graphics, Random and Raster Scan Displays, Storage Tube Graphics Display, Calligraphic Refresh Graphics Display, Flat Panel Display, Refreshing, Flickering, Interlacing, Resolution, Bit Depth, Aspect Ratio etc.

Unit-II

Scan Conversion Technique: Image representation, Line drawing: DDA, Bresenham's Algorithm. Circle Drawing: Mid-Point, DDA, Bresenham's Circle Generation Algorithm, Ellipse Generation Algorithm, Curves: Parametric Function, Bezier Method, B-Spline Method.

Unit-III

2D & 3D Transformations: Translation, Rotation, Scaling, Reflection, Shearing, Inverse Transformation, Composite Transformation, World Coordinate System, Viewing Transformation, Representation of 3D object on Screen, Parallel and Perspective Projections.

Unit-IV

Clipping: Point clipping, Line Clipping, Simple Visibility Line Clipping Algorithm, Polygon Clipping, Hidden Surface Elimination: Z- Buffer algorithm and Painter's Algorithm, Area Filling. **Basic Illumination Models:** Diffuse Reflection, Specular Reflection, Phong Shading, Gouraud Shading, Color Models: RGB, YIQ, CMY, HSV.

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DEPARTMENT OF INFORMATION TECHNOLOGY

Unit-V

Multimedia System: An Introduction, Multimedia hardware and software, Multimedia System Architecture, Multimedia Applications and evolving technologies, Multimedia Authoring. Data & File Format standards, Sampling, Compression standards, Compression through spatial and temporal redundancy.

RECOMMENDED BOOKS

- Donald Hearn and M.P. Becker : Computer Graphics, PHI Publication
 - FoleyVandam, Feiner, Hughes : Computer Graphics principle and Practice
 - Rogers : Principles of Computers Graphics, TMH
 - Sinha and Udai : Computer Graphics, TMH
 - Prabhat K. Andleigh, Kiran Thakrar : Multimedia Systems Design, Prentice Hall PTR
-

COURSE OUTCOMES

After completion of the course students will be able to:

- CO1. explore various display devices and applications of computer graphics.
 - CO2. illustrate various scan conversion techniques like line, circle, curve and shape drawing algorithms.
 - CO3. apply 2-dimensional, 3-dimensional transformations and projections on images.
 - CO4. classify methods of image clipping and various algorithms for line and polygon clipping.
 - CO5. apply appropriate filling algorithms, hidden surface elimination algorithm on images.
 - CO6. summarize various color models, shading methods and multimedia system.
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DEPARTMENT OF INFORMATION TECHNOLOGY

COMPUTER ARCHITECTURE AND MICROPROCESSOR
230401/240401/270401/280401

L	T	P	Total Credits
2	1	2	4

COURSE OBJECTIVE

- To provide the fundamental knowledge of a computer system and its processing units.
- To provide the details of input & output operations, memory management and performance measurement of the computer system.
- To understand how computer represents and manipulate data.
- To understand different processors and basic architecture of 8/16 bit microprocessors.

Unit -I

Introduction: CPU structure and functions, processor organization, ALU, data paths, internal registers, status flags; System bus structure: Data, address and control buses. Processor control, micro-operations, instruction fetch, hardwired control, micro programmed control, microinstruction sequencing and execution.

Unit- II

Instruction set principles, machine instructions, types of operations and operands, encoding an instruction set, assembly language programming, addressing modes and formats.

Unit -III

Input-Output Organization: I/O organization; I/O techniques: interrupts, polling, DMA; Synchronous vs. asynchronous I/O.

Memory Organization: Memory system, internal and external memory, memory hierarchy, cache memory and its working, virtual memory concept.

Unit -IV

Microprocessors: 8085 microprocessor architecture; Instruction set. instruction types and formats; Instruction execution, instruction cycles, different types of machine cycles and timing diagram.

16-bit microprocessors, 8086 architecture, registers, memory segmentation and addressing.

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DEPARTMENT OF INFORMATION TECHNOLOGY

Unit-V

Basic peripherals and interfacing: 8255, interfacing with LED's, ADC, DAC, stepper motors and I/O & Memory Interfacing, 8254, 8259, 8251.

RECOMMENDED BOOKS

- Computer System Architecture, Morris Mano, PHI.
- Microprocessor Architecture, Programming and Applications with the 8085, Gaonkar, Penram International Publishing (India) Pvt.Ltd.
- Computer Organization, Carl Hamacher, THM.
- Computer Architecture and Organization, J P Hayes, Mc-Graw Hills, New Delhi.
- The Intel. Microprocessors, Architecture, Programming and Interfacing, B.B. Brey (PHI)
- Microprocessor 8086: Architecture, Programming, and Interfacing, Sunil Mathur(PHI)
- Advanced Microprocessor and Interfacing, D.V. Hall (Mc-Graw Hill)
- Advanced Microprocessor and Peripherals – Architecture, Programming and Interfacing, A.K. Ray & K.M. Bhurchandi, Tata McGraw Hill.
- Interfacing techniques in Digital Design with emphasis on Microprocessors, R.L. Krutz (John Wiley)

COURSE OUTCOMES

After completion of the course, students would be able to:

- CO1. demonstrate the computer architecture and microprocessor for defining basic component and functional unit.
 - CO2. develop the fundamental concept to understand the working of computer architecture and microprocessor.
 - CO3. explain the basic concept of input output and memory organization.
 - CO4. develop the skill of writing assembly language programming.
 - CO5. build a system using peripheral devices and controllers for 8086 microprocessors.
 - CO6. apply the concept computer architecture and microprocessor in solving real world problems.
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DEPARTMENT OF INFORMATION TECHNOLOGY

CLOUD COMPUTING
230402/240402/270402/280402

L	T	P	Total Credits
3	-	-	3

COURSE OBJECTIVES

- To understand Cloud Computing concepts, technologies, architecture and applications.
- To understand the underlying principle of cloud virtualization, cloud storage, data management and data visualization.
- To understand different cloud programming platforms and tools to develop and deploy applications on cloud.

Unit-I

Cloud Architecture and Model: Technologies for Network-Based System, System Models for Distributed and Cloud Computing, NIST Cloud Computing Reference Architecture. Cloud Models:- Characteristics, Cloud Services, Cloud models (IaaS, PaaS, SaaS), Public vs Private Cloud, Cloud Solutions Cloud ecosystem, Service management, Computing on demand.

Unit- II

Virtualization: Basics of Virtualization, Types of Virtualization, Implementation Levels of Virtualization, Virtualization Structures, Tools and Mechanisms, Virtualization of CPU, Memory, I/O Devices. Virtual Clusters and Resource management, Virtualization for Data-center Automation.

Unit- III

Cloud Infrastructure: Architectural Design of Compute and Storage Clouds, Layered Cloud Architecture Development, Design Challenges. Inter Cloud Resource Management, Resource Provisioning and Platform Deployment, Global Exchange of Cloud Resources.

Unit -IV

Programming Model: Parallel and Distributed Programming Paradigms- MapReduce, Twister and Iterative MapReduce, Hadoop Library from Apache, Google App Engine (GAE), Amazon Web Service (AWS), Smart Cloud. Public Clouds and Service Offerings. Microsoft Windows Azure.

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DEPARTMENT OF INFORMATION TECHNOLOGY

Unit -V

Security in the Cloud: Security Overview, Cloud Security Challenges and Risks, Software-as-a-Service Security, Security Governance, Risk Management, Security Monitoring, Security Architecture Design, Data Security, Application Security, Virtual Machine Security, Identity Management and Access Control.

RECOMMENDED BOOKS

- Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.
 - John W. Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management, and Security", CRC Press, 2010.
 - Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach", TMH, 2009.
 - Kumar Saurabh, " Cloud Computing — insights into New-Era Infrastructure", Wiley India,2011
 - George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud" O'Reilly
 - James E. Smith, Ravi Nair, "Virtual Machines: Versatile Platforms for Systems and Processes", Elsevier/Morgan Kaufmann, 2005.
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COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. define various basic concepts related to cloud computing.
 - CO2. identify the architecture, infrastructure and delivery models of cloud computing.
 - CO3. apply suitable virtualization concepts.
 - CO4. choose the appropriate programming models and public cloud platforms.
 - CO5. analyse various security issues in cloud computing.
 - CO6. compose virtualization, security and programming modules in cloud computing solutions.
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DEPARTMENT OF INFORMATION TECHNOLOGY

SOFTWARE ENGINEERING
160412/230403/240403/270403/280403

L	T	P	Total Credits
3	-	2	4

COURSE OBJECTIVES

- To understand the nature of software development and software life cycle process models, agile software development, SCRUM and other agile practices.
- To understand project management and risk management associated with various types of projects.
- To know basics of testing and understanding concept of software quality assurance and software configuration management process.

Unit - I

Introduction to Software Engineering: Definition, Software Engineering-Layered Technology, Software Characteristics and Components, **Software Model:** Software Development of Life Cycle Model (SDLC), The Waterfall Model, Iterative Waterfall Model, Prototyping Model, Spiral Model, RAD Model. **Selection Criteria of Model:** Characteristics of Requirements, Status of Development Team, Users Participation, Type of Project and Associated Risk.

Unit - II

Requirement Engineering: Definition, Requirement Engineering Activity, **Types of Requirement-** Functional and Non-functional Requirements, User and System Requirements, Requirement Elicitation Methods, Requirement Analysis Methods, Requirement Documentation (SRS). Requirement Validation, Requirement Management.

Unit - III

Design Concept, Principle and Methods: Design Fundamentals, Design Principles, Effective Modular Design, Design Representations, Architectural Design, Procedural Design, Data Directed design, Real Time Design. Object Oriented Design, Coupling and Cohesion.

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DEPARTMENT OF INFORMATION TECHNOLOGY

Unit - IV

Software Metrics, Project Management and Estimation: Metrics in Process and Project Domains, Software Measurement, Software Quality Metrics, **Project Management-** Basics-People, Product, Process, Project, **Estimation-** Software Project Estimation, Decomposition Techniques- Function Point Estimation, Line of Code (LOC) Based estimation, Empirical Estimation, COCOMO Model, Project Scheduling Techniques.

Unit - V

Software Testing: Definitions, Software Testing Life Cycle (STLC), , Test Case Design, Strategic Approach to Software Testing- Verification & Validation , Strategic Issues, Criteria for Completion of Testing, Unit Testing, Integration Testing, Validation Testing, System Testing, Black Box Testing Techniques, White Box Testing Techniques, Acceptance Testing.

RECOMMENDED BOOKS

- Software Engineering, Sommerville, Pearson.
- Software Engineering: A Practitioner's Approach, Roger S. Pressman, McGraw Hill.
- Software Engineering, K.K. Agrawal & Yogesh Singh, New Age Publication.
- Software Engineering, Rajib Mall, PHI.

COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. explain the various fundamental concepts of software engineering.
 - CO2. develop the concepts related to software design & analysis.
 - CO3. compare the techniques for software project management & estimation.
 - CO4. choose the appropriate model for real life software project.
 - CO5. design the software using modern tools and technologies.
 - CO6. test the software through different approaches.
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DEPARTMENT OF INFORMATION TECHNOLOGY

COMPUTER NETWORKS
160413

L	T	P	Total Credits
2	1	-	3

COURSE OBJECTIVES

- Familiarize the student with the basic taxonomy and terminology of the computer networking.
- Provide detail knowledge about various layers, protocols and devices that facilitate networking.
- Enable Students to deal with various networking problems such as flow control, error control and congestion control.

Unit-I

Introduction: Computer Network, Types- LAN, MAN & WAN, Data Transmission Modes- Serial & Parallel, Simplex, Half Duplex & Full Duplex, Synchronous & Asynchronous Transmission, Transmission Medium- Guided & Unguided, Cables- Twisted Pair, Coaxial Cable & Optical Fiber, Networking Devices-Repeaters, Hub, Switch, Bridge, Router, Gateway and Modem, Performance Criteria- Bandwidth, Throughput, Propagation Time & Transmission Time, Network Standardization- OSI Reference Model & TCP/IP Reference Mode, X.25.

Unit-II

Physical Layer: Network Topologies- Bus, Ring, Star & Mesh, Line Coding- Unipolar, Polar and Bipolar, Switching- Circuit Switching, Message Switching & Packet Switching, Multiplexing: FDM – Frequency Division Multiplexing, WDM – Wavelength Division Multiplexing & TDM – Time Division Multiplexing.

Unit-III

Data Link Layer: Introduction. Design Issues, Services, Framing, Error Control. Flow Control, ARQ Strategies, Error Detection and Correction, Parity Bits, Cyclic Redundant Code (CRC), Hamming Codes. MAC Sub Layer- The Channel Allocation Problem. Pure ALOHA, Slotted ALOHA. CSMA, CSMA/CD, IEEE 802.3, IEEE 802.4 and IEEE 802.5.

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DEPARTMENT OF INFORMATION TECHNOLOGY

Unit-IV

Network Layer & Transport Layer: Introduction, Design Issues, Services, Routing- Distance Vector Routing, Hierarchical Routing & Link State Routing, Shortest Path Algorithm- Dijkstra's Algorithm & Floyd-Warshall's Algorithm, Flooding, Congestion Control- Open Loop & Closed Loop Congestion Control, Leaky Bucket & Token Bucket Algorithm. Connection Oriented & Connectionless Service, IP Addressing.

Unit-V

Presentation, Session & Application Layer: Introduction, Design Issues, Presentation Layer- Translation, Encryption- Substitutions and Transposition Ciphers, Compression- Lossy and Lossless. Session Layer – Dialog Control, Synchronization. Application Layer- Remote Login, File Transfer & Electronic Mail.

RECOMMENDED BOOKS

- Data Communication and Networking, Behrouz A. Forouzan, McGraw Hill.
- Computer Networks, Andrew S. Tanenbaum, Pearson Education India.
- Computer Networks and Internets, Douglas E. Comer, Pearson India.

COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. explain the fundamental concepts of computer network.
 - CO2. illustrate the basic taxonomy & terminologies of computer network.
 - CO3. identify various parameter for affecting the performance of computer network.
 - CO4. analyze the concepts of communication using various layer of OSI model.
 - CO5. evaluate the performance of computer network in congestion and Internet.
 - CO6. design the network environment and applications for implementation of computer networking concept.
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DEPARTMENT OF INFORMATION TECHNOLOGY

IOT ARCHITECTURE & PROTOCOLS

230404

L	T	P	Total Credits
3	-	-	3

COURSE OBJECTIVES

- Familiarize the student with the basic taxonomy and terminology of the IOT Architecture & Protocols.
- Provide detailed knowledge about various layers, protocols and devices that facilitate IoT service.

Unit-I

Introduction: IoT architecture outline, standards - IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, IoT Communication models, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics

Unit-II

IoT Reference Architecture: Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. Real-World Design Constraints- Introduction, Technical Design constraints.

Unit-III

IoT Data Link Layer & Network Layer Protocols: PHY/MAC Layer(3GPP MTC, IEEE 802.11, IEEE 802.15), Wireless HART, ZWave, Bluetooth Low Energy, Zigbee Smart Energy, DASH7 - Network Layer-IPv4,IPv6, 6LoWPAN, 6TiSCH,ND, DHCP, ICMP, RPL, CORPL, CARP.

Unit-IV

IoT Transport & Session Layer Protocols: Transport Layer (TCP, MPTCP, UDP, DCCP, SCTP)-(TLS, DTLS), Session Layer-HTTP, CoAP, XMPP, AMQP, MQTT.

Unit-V

IoT Service Layer Protocols & Security Protocols: Service Layer -oneM2M, ETSI M2M. OMA, BBF – Security in IoT Protocols – MAC802.15.4 , 6LoWPAN, RPL, Application Layer: UPnP, SCADA, Authentication Protocols.

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RECOMMENDED BOOKS

- Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications, Daniel Minoli, ISBN: 978-1-118-47347-4, Willy Publications ,2016
- From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence, Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand,Stamatis Karnouskos, David Boyle, 1st Edition, Academic Press, 2015.
- Architecting the Internet of Things, Bernd Scholz-Reiter, Florian Michahelles, ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer, 2016
- Sensors, Actuators and Their Interfaces, N. Ida, Scitech Publishers, 2014.
- IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things, David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, CISCO Press, 2017
- Internet of Things: Architectures, Protocols and Standards , Simone Cirani , Gianluigi Ferrari , Marco Picone , Luca Veltri, Willy Publications ,2018.

COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. explain the fundamental concepts of IoT Architecture.
 - CO2. illustrate the basic taxonomy & terminologies of IoT communication protocols.
 - CO3. develop a concept for understanding IoT technologies.
 - CO4. build the skill for establishing communication among IoT devices.
 - CO5. analyze various IoT Application layer Protocols in IoT.
 - CO6. design IoT-based systems for real-world problems.
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DEPARTMENT OF INFORMATION TECHNOLOGY

MACHINE LEARNING AND OPTIMIZATION
240404/270404/280404

L	T	P	Total Credits
3	-	2	4

COURSE OBJECTIVES

- Identify and develop operational research models from the verbal description of the real system.
- Analyse the results to resolve resource optimization
- To practice their skills on many well-known real-life problems.

Unit-I

Introduction to ML: Statistical Learning, Supervised vs Unsupervised Learning, Regression vs Classification Problems, Formulation of Design Problems as Mathematical Programming Problems, Linear Regression, Multiple Linear Regression, Logistic Regression, K-Nearest Neighbour Classification.

Unit-II

Tree Based Methods: Decision Tree Learning: Decision Tree Representation, Appropriate Problems for Decision Tree Learning, Random Forest, Issues in Decision Tree Learning. Naïve Bayes Classifier, Support Vector Machines.

Unit-III

Introduction to Optimization Algorithms: Optimization Algorithms, Engineering Applications of Optimization Algorithms. Objective Function, Optimization Algorithms for Differentiable and Non-Differentiable Objective Functions: Stationary and Critical Point, Functions of Single and Two Variables; Global Optimum, Single Variable Optimization, Two Variable Optimizations. First Order Algorithms, Local Descent Algorithms, Bracketing Algorithms. Stochastic Algorithms, Population Based Algorithms: Introduction, Genetic Algorithms.

Unit-IV

Artificial Neural Network: Neural Network Representation, Neural Networks as a Paradigm for Parallel Processing, Linear Discrimination, Pairwise Separation, Gradient Descent, Perceptron, Training A Perceptron. Multilayer Perceptron, Back Propagation Algorithm, Dynamically Modifying Network Structure.

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Unit-V

Unsupervised Learning: Clustering, Common Distance Measures, Hierarchical Algorithms – Agglomerative and Divisive, Partitioning Algorithms – K-Means and Derivatives; Design and Analysis of Machine Learning Experiments: Guidelines for Machine Learning Experiments, Factors, Response, and Strategy of Experimentation, Ensemble Methods, Bagging and Boosting, Cross-Validation and Resampling Methods, Measuring Classifier Performance, Assessing a Classification Algorithm's Performance (ROC Curve), Comparing Two Classification Algorithms, Comparing Multiple Algorithms: Analysis of Variance, Comparison over Multiple Datasets.

RECOMMENDED BOOKS

- Algorithms for optimization, Mykel and Tim, The MIT Press
- Principles of Soft Computing, S.N. Deepa, Fundamentals of Computer Algorithms, Wiley.
- Optimization for Engineering Design: Algorithms and Examples (2nd ed.), Kalyanmoy Deb, Prentice Hall India Learning Private Limited, 2012.
- Introduction to Statistical Learning, Gareth James et al, Springer texts in statistics, 2015.
- Machine Learning (1st ed.), T. M. Mitchell, McGraw Hill, 2017. ISBN 978-1259096952.

COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. demonstrate a familiarity with major optimization algorithms.
 - CO2. apply important optimization algorithmic and analyze the results.
 - CO3. finding out the local and global optimum.
 - CO4. formulation of design problems as mathematical programming problems.
 - CO5. design supervised and unsupervised learning approaches for real-life problems.
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DEPARTMENT OF INFORMATION TECHNOLOGY

CYBER SECURITY

100004

L	T	P	Total Credits
2	-	-	2

COURSE OBJECTIVES

- To provide an understanding of cyber security fundamentals.
- To analyse various cyber-attacks and their countermeasures.
- To provide basics of Internet and networking.
- To identify various cyber security threats and vulnerabilities.
- To apply forensic science to investigate a cybercrime.

Unit-I

Introduction- Overview of Cyber Security, Cyber Crime, Cyber Warfare, Cyber Terrorism, Cyber Espionage, Cyber Vandalism (Hacking), Cyber Stalking, Internet Frauds and Software Piracy.

Unit-II

Basics of Internet & Networking- Wired and Wireless Networks, Internetworking Devices, Topologies, Web Browser, Web Server, OSI Model, IP Addressing, Firewall, E-Commerce, DNS, NAT, VPN, HTTP & HTTPS.

Unit-III

Cryptography and Network Security- Security Principles, Attacks, Cryptography, Steganography, Cryptanalysis, Symmetric Key and Public Key Cryptography, Digital Signature, Intrusion Detection System, Secure Socket Layer(SSL) & Secure Electronic Transaction(SET).

Unit-IV

Cyber Security Threats and Vulnerabilities- Hacker, Types of Hacker- White, Gray and Black, **Malicious Software's:** Virus, Worm, Trojan Horse, Backdoors and Spywares, Sniffers, Denial of Service Attack and Phishing.

Unit-V

Cyber Crime Investigation and Legal Issues: Intellectual Property, Privacy Issues, IT Act 2000, Basics of Cyber Crime Investigation- Cyber Forensics, Electronic Evidences and its Types.

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DEPARTMENT OF INFORMATION TECHNOLOGY

RECOMMENDED BOOKS:

- Cryptography and Network Security, 4/E, William Stallings, 4th edition, Pearson publication
- Computer Security: Principles and Practice, Stallings William, Pearson publication
- Investigating Network Intrusions and Cybercrime, EC-Council Press
- Network Forensics, Tracking Hackers through Cyberspace, Sherri Davidoff, Jonathan Ham, Prentice Hall.
- Cryptography and Network Security, 3e, Atul Kahate, McGraw Hill publication.

COURSE OUTCOMES:

After completion of the course students would be able to:

- CO1. tell the basic terminologies of cyber security.
 - CO2. explain the basic concept of networking and internet.
 - CO3. apply various methods used to protect data in the internet environment in real world situations.
 - CO4. discover the concept of IP security and architecture.
 - CO5. compare various types of cyber security threats/vulnerabilities.
 - CO6. develop the understanding of cybercrime investigation and IT ACT 2000.
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DEPARTMENT OF INFORMATION TECHNOLOGY

NETWORK & WEB SECURITY
230405/240405/270405/280405

L	T	P	Total Credits
3	-	-	3

COURSE OBJECTIVES

- To provide conceptual understanding of network security principles, issues, challenges and mechanisms.
- To understand how to apply encryption techniques to secure data in transit across data networks.
- To explore the requirements of real-time communication security and issues related to the security of web services.

Unit-I

Security: Principles and Attacks, Basic Number Theory: Prime Number, Congruence's, Modular Exponentiation, Fundamentals of Cryptography, Steganography, Cryptanalysis, Code Breaking, Block Ciphers and Steam Ciphers, Substitution Ciphers, Transposition Ciphers, Caesar Cipher, Play-Fair Cipher, Hill Cipher, Cipher Modes of Operation.

Unit-II

Cryptography: Symmetric Key Cryptography, Public Key Cryptography, Principles of Public Key Cryptosystem, Classical Cryptographic Algorithms: DES, RC4, Blowfish, RSA, Distribution of Public Keys and Key Management, Diffie-Hellman Key Exchange.

Unit-III

Hash Functions: Hash Functions. One Way Hash Function, SHA (Secure Hash Algorithm), **Authentication:** Requirements, Functions, Kerberos. Message Authentication Codes, Message Digest: MD5, SSH (Secure Shell), Digital Signatures. Digital Certificates.

Unit-IV

IP & Web Security Overview: SSL (Secure Socket Layer), TLS (Transport Layer Security), SET (Secure Electronic Transaction). IDS (Intrusion detection system):



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Statistical Anomaly Detection and Rule-Based Intrusion Detection, Penetration Testing, Risk Management. Firewalls: Types, Functionality and Policies.

Unit -V

Phishing: Attacks and its Types, Buffer Overflow Attack, Cross Site Scripting, SQL Injection Attacks, Session Hijacking. Denial of Service Attacks: Smurf Attack, SYN Flooding, Distributed Denial of Service. Hacker: Hacking and Types of Hackers, Foot Printing, Scanning: Types: Port, Network, Vulnerability), Sniffing in Shared and Switched Networks, Sniffing Detection & Prevention, Spoofing.

RECOMMENDED BOOKS

- Cryptography and Network Security, William Stallings, Pearson Education.
- Cryptography and Network Security, Atul Kahate, McGraw Hill Education.
- Incident Response and Computer Forensics, Kevin Mandia, Chris Prorise, Tata McGraw Hill.

COURSE OUTCOMES

After completion of the course students would be able to:

- CO1. explain cryptographic algorithms, hash algorithms and authentication mechanisms.
 - CO2. illustrate fundamentals of number theory, attacks and security principles.
 - CO3. apply number theory and various algorithms to achieve principles of security.
 - CO4. analyze the cause for various existing network attacks and describe the working of available security controls.
 - CO5. examine the vulnerabilities in IT infrastructure.
 - CO6. predict the attacks and controls associated with IP. transport-level, web and e-mail security.
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DEPARTMENT OF INFORMATION TECHNOLOGY

PYTHON PROGRAMMING LAB

160414/230406

L	T	P	Total Credits
-	1	2	2

COURSE OBJECTIVES

- Implement an algorithm in Python by using standard programming constructs such as, functions, modules, aggregated data (arrays, lists, etc.)
- Explain the output of a given Python program and identify and correct errors in a given Python program
- Write programs using the features of object-oriented programming language such as, encapsulation, polymorphism, inheritance, etc.

Unit-I

Introduction to Python programming language Data and Expressions: Literals; Variables and Identifiers; Operators; Expressions and Data Types, Logical operator; Boolean operator; Boolean Expressions; Control Structures; Selection Control, Iterative Control. Lists & tuples: List Structures; Lists in Python, Iterating over Lists in Python.

Unit-II

Functions: Arguments in functions; Program routes; Calling Value Returning Functions; Calling Non- value Returning Functions Parameter Passing; Variable Scope; Modular design Modules; Top-Down Design Python Modules; File Handling Operation in file: Reading, Writing and appending in Text Files.

Unit-III

String Processing; Dictionaries and sets operations; Exception Handling: Exceptions Data Collections applying lists etc.

Unit-IV

Introduction to Object Oriented Programming, Class, Objects, Encapsulation, Data abstraction, Inheritance, Polymorphism.

Unit-V

Graphics Programming: Graphics Programming, Using Graphical Objects. Interactive Graphics, Displaying Images. Generating Colors, Graphics Objects. Entry Objects, Test Case: Numpy, scipy; Test Case: panda, Matplotlib.

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DEPARTMENT OF INFORMATION TECHNOLOGY

DESIGN AND THINKING LAB
240406/270406/280406

L	T	P	Total Credits
-	-	2	1

PREREQUISITES

C, C++, Basic electronics.

COURSE OBJECTIVE:

The students will:

- Learn how to frame the design challenge properly
- Learn how to prototype circuits with a breadboard
- Learn the Arduino programming language and IDE
- Prototype circuits and connect them to the Arduino
- Program the Arduino microcontroller to make the circuits work
- Explore the provided example code and online resources for extending knowledge about the capabilities of the Arduino microcontroller
- Learn how to design successful products or enterprises

Unit-I

Introduction: Introduction to microcontroller, embedded system, Microprocessor vs Microcontroller, Common features of Microcontroller, Comparison between different types of microcontrollers.

Unit-II

Arduino: introduction, Pin Configuration and Architecture, Device and Platform Features, Concept of Digital and Analog ports. Arduino Interfacing Board, Introduction to Embedded C and Arduino Platform.

Unit-III

Basic Concepts and Functions: Arduino data types, Variables and constants, Operators. Control Statements, Arrays, Functions. Pins Configured as INPUT, Pull-up Resistors. Pins Configured as OUTPUT, pinMode() Function, digitalWrite() Function, analogRead() function, Arduino Interrupts.

Unit-IV

Arduino Time and Displays: Incorporating Arduino time, delay() function, delayMicroseconds() function, millis() function, micros() function. Working with Serial Monitor, Line graph via serial monitor. interfacing 8 bit LCD to Arduino, Fixed one

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line static message display, Running message display using the LCD Library of Arduino.

Unit-V

Arduino Sensors and Secondary Integrations: Humidity Sensor, Temperature Sensor, Water Detector/ Sensor, PIR Sensor, Ultrasonic Sensor, Connecting Switch (Relay switches). Types of Relay, Controlling Electrical appliances with electromagnetic relays.

RECOMMENDED BOOKS:

- Arduino for Dummies, by John Nussey (2013)
- Design Thinking for Strategic Innovation: What They Can't Teach You at Business or Design School - IdrisMootee

References:

1. Arduino Projects for Dummies, by Brock Craft (2013)
2. Programming Arduino – Getting Started with Sketches, Simon Monk (2016)
3. Programming Arduino - Next Steps, by Simon Monk (2016)

COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. define the basic concept of embedded system.
 - CO2. describe the basic principles of Arduino programming and IDE.
 - CO3. design, implement, debug and test programs/ system.
 - CO4. design and develop smart systems applications.
 - CO5. identify an opportunity from a Problem
 - CO6. build Arduino board using different sensors.
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***Experiments List / Lab manuals
of***

Laboratory Courses

B. Tech IV Semester

(Batch Admitted in 2021-22)

(Information Technology/Internet of Things

(IoT)/ Information Technology (Artificial

Intelligence and Robotics)/ Artificial

Intelligence and Data Science/ Artificial

Intelligence and Machine Learning)

Under Flexible Curriculum

[ITEM IT - 10]

DEPARTMENT OF INFORMATION TECHNOLOGY

COMPUTER ARCHITECTURE AND MICROPROCESSOR
230401/240401/270401/280401

LIST OF EXPERIMENT

1. Write an assembly language program to perform the subtraction of two 8-bit numbers using the 8085/8086 instruction set.
2. Write an assembly language program to move data blocks starting at location 'X' to location 'Y' without overlap using the 8085/8086 instruction set.
3. Write an assembly language program to move data blocks starting at location 'X' to location 'Y' with overlap using 8085/8086 instruction set.
4. Write an assembly language program to arrange a set of 8-bit numbers starting at location in ASCENDING/DESCENDING order. Display the stored vector in the address data field using the 8085/8086 instruction set.
5. Write an assembly language program to perform the multiplication of two 8-bit numbers using the 8085/8086 instruction set.
6. Write an assembly language program to perform the division of two 8-bit numbers using the 8085/8086 instruction set.
7. Write an assembly language program to find the larger number in an array of data using the 8085/8086 instruction set.
8. Write an assembly language program to convert two BCD numbers in memory of the equivalent HEX number using the 8085/8086 instruction set.
9. Write an assembly language program to convert a given hexadecimal number into its equivalent BCD number using the 8085/8086 instruction set.
10. Write an assembly language program to convert a given hexadecimal number into its equivalent ASCII number using the 8085/8086 instruction set.
11. Write an assembly language program to convert a given ASCII character into its equivalent hexadecimal number using the 8085/8086 instruction set.

COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. explain types of instructions and addressing modes.
- CO2. make use of Hex code needed in assembly language
- CO3. experiment with various peripheral devices to interface with microprocessors.
- CO4. simplify the arithmetic, Logical, etc. problems using the instruction set of 8086/8085 microprocessors.

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DEPARTMENT OF INFORMATION TECHNOLOGY

CO5. determine the process required in interfacing with 8086/8085.

CO6. develop the assembly language programs in 8086/8085 to solve a real world problem.

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DEPARTMENT OF INFORMATION TECHNOLOGY
COMPUTER GRAPHICS & MULTIMEDIA
160411

LIST OF PROGRAMS

1. WAP to implement line generation using DDA algorithm.
2. WAP to implement line generation using Bresenham's line generation algorithm.
3. WAP to generate a circle using mid-point algorithm.
4. WAP to implement Bresenham's circle generation algorithm.
5. WAP to perform translation, rotation, scaling on 2D transformation.
6. WAP to perform scaling and shearing on 2D transformation.
7. WAP to implement translation of a line and triangle.
8. WAP to implement rotation of a line and triangle.
9. WAP to implement scaling transformation.
10. WAP to fill polygon using seed filling algorithm.
11. WAP to implement 3D rotation about an arbitrary axis.
12. WAP to implement Cohen Sutherland line clipping.

COURSE OUTCOMES

After completion of the course students will be able to:

- CO1. understand the basic concepts of computer graphics.
 - CO2. demonstrate scan conversion problems using programming language.
 - CO3. implement the concepts of geometric transformation of 2D and 3D objects.
 - CO4. apply clipping and filling techniques for modifying an object.
 - CO5. understand the practical implementation of modelling and rendering.
 - CO6. demonstrate the concept of viewing of 2D objects.
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DEPARTMENT OF INFORMATION TECHNOLOGY

SOFTWARE ENGINEERING LAB
160412/230403/240403/270403/280403

LIST OF EXPERIMENTS

Experiment 1: Identify the requirements from problem statements

Requirements, Characteristics of Requirements, Categorization of Requirements, Functional Requirements, Identifying Functional Requirements

Experiment 2: Estimation of project metrics using estimation techniques like COCOMO model

Project Estimation Techniques, COCOMO, Basic COCOMO Model, Intermediate COCOMO Model, Complete COCOMO Model, Advantages of COCOMO, Drawbacks of COCOMO, Haistcad's Complexity Metrics

Experiment 3: Modeling UML Use Case diagrams and capturing Use Case Scenarios

Use case diagrams, Actor, Use Case, Subject, Graphical Representation, Association between Actors and Use Cases, Use Case Relationships, Include Relationship, Extend Relationship, Generalization Relationship, Identifying Actors, Identifying Use cases, Guidelines for drawing Use Case diagrams

Experiment 4: E-R modeling from the problem statements

Entity Relationship Model, Entity Set and Relationship Set, Attributes of Entity, Keys, Weak Entity, Entity Generalization and Specialization, Mapping Cardinalities, ER Diagram, Graphical Notations for ER Diagram, Importance of ER modeling

Experiment 5: Modeling UML Class diagrams and Sequence diagrams

Structural and Behavioral aspects, Class diagram, Elements in class diagram, Class, Relationships, Sequence diagram, Elements in sequence diagram, Object, Life-line bar, Messages

Experiment 6: Modeling Data Flow diagrams

Data Flow Diagram, Graphical notations for Data Flow Diagram, Explanation of Symbols used in DFD, Context diagram and leveling DFD

Experiment 7: Create flow chart for an algorithm using Raptor

Assignment, Call, Input, Output, Selection and Loop symbols.

Experiment 8: Estimation of Test coverage metrics and structural complexity

Control Flow Graph, Terminologies, McCabe's Cyclomatic Complexity, Computing Cyclomatic Complexity, Optimum Value of Cyclomatic Complexity, Merits, Demerits.

Experiment 9: Designing Test Suites

Software Testing, Standards for Software Test Documentation, Testing Frameworks, Need for Software Testing, Test Cases and Test Suite, Types of Software Testing, Unit Testing, Integration Testing, System Testing, Example, Some Remarks.

RECOMMENDED TOOLS

- Selenium
- Star UML

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DEPARTMENT OF INFORMATION TECHNOLOGY

- UMLet
- Raptor

REFERENCE

- Virtual Labs (<http://vlabs.iitkgp.ernet.in/se/>)

COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. demonstrate the basic concept of UML.
 - CO2. discuss the software development process using different tools.
 - CO3. display the various ways for solving different common modelling problems using UML.
 - CO4. use the knowledge of Software engineering and project management.
 - CO5. identify the vocabulary, rules and idioms of the UML and learn how to model it effectively.
 - CO6. design the software systems using software engineering concepts.
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DEPARTMENT OF INFORMATION TECHNOLOGY

MACHINE LEARNING AND OPTIMIZATION

240404/270404/280404

LIST OF PROGRAMS

1. Implementation of linear regression using any of the tools or language like XLminer, matlab, R or python over the wine quality dataset available on UCI repository.
 2. Implement Logistic regression model.
 3. Implement the decision tree algorithms like ID3 etc. over any dataset from Kaggle or UCI repository.
 4. Implement random forest over the physionet challenge 2012 dataset for mortality prediction.
 5. Implement K-nearest neighbours' algorithm over the dataset from Kaggle or any other repository.
 6. Implement the K-means partitioning clustering algorithm.
 7. Implement the simple AND, OR and EX-OR gate using neural networks.
 8. Implement the classification over any dataset using ANN.
 9. Use a bagging, boosting approach to improve the performance of your algorithm over any dataset from a trusted repository.
 10. Use the libraries in python for assessing and visualizing the performance of classification algorithms.
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DEPARTMENT OF INFORMATION TECHNOLOGY

PYTHON PROGRAMMING LAB

160414/230406

LIST OF PROGRAMS

1. Write a program to demonstrate different number data types in python.
2. Write a program to perform different arithmetic operations on numbers in python.
3. Write a program to create, concatenate and print a string and accessing substring from a given string.
4. Write a python program to create, append and remove lists in python.
5. Write a program to demonstrate working with tuples in python.
6. Write a program to demonstrate working with dictionaries in python.
7. Write a python program to find the factorial of a number using recursion.
8. WAP to swap two integers without using a third variable. The swapping must be done in a different method in a different class.
9. WAP to find the greater of two given numbers in two different classes using friend function.
10. Write a python program to define a module and import a specific function in that module to another program.

COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. write, test, and debug simple Python programs.
 - CO2. solve computational problem using python language.
 - CO3. familiar with basics syntax and features of python programming language.
 - CO4. use Python lists, tuples, dictionaries for representing compound data.
 - CO5. design a program utilizing the features of object oriented concept.
 - CO6. utilize some of the libraries available for solving problems.
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DEPARTMENT OF INFORMATION TECHNOLOGY

DESIGN AND THINKING LAB

240406/270406/280406

LIST OF PROGRAMS

1. Introduction to Arduino Board and Arduino IDE (Installation and Setup)
2. Write a Program to Blink LED (Turn an LED on and off).
3. Write a Program to demonstrate the use of analog output to fade an LED.
4. Write a Program to read an analog input and prints the voltage to the serial monitor.
5. Write a Program to count the number of button pushes.
6. Write a Program to Control an LED using Button.
7. Write a program to detect object using IR Obstacle Sensor.
8. Write a program to detect presence of Gas using GAS Sensor.
9. Write a Program to Control Electronic Appliances using RELAY SHIELD Sensor.
10. Write a Program to measure Temperature and Humidity using DHT11 Sensor.
11. Write a program to detect motion using Motion Sensor (PIR sensor).
12. Write a Program to detect presence of smoke using Smoke Sensor.
13. Write a program to interface a range sensor with an arduino board and understand the principle behind an ultrasonic range sensor.
14. Write a program to interface DHT11 and Range sensor using a single board.

COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. define the basic concept of Embedded System.
 - CO2. describe the basic principles of Arduino programming and IDE.
 - CO3. familiarize with different types of sensors and related systems.
 - CO4. design, implement, debug and test programs/ system.
 - CO5. design and develop Smart systems applications.
 - CO6. interface different sensors to embedded boards like arduino.
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Skill Based Mini Projects
of
Laboratory Courses
B. Tech IV Semester
(Batch Admitted in 2021-22)
(Information Technology (IT) /
Internet of Things (IoT) /
Artificial Intelligence & Robotics (AIR)/
Artificial Intelligence and Data Science/
Artificial Intelligence and Machine Learning)
Under Flexible Curriculum
[ITEM IT - 11]

DEPARTMENT OF INFORMATION TECHNOLOGY

COMPUTER ARCHITECTURE AND MICROPROCESSOR
230401/240401/270401/280401

LIST OF SKILL BASED MINI PROJECT

1. Design an interface Temperature Controller using microprocessor 8085/8086.
 2. Design a Traffic light controller using 8085/8086 microprocessor.
 3. Design a Night light saver using 8085/8086 microprocessor.
 4. Design an interfacing with Stepper Motor controller using 8085/8086 microprocessor.
 5. Design an interfacing with DC motor controller using 8085/8086 microprocessor.
 6. Design an Interfacing with keypad using 8085/8086 microprocessor.
 7. Design an interfacing with LED's using 8085/8086 microprocessor.
 8. Design an interfacing with switches using 8085/8086 microprocessor.
 9. Design an interfacing with ADC using 8085/8086 microprocessor.
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DEPARTMENT OF INFORMATION TECHNOLOGY
COMPUTER GRAPHICS & MULTIMEDIA
160411

LIST OF SKILL BASED MINI PROJECT

1. Using C/C++/Python language, draw a Flag using any three colors in the center of the computer screen.
 2. Draw a Pyramid using the star key of the keyboard in C/C++/Python language.
 3. Design a front face of the House with door and window in C/C++/Python language.
 4. Implement a Balloon with multicolor in the center of the computer screen.
 5. The task is to draw a smiley face using graphics in C/C++/Python language.
 6. Implement a project to draw the scenario of Rainfall.
 7. Using C/C++/Python to draw a football ground using computer graphics.
 8. Design a wheel in the center of the screen using C/C++.
 9. Draw a car using computer graphics programming in C/C++.
 10. To draw a traffic light signal using computer graphics in C/C++/Python language.
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DEPARTMENT OF INFORMATION TECHNOLOGY

SOFTWARE ENGINEERING LAB
160412/230403/240403/270403/280403

LIST OF SKILL BASED MINI PROJECT

Note: In every project students must have to

- **Design the SRS of the project.**
- **Draw the various ER diagram, DFD and Use Case diagram of the project.**
- **Design the test case of the project.**

Mini Skill Project 01

Delivery Agent System

There are many online shopping portals such as Flipkart, Amazon, Snapdeal, etc. are active in the Indian market. One major task is to deliver an online books T-shirt to the customers as first as possible in a cost-effective (cheapest) manner. A delivery agent system, which would automatically receive a delivery request from an online portal and identify the couriers, whom the delivery job can be assigned.

Input:

- Shipping details (source and destination) locations
- Couriers' details in different localities.
- Service offering for each courier company.

Functions:

- Booking delivery
- Status of delivery
- Cancellation of booking

Output:

- Booking confirmation, if booking is successful.
- Reporting delivery status
- Cancellation of booking confirmation

Mini Skill Project 02

Payroll Management System (PMS)

The Employee and Payroll Systems objective is to provide a system which manages the employee details, the Payroll activity done in a company depending upon the employees attendance and its calculation which is very huge. The users will consume less amount of time through computerized system rather than working manually. The system will take care of all the payroll activities like managing each employee's attendance, the number of leaves taken by that particular employee and calculation in a very quick manner and it avoids Data storing is easier. Paper work will be reduced and the company staffs spend more time on monitoring the progress. The system is user friendly and easy to use. All the important data's will be stored in the database and it avoids any miscalculation. The "Employee and Payroll System" is based on maintaining each employee records and calculating his/her salary depending on the workdays. The first activity is based on saving the employees details where each employee will be given a unique Employee ID. Now based on the no of days an employee attended per month.

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salary will be calculated by checking the no of workdays of a company and his/her basic salary and a separate salary slip will be provided for reference.

Inputs:

- Employee details (employee no, name, address, designation, department, achievements)
- Accounts details (salary of each employee, deduction, TA, DA, HRA, other allowance, PF)
- Leave information (no of leave taken by each employee)

Output:

- Salary slip
- Detailed salary report
- Deduction details
- Leave information

Mini Skill Project 3

Online Toll Plaza System

Now-a-days, cashless transaction is becoming popular among the users because it is easy to handle, and it does not require to carry cash in hand. Typically, in India, road tolls are collected from cars manually for which the cars need to stop to pay the toll fee. In contrast, the objective is to make the system Online, so that the toll fee is automatically deducted from the user. Therefore, users credit their Online account (consider this as eWallet), and money is automatically deducted when the cars pass the toll system. As a result, the users do not have to wait for manual toll fee payment. Concurrently, administrator can also view all transactions from anywhere. Finally, the administrator can view the total income in a day-to-day basis, and can also analyze the traffic pattern as well.

Inputs:

- User Information (Name, Car Number, Email Address, Password, Money in eWallet)
- Administrator Information (Email Address, Password)

Operations:

- User
 - Log-In
 - Credit in eWallet
 - Check eWallet Balance
 - Log-Out
- System
 - Check the car number
 - Required Fee Available
 - Allow the car to pass
 - Deduct money from eWallet
 - Required Fee NOT Available
 - Do Not Allow the car to pass
 - Fee Payment is done manually
 - Allow the car to pass
 - Total Income is stored in a database
- Administrator
 - Log-In

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DEPARTMENT OF INFORMATION TECHNOLOGY

- View transactions
- View total income

Outputs:

- Display day-wise transactions to administrator
- User can view his/her own transactions

Mini Skill Project 04

Online Examination System

Now-a-days, Online examination system has become popular for competitive examinations because of its unique features such as auto-evaluation, speed and accuracy. Moreover, it also helps environments by reducing the use of paper. In such a system, students are asked to select answers from multiple options given for a single question. Likewise, there are several questions which appear in the students' systems. The questions and multiple options are saved in a database along with desired answers. Typically, a student can edit an answer after saving it, however, editing cannot be done after submitting the answer. Another user is also there – administrator. The administrator can create, modify and delete questions and accordingly, the question is updated in the system.

Inputs:

- Subject Information with Code, so that all subjects can be identified using unique codes.
- User Information
- If Student- Student Information (Name, Roll No, Email Address, Contact Number, Password)
- If Administrator (Email Address, Password)
- Set of Questions with multiple answers for each stored in a database along with desired answers.

Operations:

- Administrator
 - Log-In
 - CREATE, MODIFY or DELETE questions. Accordingly, the question set must be updated.
 - Log-Out
- Student
 - Log-In (Time starts)
 - Answer the questions – SAVE and SUBMIT
 - Log-Out (Automatically logged out after Timeout)

Outputs:

- Display the result in DESCENDING order according to obtained marks with Roll Number.
- The result is also saved into a database for future use.

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DEPARTMENT OF INFORMATION TECHNOLOGY

MACHINE LEARNING AND OPTIMIZATION

240404/270404/280404

LIST OF SKILL BASED MINI PROJECT

1. Design and implement heart disease prediction using different classification algorithm and analyse the best over the dataset.
 2. Design and implementation of Animal Kingdom Classification using CNN with the help of available libraries in python.
 3. Apply the classification algorithms over the time series dataset by transforming the dataset into static values.
 4. With the help of Support vector machine algorithm classify any suitable dataset available over the trusted repository.
 5. Design a program for Number Guessing using random number generator library. Make a play game with the defined library.
 6. Design the game of tic-tac-toe etc.
 7. Optimize the performance of your classification algorithm using the applicable optimization algorithm like swarm based, genetic algorithm.
 8. Compare the performance of different algorithms over physionet challenge 2012 dataset.
 9. Implement an algorithm for Parkinson disease detection and validate its performance with cross-validation approach.
 10. Implement a movie recommendation system using any algorithm over the dataset from trusted repository.
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DEPARTMENT OF INFORMATION TECHNOLOGY

PYTHON PROGRAMMING LAB

160414/230406

LIST OF SKILL BASED MINI PROJECT

1. Implement a calculator using Tkinter library.
 2. Design and implementation of Animal Kingdom Classification.
 3. Design and implementation of a real-time, User friendly Currency Converter.
 4. Design and implementation of a File Manager which supports various types of files.
 5. Design a program for Number Guessing using random number generator library. Make a play game with the defined library.
 6. Design any game of your choice like tic-tac-toe etc.
 7. Implement a contact book (command line project) capable of storing user data like name, address, phone number, email etc. Use any database for storing the information so that updation and deletion can also be carried out.
 8. Implement binary search algorithm by creating a list from random numbers between any predefined ranges.
 9. Design a program for spam filtering.
 10. Design a dice rolling simulator generating random number from 1 to 6 every time dice is rolled.
 11. Implement countdown clock and timer.
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DEPARTMENT OF INFORMATION TECHNOLOGY

DESIGN AND THINKING LAB

240406/270406/280406

LIST OF SKILL BASED MINI PROJECT

1. Design intelligent home locking system using a stepper motor (working as a lock) and nodeMCU (as a wireless transmitter and receiver) interfaced to arduino uno. Control the stepper motor/locking mechanism wirelessly using NodeMCU by giving instructions to the lock accordingly.
 2. Design Intelligent water level management system using through depth sensor the Arduino UNO alerts the user through call by using GSM module, (NodeMCU). The proposed system evacuates the water to a storage tank through a submersible water pump.
 3. Design and development of a RFID based Room Automation using microcontroller. RFID system uses Radiofrequency electromagnetic fields to transfer data from a RFID tag to identify and track the object. This system will apply Radio Frequency technology, which consists of RFID Tags, RF Readers with antennas, Arduino, transmitter- receiver, and added networking properties to identify and track objects.
 4. Design and development of an IoT-based smart home automation system using a microcontroller-based Arduino board and mobile-based Short Message Service (SMS) application working functionality with Wi-Fi connectivity to establish communication between the Arduino module and automated home appliances.
 5. Design and development Intelligent Automatic Irrigation System using an Arduino microcontroller, servo motor to control and sense the thing in the projects such as sense or measure the moisture in the soil we are using soil moisture sensor. The Arduino sends the signals to the relay module and the water pump is turned on for some time and can change the time by modifying the code.
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***Scheme & Syllabi
of
B. Tech I & II Semester
(Batch Admitted in 2022-23)
(Information Technology (IT) / Internet of Things (IoT) /
Artificial Intelligence & Robotics (AIR) / Artificial Intelligence and
Data Science / Artificial Intelligence and Machine Learning)
Under Flexible Curriculum
[ITEM IT – 12]***



Department of Information Technology

Scheme of Evaluation

B. Tech. I Semester (Information Technology)

(for batch admitted in academic session 2022-23)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Exam	Duration of Exam	
				Theory Slot				Practical Slot				L	T	P				
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation									
				End Sem. Exam	Proficiency in subject /course	Mid Sem. Exam.	Quiz/ Assignment		Lab Work & Sessional	Skill Based Mini Project								
1.	2160121	DC	Introduction to Information Technology	50	10	20	20	-	-	-	100	4	-	-	4	Blended	MCQ	1.5 Hrs
2.	2160122	DC	Computer Programming	50	10	20	20	60	20	20	200	2	1	2	4	Blended	AO	2 Hrs
3.	2160123	DC	Digital Logic Design	50	10	20	20	-	-	-	100	2	1	-	3	Blended	PP	2 Hrs
4.	2160124	DC	Discrete Structures	50	10	20	20	-	-	-	100	2	1	-	3	Offline	PP	2 Hrs
5.	2100022	ESC	Basic Electrical & Electronics Engineering	50	10	20	20	60	20	20	200	2	1	2	4	Blended	MCQ	1.5 Hrs
6.	2160125	DLC	IT workshop	-	-	-	-	60	20	20	100	-	-	2	1	Online		
Total				250	50	100	100	180	60	60	800	12	04	06	19	-	-	-
7.	3000001	Natural Sciences & Skills	Engineering Physics	50	10	20	20	30	10	10	150	1	-	2	GRADE	Blended	MCQ	1.5 Hrs

Induction programme of three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations.

^{SP}Proficiency in course/subject – includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in that particular course/subject

Natural Sciences & Skills: Engineering Physics / Engineering Chemistry / Environmental Engineering / Language

Credits of Natural Sciences & Skills will be added in the VI Semester

MCQ: Multiple Choice Question AO: Assignment + Oral PP: Pen Paper SO: Submission + Oral

Theory		Lab		Mode of Examination			Total Credits
Online	Blended	Online	PP	AO	MCQ	Lab	
03	13	03	06	03	07	03	19
15.79%	68.42%	15.79%	31.58%	15.79%	36.84%	15.79%	Credits

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Department of Information Technology

Scheme of Evaluation

B. Tech. II Semester (Information Technology)

(for batch admitted in academic session 2022-23)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Total Marks	Contact Hours per week			Total Credits	Mode of Examination	Duration of Exam		
				Theory Slot				Practical Slot			L	T	P					
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation									
				End Sem. Exam	Proficiency in subject/course	Mid Sem. Exam.	Quiz/Assignment		Lab Work & Sessional								Skill Based Mini Project	
1.	2160221	DC	Data Structures	50	10	20	20	60	20	20	200	3	-	2	4	Blended	PP	2 Hrs
2.	2160222	DC	Python Programming	50	10	20	20	60	20	20	200	2	1	2	4	Blended	AO	2 Hrs
3.	2160223	DC	Database Management System	50	10	20	20	60	20	20	200	2	1	2	4	Blended	PP	2 Hrs
4.	2160224	DC	Computer System Organization	50	10	20	20	-	-	-	100	2	1	-	3	Blended	PP	2 Hrs
5.	2100011	BSC	Engineering Mathematics-I	50	10	20	20	-	-	-	100	3	1	-	4	Blended	PP	2 Hrs
Total				250	50	100	100	180	60	60	800	12	04	06	19	-	-	-
6.	3000002	Natural Sciences & Skills	Engineering Chemistry	50	10	20	20	30	10	10	150	1	-	2	GRADE	Blended	MCQ	1.5 Hrs

Induction programme of three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations. Summer Internship Project - I (Institute Level)

⁵Proficiency in course/subject - includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in that particular course/subject

Natural Sciences & Skills: Engineering Physics / Engineering Chemistry / Environmental Engineering / Language

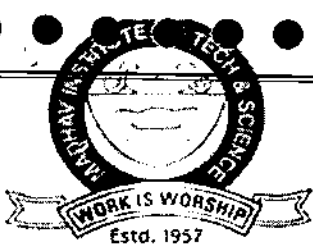
Credits of Natural Sciences & Skills will be added in the VI Semester

MCQ: Multiple Choice Question AO: Assignment + Oral PP: Pen Paper SO: Submission + Oral

Theory				Lab		Theory			Lab		Total Credits
Offline	Online	Blended	Offline	PP	AO	MCQ					
04	-	12	03	13	03	-	03	19			
21.05%	-	63.16%	15.79%	68.42%	15.79%	-	15.79%	Credits %			

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Department of Information Technology
Scheme of Evaluation
B. Tech. I Semester (Internet of Things (IoT))

(for batch admitted in academic session 2022-23)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Evaluation	Duration of Exam	
				Theory Slot				Practical Slot				L	T	P				
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation									
				End Sem. Exam	Proficiency in subject /course	Mid Sem. Exam.	Quiz/ Assignment		Lab Work & Sessional	Skill Based Mini Project								
1.	2230121	DC	Introduction to Internet of Things (IoT)	50	10	20	20	-	-	-	100	4	-	-	4	Blended	MCQ	1.5 Hrs
2.	2230122	DC	Computer Programming	50	10	20	20	60	20	20	200	2	1	2	4	Blended	AO	2 Hrs
3.	2230123	DC	Digital Logic Design	50	10	20	20	-	-	-	100	2	1	-	3	Blended	PP	2 Hrs
4.	2250100	BSC	Linear Algebra	50	10	20	20	-	-	-	100	3	1	-	4	Blended	PP	2 Hrs
5.	2100022	ESC	Basic Electrical & Electronics Engineering	50	10	20	20	60	20	20	200	2	1	2	4	Blended	MCQ	1.5 Hrs
Total				250	50	100	100	120	40	40	700	13	04	04	19	-	-	-
6.	3000001	Natural Sciences & Skills	Engineering Physics	50	10	20	20	30	10	10	150	1	-	2	GRADE	Blended	MCQ	1.5 Hrs

Induction programme of three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations.

***Proficiency in course/subject – includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in that particular course/subject**

Natural Sciences & Skills: Engineering Physics / Engineering Chemistry / Environmental Engineering / Language

Credits of Natural Sciences & Skills will be added in the VI Semester

MCQ: Multiple Choice Question AO: Assignment + Oral PP: Pen Paper SO: Submission + Oral

Theory		Lab		Mode of Examination			Total Credits
Online	Blended	Online	PP	AO	MCQ	Lab	
04	-	13	02	07	03	07	19
21.05%	-	68.42%	10.53%	36.84%	15.79%	36.84%	Credits %

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Department of Information Technology
Scheme of Evaluation
B. Tech. II Semester (Internet of Things (IoT))
(for batch admitted in academic session 2022-23)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Examination	Duration	
				Theory Slot				Practical Slot				L	T	P				
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation									
				End Sem. Exam	Proficiency in subject/course	Mid Sem. Exam.	Quiz/Assignment		Lab Work & Sessional	Skill Based Mini Project								
1.	2230221	DC	Discrete Structures	50	10	20	20	-	-	-	100	2	1	-	3	Blended	PP	2 Hrs
2.	2230222	DC	Data Structures	50	10	20	20	60	20	20	200	3	-	2	4	Blended	PP	2 Hrs
3.	2230223	DC	Python Programming	50	10	20	20	60	20	20	200	2	1	2	4	Blended	AO	2 Hrs
4.	2230224	DC	Database Management System	50	10	20	20	60	20	20	200	2	1	2	4	Blended	PP	2 Hrs
5.	2220202	DC	Sensor Technology	50	10	20	20	60	20	20	200	3	-	2	4	Blended	PP	2 Hrs
Total				250	50	100	100	240	80	80	900	12	03	08	19	-	-	-
6.	3000002	Natural Sciences & Skills	Engineering Chemistry	50	10	20	20	30	10	10	150	1	-	2	GRADE	Blended	MCQ	1.5 Hrs

Induction programme of three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations. **SIP- I (Institute level): Minimum two-week.**

***Proficiency in course/subject** – includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in that particular course/subject
Natural Sciences & Skills: Engineering Physics / Engineering Chemistry / Environmental Engineering / Language
Credits of Natural Sciences & Skills will be added in the VI Semester
MCQ: Multiple Choice Question **AO:** Assignment + Oral **PP:** Pen Paper **SO:** Submission + Oral

Theory			Lab		Mode of Examination			Total Credits
Offline	Online	Blended	Offline	PP	AO	MCQ		
03	-	12	04	12	03	-	04	19
15.79%	-	63.16%	21.05%	63.16%	15.79%	-	21.05%	Credits %

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**Department of Information Technology
Scheme of Evaluation**

B. Tech. I Semester (Information Technology (Artificial Intelligence and Robotics))

(for batch admitted in academic session 2022-23)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Exam	Duration of Exam	
				Theory Slot				Practical Slot				L	T	P				
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation									
				End Sem. Exam	Proficiency in subject /course	Mid Sem. Exam.	Quiz/ Assignment		Lab Work & Sessional	Skill Based Mini Project								
1.	2240121	DC	Introduction to Artificial Intelligence	50	10	20	20	-	-	-	100	4	-	-	4	Blended	MCQ	1.5 Hrs
2.	2240122	DC	Computer Programming	50	10	20	20	60	20	20	200	2	1	2	4	Blended	AO	2 Hrs
3.	2240123	DC	Digital Logic Design	50	10	20	20	-	-	-	100	2	1	-	3	Blended	PP	2 Hrs
4.	2250100	BSC	Linear Algebra	50	10	20	20	-	-	-	100	3	1	-	4	Blended	PP	2 Hrs
5.	2100022	ESC	Basic Electrical & Electronics Engineering	50	10	20	20	60	20	20	200	2	1	2	4	Blended	MCQ	1.5 Hrs
Total				250	50	100	100	120	40	40	700	13	04	04	19	-	-	-
6.	3000001	Natural Sciences & Skills	Engineering Physics	50	10	20	20	30	10	10	150	1	-	2	GRADE	Blended	MCQ	1.5 Hrs

Induction programme of three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations.

⁵Proficiency in course/subject – includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in that particular course/subject

Natural Sciences & Skills: Engineering Physics / Engineering Chemistry / Environmental Engineering / Language

Credits of Natural Sciences & Skills will be added in the VI Semester

MCQ: Multiple Choice Question AO: Assignment + Oral PP: Pen Paper SO: Submission + Oral

Theory		Lab		Theory			Lab	Total Credits
Online	Blended	Online	PP	AO	MCQ			
04	-	13	02	07	03	07	02	19
21.05%	-	68.42%	10.53%	36.84%	15.79%	36.84%	10.53%	Credits %

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A. Singh
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G. Singh
H. Singh
I. Singh
J. Singh
K. Singh
L. Singh
M. Singh
N. Singh
O. Singh
P. Singh
Q. Singh
R. Singh
S. Singh
T. Singh
U. Singh
V. Singh
W. Singh
X. Singh
Y. Singh
Z. Singh



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Department of Information Technology Scheme of Evaluation

B. Tech. II Semester (Information Technology (Artificial Intelligence and Robotics))

(for batch admitted in academic session 2022-23)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Exam	Duration of Exam	
				Theory Slot				Practical Slot				L	T	P				
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation									
				End Sem. Exam	³ Proficiency in subject /course	Mid Sem. Exam.	Quiz/ Assignment		Lab Work & Sessional	Skill Based Mini Project								
1.	2240221	DC	Discrete Structures	50	10	20	20	-	-	-	100	2	1	-	3	Online	PP	2 Hrs
2.	2240222	DC	Data Structures	50	10	20	20	60	20	20	200	3	-	2	4	Blended	PP	2 Hrs
3.	2240223	DC	Python Programming	50	10	20	20	60	20	20	200	2	1	2	4	Blended	AO	2 Hrs
4.	2240224	DC	Database Management System	50	10	20	20	60	20	20	200	2	1	2	4	Blended	PP	2 Hrs
5.	2220202	DC	Sensor Technology	50	10	20	20	60	20	20	200	3	-	2	4	Blended	PP	2 Hrs
Total				250	50	100	100	240	80	80	900	12	03	08	19	-	-	-
6.	3000002	Natural Sciences & Skills	Engineering Chemistry	50	10	20	20	30	10	10	150	1	-	2	GRADE	Blended	MCQ	1.5 Hrs

Induction programme of three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations. SIP-I (Institute level) : minimum Two Week duration

³Proficiency in course/subject – includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in that particular course/subject

Natural Sciences & Skills: Engineering Physics / Engineering Chemistry / Environmental Engineering / Language

Credits of Natural Sciences & Skills will be added in the VI Semester

MCQ: Multiple Choice Question AO: Assignment + Oral PP: Pen Paper SO: Submission + Oral

Theory		Lab		Mode of Examination			Total Credits
Online	Blended	Online	PP	AO	MCQ	Lab	
03	12	04	12	03	-	4	19
15.79%	63.16%	21.05%	63.16%	15.79%	-	21.05%	Credits %

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Department of Information Technology

Scheme of Evaluation

B. Tech. I Semester (Artificial Intelligence (AI) and Data Science)

(for batch admitted in academic session 2022-23)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Evaluation	Duration	
				Theory Slot				Practical Slot				L	T	P				
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation									
				End Sem. Exam	Proficiency in subject /course	Mid Sem. Exam.	Quiz/ Assignment		Lab Work & Sessional	Skill Based Mini Project								
1.	2270121	DC	Introduction to Artificial Intelligence & Data Science	50	10	20	20	-	-	-	100	4	-	-	4	Blended	MCQ	1.5 Hrs
2.	2270122	DC	Computer Programming	50	10	20	20	60	20	20	200	2	1	2	4	Blended	AO	2 Hrs
3.	2270123	DC	Digital Logic Design	50	10	20	20	-	-	-	100	2	1	-	3	Blended	PP	2 Hrs
4.	2250100	BSC	Linear Algebra	50	10	20	20	-	-	-	100	3	1	-	4	Online	PP	2 Hrs
5.	2100022	ESC	Basic Electrical & Electronics Engineering	50	10	20	20	60	20	20	200	2	1	2	4	Blended	MCQ	1.5 Hrs
Total				250	50	100	100	120	40	40	700	13	04	04	19	-	-	-
6.	3000001	Natural Sciences & Skills	Engineering Physics	50	10	20	20	30	10	10	150	1	-	2	GRADE	Blended	MCQ	1.5 Hrs

Induction programme of three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations.

⁵Proficiency in course/subject – includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in that particular course/subject

Natural Sciences & Skills: Engineering Physics / Engineering Chemistry / Environmental Engineering / Language

Credits of Natural Sciences & Skills will be added in the VI Semester

MCQ: Multiple Choice Question AO: Assignment + Oral OB: Open Book PP: Pen Paper SO: Submission + Oral

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Theory				Lab		Mode of Evaluation			Total Credits
Online	Online	Blended	Online	PP	AO	MCQ	Lab		
04	-	13	02	07	03	7	02	19	
21.05%	-	68.42%	10.53%	36.84%	15.79%	36.84%	10.53%	Credits %	

Asst. Prof. Subodh
Prof. Aditya
Prof. Sandeep
Prof. I. A. G.
Prof. V. A. B.



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Department of Information Technology
Scheme of Evaluation

B. Tech. II Semester (Artificial Intelligence (AI) and Data Science)

(for batch admitted in academic session 2022-23)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Evaluation	Duration	
				Theory Slot				Practical Slot				L	T	P				
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation									
				End Sem. Exam	⁵ Proficiency in subject /course	Mid Sem. Exam.	Quiz/ Assignment		Lab Work & Sessional	Skill Based Mini Project								
1.	2270221	DC	Data Structures	50	10	20	20	60	20	20	200	3	-	2	4	Blended	PP	2 Hrs
2.	2270222	DC	Python Programming	50	10	20	20	60	20	20	200	2	1	2	4	Blended	PP	2 Hrs
3.	2270223	DC	Database Management System	50	10	20	20	60	20	20	200	2	1	2	4	Blended	AO	2 Hrs
4.	2270224	DC	Operating System	50	10	20	20	-	-	-	100	2	1	-	3	Blended	PP	2 Hrs
5.	2250106	BSC	Probability and Random Process	50	10	20	20	-	-	-	100	3	1	-	4	Blended	PP	2 Hrs
Total				250	50	100	100	180	60	60	800	12	04	06	19	-	-	-
6.	3000002	Natural Sciences & Skills	Engineering Chemistry	50	10	20	20	30	10	10	150	1	-	2	GRADE	Blended	MCQ	1.5 Hrs

Induction programme of three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations. *SIP-I (Institute level): minimum two week duration.*

⁵Proficiency in course/subject – includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in that particular course/subject

Natural Sciences & Skills: Engineering Physics / Engineering Chemistry / Environmental Engineering / Language

Credits of Natural Sciences & Skills will be added in the VI Semester

MCQ: Multiple Choice Question AO: Assignment + Oral OB: Open Book PP: Pen Paper SO: Submission + Oral

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02.03.2023
DEAN (ACADEMICS)

Theory			Lab	Theory			Lab	Total Credit
Offline	Online	Blended	Offline	PP	AO	MCQ		
04	-	12	03	13	03	-	03	19
21.05%	-	63.16%	15.79%	68.42%	15.79%	-	15.79%	Credits %

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Department of Information Technology Scheme of Evaluation

B. Tech. I Semester (Artificial Intelligence (AI) and Machine Learning)

(for batch admitted in academic session 2022-23)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Total Marks	Contact Hours per week			Total Credits	Mode	Duration			
				Theory Slot				Practical Slot			End Sem. Exam.	Lab Work & Sessional	Skill Based Mini Project				L	T	P
				End Term Evaluation		Continuous Evaluation		Continuous Evaluation											
				End Sem. Exam	Proficiency in subject /course	Mid Sem. Exam.	Quiz/ Assignment	Lab	Skill										
1.	2280121	DC	Introduction to Artificial Intelligence & Machine Learning	50	10	20	20	-	-	-	100	4	-	-	4	Blended	MCQ	1.5 Hrs	
2.	2280122	DC	Computer Programming	50	10	20	20	60	20	20	200	2	1	2	4	Blended	AO	2 Hrs	
3.	2280123	DC	Digital Logic Design	50	10	20	20	-	-	-	100	2	1	-	3	Blended	PP	2 Hrs	
4.	2250100	BSC	Linear Algebra	50	10	20	20	-	-	-	100	3	1	-	4	Blended	PP	2 Hrs	
5.	2100022	ESC	Basic Electrical & Electronics Engineering	50	10	20	20	60	20	20	200	2	1	2	4	Blended	MCQ	1.5 Hrs	
Total				250	50	100	100	120	40	40	700	13	04	04	19	-	-	-	
6.	3000001	Natural Sciences & Skills	Engineering Physics	50	10	20	20	30	10	10	150	1	-	2	GRADE	Blended	MCQ	1.5 Hrs	

Induction programme of three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations.

^sProficiency in course/subject – includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in that particular course/subject

Natural Sciences & Skills: Engineering Physics / Engineering Chemistry / Environmental Engineering / Language

Credits of Natural Sciences & Skills will be added in the VI Semester

MCQ: Multiple Choice Question AO: Assignment + Oral OB: Open Book PP: Pen Paper SO: Submission + Oral

DEAN (ACADEMICS)
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Theory				Lab		Theory			Lab		Total Credits
Offline	Online	Blended	Offline	PP	AO	MCQ	Offline	PP			
04	-	13	02	07	03	07	02	19			
21.05%	-	68.42%	10.53%	36.84%	15.79%	36.84%	10.53%	Credits %			



Department of Information Technology
Scheme of Evaluation

B. Tech. II Semester (Artificial Intelligence (AI) and Machine Learning)

(for batch admitted in academic session 2022-23)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Evaluation	Duration	
				Theory Slot				Practical Slot				L	T	P				
				End Term Evaluation		Continuous Evaluation		End Sem. Exam.	Continuous Evaluation									
				End Sem. Exam	Proficiency in subject/course	Mid Sem. Exam.	Quiz/Assignment		Lab Work & Sessional	Skill Based Mini Project								
1.	2280221	DC	Data Structures	50	10	20	20	60	20	20	200	3	-	2	4		PP	2 Hrs
2.	2280222	DC	Python Programming	50	10	20	20	60	20	20	200	2	1	2	4	Blended	PPAO	2 Hrs
3.	2280223	DC	Database Management System	50	10	20	20	60	20	20	200	2	1	2	4	Blended	AO PP	2 Hrs
4.	2280224	DC	Operating System	50	10	20	20	-	-	-	100	2	1	-	3	Blended	PP	2 Hrs
5.	2250106	BSC	Probability and Random Process	50	10	20	20	-	-	-	100	3	1	-	4	Blended	PP	2 Hrs
Total				250	50	100	100	180	60	60	800	12	04	06	19	-	-	-
6.	3000002	Natural Sciences & Skills	Engineering Chemistry	50	10	20	20	30	10	10	150	1	-	2	GRADE	Blended	MCQ	1.5 Hrs

Induction programme of three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations. *SIP-I (Institution Level): Minimum two week duration.*

⁵Proficiency in course/subject – includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in that particular course/subject

Natural Sciences & Skills: Engineering Physics / Engineering Chemistry / Environmental Engineering / Language

Credits of Natural Sciences & Skills will be added in the VI Semester

MCQ: Multiple Choice Question AO: Assignment + Oral OB: Open Book PP: Pen Paper SO: Submission + Oral

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DEAN (ACADEMICS)

Theory			Lab	Mode of Evaluation			Lab	Total Credits
Offline	Online	Blended	Offline	PP	AO	MCQ		
04	-	12	03	13	03	-	03	19
21.05%	-	63.16%	15.79%	68.42%	15.79%	-	15.79%	Credits %

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DEPARTMENT OF INFORMATION TECHNOLOGY

INTRODUCTION TO INFORMATION AND TECHNOLOGY
2160121

L	T	P	Total Credits
4	-	-	4

COURSE OBJECTIVES

- To provide the most fundamental knowledge to the students so that they can understand what the IT is.
- To present the basics and difference of Data, Information and knowledge.
- To investigate applications of Information Technology in social media analysis, mobile and IoT analysis, time series analysis, artificial neural networks and other machine learning models.

Unit I

Attributes of Information Technology, Data vs Information vs Knowledge, Type of Data: Structure, Non Structure, Semi Structure, Images, Video, Temporal, Real Time, Data Types: Categorical/Nominal/Ordinal, Data Types Conversion, Knowledge Discovery Through Data, ICT and Digital Divide, Societal Impacts of Information Technology: Introduction, Privacy, Security and Integrity of Information, Disaster Recovery, Intellectual Property Rights, IT Projects in India.

Unit II

Cyber Space and Cyber Crime: Defining Cyberspace and Overview of Computer and Web-Technology. Architecture of Cyberspace, Communication and Web Technology, Internet, World Wide Web, Information Retrieval From the World Wide Web, Advent of Internet, Internet Infrastructure for Data Transfer and Governance, Internet Society, Regulation of Cyberspace, Concept of Cyber Security, Issues and Challenges of Cyber Security.

Unit III

Introduction to Social Networks: Types of Social Media. Social Media Platforms, Social Media Monitoring, Hashtag, Viral Content, Social Media Marketing. Social Media Privacy, Challenges, Opportunities and Pitfalls in Online Social Network. Security issues Related to Social Media. Flagging and Reporting of Inappropriate Content, Laws Regarding Posting of Inappropriate Content, Best Practices for the use of Social Media.

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DEPARTMENT OF INFORMATION TECHNOLOGY

Unit IV

E-Commerce and Digital Payments: Definition of E- Commerce, Main Components of E-Commerce, Elements of E-Commerce Security, E-Commerce Threats, E-Commerce Security Best Practices, Introduction to Digital Payments, Components of Digital Payment and Stake Holders, Modes of Digital Payments- Banking Cards, Unified Payment Interface (UPI), E-Wallets, Unstructured Supplementary Service Data (USSD), Aadhar Enabled Payments, Digital Payments Related Common Frauds and Preventive Measures.

Unit V

Artificial Intelligence: Introduction, History of AI, AI Problem, Approaches, Goals, Purpose, Scope, Terminology, and Application Areas, Industrialization and its Impact, Cyber-Physical System, Evolution of Industry, Data Availability, Relation Between Artificial Intelligence, Machine Learning, Deep Learning and other Related Fields.

RECOMMENDED BOOKS

- Artificial Intelligence A Modern Approach by Stuart J. Russell and Peter Norvig, Prentice Hall.
- Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011).
- Electronic Commerce by Elias M. Awad, Prentice Hall of India Pvt Ltd.
- Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers
- E. Alpaydin, Introduction to Machine Learning (3rd ed.), PHI, 2015. ISBN 978-8120350786.

COURSE OUTCOMES

After completion of the course students would be able to:

- CO1. define basic concepts of Information Technology.
 - CO2. understand the role of IT professional
 - CO3. examining the cyber space and cyber crime
 - CO4. link the roles and opportunities of individual towards the online social media
 - CO5. reflect the applications of AI and ML for solving the problems over the real world problems.
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DEPARTMENT OF INFORMATION TECHNOLOGY

INTRODUCTION TO INTERNET OF THINGS (IoT)
2230121

L	T	P	Total Credits
4	-	-	4

COURSE OBJECTIVES

- To understand basic terminology of Internet of Things.
- To understand technology behind interaction between things.
- To understand basic terminology of Internet of Things.

Unit I

Internet of things (IoT): Introduction, Evaluation of IoT concept, Definition, Key features and components, IoT Building block, IoT Characteristics, Advantages and Disadvantages.

Unit II

IoT Applications, IoT application structures and driver technologies : collection, transmission, processing, managing, utilization phase, Telematics and Telemetry, Telematics vs IoT, Machine-to-Machine communication, M2M vs IoT, IoE, IIoT, V2V, V2X.

Unit III

IoT hardware and software, Study of IoT Sensors, Actuators, Wearable electronics, Standard devices, Concept of Cloud, Edge, Fog and Roof computing in IoT, Introduction to communication, Components of communication system, Modes of communication, Types of data transmission, IoT communication models : Device-to-Device, Device-to-Cloud, Device-to-Gateway, and Back-End Data-Sharing, IoT Connectivity and Management.

Unit IV

Introduction to Internet and Networking Protocol, IoT protocols, Types of IoT Networks, Introduction of WSN, RF wireless sensors, RFID, WiFi, Bluetooth, IP Based Cellular Networks & 3G, 4G.

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DEPARTMENT OF INFORMATION TECHNOLOGY

Unit V

IoT Challenges: Interoperability, Precision, Data volume and scalability, Internet connectivity, **IoT Security:** Security vulnerabilities in overall IoT system, Security vulnerabilities at different layers of IoT architecture, IoT Privacy and Trust, Standardization gap.

RECOMMENDED BOOKS

- Internet of Things from Hype to Reality, The Road to Digitization, Ammar Rayes and Samer Saïam, Second Edition, Springer
- Internet of Things (IoT) Technology, Economic View And Technical Standardization, Etienne Schneider, Version 1.0, ILNAS
- Internet-of-Things (IoT) Systems Architectures, Algorithms, Methodologies, Dimitrios Serpanos and Marilyn Wolf, Springer
- Data Communications and Networking, Behrouz A Forouzan, Fourth Edition, McGraw Hill Education

COURSE OUTCOMES

After completion of the course students would be able to:

- CO1. explain basic terminology of Internet of Things.
 - CO2. illustrate the role of communication in IoT.
 - CO3. identify and use various protocols devices that are used in IoT.
 - CO4. classify networking, cloud and fog computing concept for data management.
 - CO5. investigate challenges, security and privacy.
 - CO6. discuss different IoT enabled techniques behind interaction between things.
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DEPARTMENT OF INFORMATION TECHNOLOGY

INTRODUCTION TO ARTIFICIAL INTELLIGENCE
2240121

L	T	P	Total Credits
4	-	-	4

COURSE OBJECTIVES

- To provide the most fundamental knowledge to the students so that they can understand what the AI is.
- To present the basic representation and reasoning paradigms used in AI.
- To investigate applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.

Unit I

Artificial Intelligence: Introduction, History of AI, AI Problem, Approaches, Goals, Purpose, Scope, Terminology, and Application Areas, Industrialization and its Impact, Cyber-Physical System, Evolution of Industry, Data Availability, Relation between Artificial Intelligence, Machine Learning, Deep Learning and other Related Fields.

Unit II

Conventional Vs Machine Learning Programming , Data/Information/Knowledge, Type of Data: Structure, Non Structure, Semi Structure, Images, Video, Temporal, Real Time, etc, Data Types: Categorical/Nominal/Ordinal, etc..., Data Types Conversion, Model, Algorithm, Model Development Life Cycle, Learning, Training, Testing, Validation, Importance of Data, AI Tools for Implementation.

Unit III

Introduction to Machine Learning: Basic Concepts of Machine Learning, Types of Learning: Supervised, Unsupervised and Reinforcement Learning, Categorical and Continuous Data, Skewness and Correlation, Regression Analysis Vs Classification. Introduction to Optimization: Evolutionary Algorithms, Genetic Algorithms: Basic Concepts. Optimization, Need for Optimization, Membership Functions.

Unit IV

Introduction to Intelligent Agent, Characteristics and functionalities. Introduction to Expert System, Roles of Expert Systems, Logic and Reasoning in AI: Introduction to Logic, Basic

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DEPARTMENT OF INFORMATION TECHNOLOGY

of Boolean Algebra, Logic Gates, Propositional and Predicate Logic: Interpretation of Formulas, Syntax and Semantics of an Expression, Inference Rules.

Unit V

Artificial Intelligence in Real World: Speech Processing, Natural Language Processing, Planning, Engineering and Expert Systems, Fuzzy Systems, Models of Brain and Evolution, AI in Healthcare, Defence and Agriculture, Cyber Security, Agriculture, E-Commerce, Gaming, Finance, Smart Devices.

RECOMMENDED BOOKS

- Artificial Intelligence A Modern Approach by Stuart J. Russell and Peter Norvig, Prentice Hall.
- Fundamentals of Artificial Intelligence by K. R. Chowdhary, Springer.

COURSE OUTCOMES

After completion of the course students would be able to:

- CO1. define basic concepts of Artificial Intelligence.
 - CO2. relate various computer components used in Artificial Intelligence.
 - CO3. identify different logical and reasoning techniques used in AI.
 - CO4. analyze the general approach of optimization, intelligent agent and expert system.
 - CO5. analyze the general approach of machine learning.
 - CO6. build AI enabled intelligent procedures for solving real world problems.
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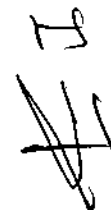




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DEPARTMENT OF INFORMATION TECHNOLOGY

INTRODUCTION TO ARTIFICIAL INTELLIGENCE AND DATA SCIENCE
2270121

L	T	P	Total Credits
4	-	-	4

COURSE OBJECTIVES

- To provide the most fundamental knowledge to the students so that they can understand what the AI is.
- To present the basics of Data Science (DS) and machine learning (ML) and how DS is different from ML.
- To investigate applications of AI and DS techniques in social media analysis, mobile and IoT analysis, time series analysis, security and privacy for data analytics.

Unit I

Artificial Intelligence: Introduction, History of AI, AI Problem, Approaches, Goals, Purpose, Scope, Terminology, and Application Areas, Industrialization and its Impact, Cyber-Physical System, Evolution of Industry, Data Availability, Relation between Artificial Intelligence, Machine Learning, Deep Learning and other Related Fields.

Unit II

Conventional Vs Machine Learning Programming, Data/Information/Knowledge, Type of Data: Structure, Non-Structure, Semi Structure, Images, Video, Temporal, Real Time. Data Types: Categorical/Nominal/Ordinal, Data Types Conversion, Model, Algorithm, Model Development Life Cycle, Learning, Training, Testing, Validation, Importance of Data, AI Tools for Implementation.

Unit III

Introduction to Machine Learning: Basic Concepts of Machine Learning, Types of Learning: Supervised, Unsupervised and Reinforcement Learning, Categorical and Continuous Data, Skewness and Correlation, Regression Analysis Vs Classification.

Unit IV

Introduction and importance of Data Science, modelling process in Data Science, various tools for data analytics, data handling and visualization, data scientist roles and responsibilities, privacy and security in Data Science.

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Unit V

Artificial Intelligence and Data Science in Real World: Speech Processing, Natural Language Processing, Satellite Data Analysis, manufacturing industry, logistic industry, retail industry. AI and DS in Healthcare, Defence and Agriculture, Cyber Security, Agriculture, E-Commerce, Finance, Smart Devices.

RECOMMENDED BOOKS

- Artificial Intelligence A Modern Approach by Stuart J. Russell and Peter Norvig, Prentice Hall.
- Fundamentals of Artificial Intelligence by K. R. Chowdhary, Springer.

COURSE OUTCOMES

After completion of the course students would be able to:

- CO1. define basic concepts of Artificial Intelligence.
 - CO2. relate various computer components used in Artificial Intelligence.
 - CO3. identify different logical and reasoning techniques used in AI.
 - CO4. understand pattern discovery, data handling and data visualization
 - CO5. analyze the general modelling process in Data Science.
 - CO6. understand the real world problems and applications of AI and DS for solving the problems.
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DEPARTMENT OF INFORMATION TECHNOLOGY

**INTRODUCTION TO ARTIFICIAL INTELLIGENCE AND MACHINE
LEARNING
2280121**

L	T	P	Total Credits
4	-	-	4

COURSE OBJECTIVES

- To provide the most fundamental knowledge to the students so that they can understand what the AI is.
- To present the basics of Artificial Intelligence (AI) and machine learning (ML).
- To investigate applications of AI and ML techniques in social media analysis, mobile and IoT analysis, time series analysis, artificial neural networks and other machine learning models.

Unit I

Artificial Intelligence: Introduction, History of AI, AI Problem, Approaches, Goals, Purpose, Scope, Terminology, and Application Areas, Industrialization and its Impact, Cyber-Physical System, Evolution of Industry, Data Availability, Relation between Artificial Intelligence, Machine Learning, Deep Learning and other Related Fields.

Unit II

Conventional vs Machine Learning Programming, Data/Information/Knowledge, Type of Data: Structure, Non Structure, Semi Structure, Images, Video, Temporal, Real Time. Data Types: Categorical/Nominal/Ordinal, Data Types Conversion, Model, Algorithm, Model Development Life Cycle, Learning, Training, Testing, Validation, Importance of Data, AI Tools for Implementation.

Unit III

Introduction to Machine Learning: Basic Concepts of Machine Learning, Types of Learning: Supervised, Unsupervised and Reinforcement Learning, Categorical and Continuous Data, Skewness and Correlation, Regression Analysis Vs Classification. Supervised Learning: Linear and Logistic Regression: Linear models for classification, Sigmoid, Logistic regressions with single and multiple variables, Polynomial regression.

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DEPARTMENT OF INFORMATION TECHNOLOGY

Unit IV

Unsupervised Learning: Clustering, Common distance measures, Hierarchical algorithms – agglomerative and divisive, partitioning algorithms – k-means and derivatives; Design and Analysis of Machine Learning Experiments: Guidelines for machine learning experiments, Factors, Response, and Strategy of experimentation, Cross-Validation and Resampling methods, measuring classifier performance.

Unit V

Artificial Intelligence and Machine Learning in Real World: Speech Processing, Natural Language Processing, Planning, manufacturing industry, logistic industry, retail industry. AI and DS in Healthcare, Defense and Agriculture, Cyber Security, Agriculture, E-Commerce, Finance, Smart Devices.

RECOMMENDED BOOKS

- Artificial Intelligence A Modern Approach by Stuart J. Russell and Peter Norvig, Prentice Hall.
- Fundamentals of Artificial Intelligence by K. R. Chowdhary, Springer.
- E. Alpaydin, Introduction to Machine Learning (3rd ed.), PHI, 2015. ISBN 978-8120350786.

COURSE OUTCOMES

After completion of the course students would be able to:

- CO1. define basic concepts of Artificial Intelligence.
- CO2. relate various computer components used in Artificial Intelligence.
- CO3. learn about and practice a variety of Supervised and Unsupervised Learning approaches.
- CO4. familiarize and learn about the latest trends and research in the field.
- CO5. understand the real world problems and applications of AI and ML for solving the problems.

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DEPARTMENT OF INFORMATION TECHNOLOGY

COMPUTER PROGRAMMING
2160122/2230122/2240122/2270122/2280122

L	T	P	Total Credits
2	1	2	4

COURSE OBJECTIVES

- To develop the understanding of algorithms, programming approaches and program documentation techniques.
- To study the concepts of procedural and object oriented programming.
- To design and implement basic programming solutions using programming constructs.

Unit I

Introduction to Programming, Types of Computer Programming Languages, Program Execution and Translation Process, Problem Solving using Algorithms and Flowcharts. Introduction to C++ Programming: Data Types, Constants, Keywords, Variables, Input/Output, Operators & Expressions, Precedence of Operators.

Unit II

Control Statements and Decision Making: goto statement, if statement, if-else statement, nesting of if statements, switch statement, while loop, do...while loop, for loop, nesting of for loops, break and continue statement. Function Basics, Function Prototypes, Passing Parameter by Value and by Reference, Default Arguments, Recursion. Arrays: One Dimensional Arrays, Multidimensional Arrays, Passing Arrays to Functions.

Unit III

Strings, Pointers, Structures and File Handling: Operations on Strings, Basics of Pointers & Addresses, Reference Variable, Pointer to Pointer, Pointer to Array, Array of Pointers, Pointer to Strings. Dynamic Memory Allocation using New and Delete Operators. Structures & Union, Pointer to Structure, Self-Referential Structures. File Concepts, Study of Various Files and Streams, Operations on Files.

Unit IV

Object Oriented Paradigm, Features of OOPS, Comparison of Procedural Oriented Programming with Object Oriented Programming. Abstract Data Types, Specification of Class, Visibility Modes, Defining Member Functions, Scope Resolution Operator, Constructors, its types, and Destructors, Creating of Objects, Static Data Member, Static

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DEPARTMENT OF INFORMATION TECHNOLOGY

Member Function, Array of Objects, Object as Arguments, Inline Function, Friend Function.

Unit V

Polymorphism: Introduction, Type of Polymorphism: Compile Time Polymorphism & Run Time Polymorphism, Function Overloading, Operator Overloading. Inheritance: Introduction, Visibility Modes, Types of Inheritance: Single Level, Multilevel, Multiple, Hybrid, Multipath.

RECOMMENDED BOOKS

- C++ How to Program, H M Deitel and P J Deitel, Prentice Hall.
- Programming with C++, D Ravichandran, T.M.H.
- Computing Concepts with C++ Essentials, Horstmann, John Wiley.
- The Complete Reference in C++, Herbert Schildt, TMH.
- Object-Oriented Programming in C++, E Balagurusam.
- Fundamentals of Programming C++, Richard L. Halterman.

COURSE OUTCOMES

After completing this, the students will be able to:

- CO1. identify situations where computational methods and computers would be useful.
 - CO2. develop algorithms and flowchart for a given problem.
 - CO3. understand the concepts of procedural programming.
 - CO4. explain the concepts of object oriented programming and its significance in the real world.
 - CO5. analyze the problems and choose suitable programming techniques to develop solutions.
 - CO6. develop computer programs to solve real world problems.
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DEPARTMENT OF INFORMATION TECHNOLOGY

DIGITAL LOGIC DESIGN
2160123/2230123/2240123/2270123/2280123

L	T	P	Total Credits
2	1	-	3

COURSE OBJECTIVES

- To understand the fundamental operating components of Digital Computers.
- To learn various number systems, boolean algebra employed in digital computers.
- To understand the concepts of counters, latches and flip-flops.

Unit I

Introduction to Digital Electronics, Needs and Significance, Different Number System: Binary Numbers, Octal and Hexadecimal Numbers, Conversions, Complement's, Signed Binary Numbers, Binary Arithmetic's, Binary Codes: BCD, ASCII Codes.

Unit II

Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Boolean Relations, Digital Logic Gates, De Morgan's Theorem. Karnaugh Maps and simplifications.

Unit III

Combinational Circuits, Half Adder, Full Adder, Binary Adder-Subtractor, Binary Multiplier, Comparator, Decoders, Encoders, Multiplexers.

Unit IV

Sequential Circuits, Latches, Flip-Flops: RS Latches, Level Clocking, D Latches, Edge-triggered D Flip-flop, Edge-triggered JK Flip-flop, JK Master-slave Flip-flop; Registers. Shift Registers, Counters, Ripple Counters, Synchronous Counters.

Unit V

Introduction to Memory, Memory Decoding, Programmable Devices: Programmable Logic Array (PLA), Programmable Array Logic (PAL). Sequential Programmable Logic Device (SPLD), Complex Programmable Logic Device (CPLD), Field-Programmable Gate Array (FPGA), Digital Logic Design: RTL and DTL Circuits, TTL.

RECOMMENDED BOOKS

- Digital Design, Morris Mano M. and Michael D. Ciletti, IV Edition, Pearson Education.
- Digital Electronics: Principles, Devices and Applications, Anil K. Maini, Wiley.

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE OUTCOMES

After completion of the course students would be able to:

- CO1. explain the basic components and functional units to define computer architecture
 - CO2. explain different number systems and basic operations employed at machine level.
 - CO3. develop the understanding of combinational circuits.
 - CO4. analyse the basic concept of sequential circuits.
 - CO5. compare and differentiate various memories used in Computers.
 - CO6. reduce the boolean functions to mitigate hardware complexity issues.
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RECOMMENDED BOOKS

- J. Tremblay and Manohar: Discrete Mathematical Structures with Application to Computer science. Narsingh Deo: Graph Theory.
- Kenneth Rosen: Discrete mathematics and its applications (6th edition).2006. McGraw-Hill
- C. Liu, D. Mohapatra: Elements of Discrete Mathematics. 2008. Tata McGraw-Hill.
- T. Koshy: Discrete mathematics with applications.2003. Academic Press.
- J. Hein: Discrete structures, logic and computability.2009. Jones & Bartlett Publishers.

COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. explain the basic concept of set theory, propositional logic, graph theory, discrete numeric function and algebraic structure.
 - CO2. illustrate the knowledge of course content and distinguish between them in terms of their applications.
 - CO3. identify the concepts of graph and tree for solving problems in the computer science.
 - CO4. apply the concepts of studied topics with suitable technique faced in engineering problems
 - CO5. analyze the set theory, propositional logic, graph theory, discrete numeric function and algebraic structure to examine the real world problem.
 - CO6. build analytical skill and interpret applications of engineering beneficial in real time troubleshooting.
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DEPARTMENT OF INFORMATION TECHNOLOGY

BASIC ELECTRICAL & ELECTRONICS ENGINEERING
2100022

L	T	P	Total Credits
2	1	2	4

COURSE OBJECTIVES

- To impart the basic knowledge of the DC and AC circuits and their applications.
- To familiarize the students with the basic knowledge of magnetic circuits, transformer and its terminology.
- To make familiarize the students about the working of rotating electrical machine, various electronic circuits and its importance.

Unit I

D.C. Circuits Analysis: Voltage and Current Sources: Dependent and independent source, Source conversion, Kirchhoff's Law, Mesh and Nodal analysis. Network theorems: Superposition theorem, Thevenin's theorem & Norton's theorem and their applications.

Unit II

Single-phase AC Circuits: Generation of sinusoidal AC voltage, definitions: Average value, R.M.S. value, Form factor and Peak factor of AC quantity, Concept of Phasor, analysis of R-L, R-C, R-L-C Series and Parallel circuit, Power and importance of Power factor.

Unit III

Magnetic Circuits: Basic definitions, AC excitation in magnetic circuits, self-inductance and mutual inductance, Induced voltage, laws of electromagnetic Induction, direction of induced E.M.F. Flux, MMF and their relation, analysis of magnetic circuits.

Unit IV

Single-phase Transformer & Rotating Electrical Machines: Single phase transformer, Basic concepts, construction and working principal, Ideal Transformer and its phasor diagram at No Load, Voltage. current and impedance transformation, Equivalent circuits and its Phasor diagram, voltage regulation, losses and efficiency, testing of transformers. Construction & working principle of DC and AC machine.

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DEPARTMENT OF INFORMATION TECHNOLOGY

Unit V

Digital Electronics, Devices & Circuits: Number systems used in digital electronics, decimal, binary, octal, hexadecimal, their complements, operation and conversion, Demorgan's theorem, Logic gates- symbolic representation and their truth table, Introduction to semiconductors, Diodes, V-I characteristic, Bipolar junction transistors and their working, Introduction to CB, CE & CC transistor configurations.

RECOMMENDED BOOKS

- Basic Electrical and Electronics Engineering, D.P. Kothari & I.J. Nagrath-Tata McGraw Hill
- Basic Electrical and Electronics Engineering, V N Mittle & Arvind Mittal -Tata McGraw Hill
- Basic Electrical and Electronics Engineering, S. K Bhattacharya -Pearson
- Electrical Machinery- A.E. Fitzgerald, C. Kingsley and Umans - TMH
- Principles of Electrical Engineering- Vincent Del Toro- Prentice Hall.
- Basic Electrical Engineering -A.E. Fitzgerald, Higginbotham and Gabel -TMH
- Integrated Electronics- Millmann & Halkias
- Electronics Devices & circuits- Sanjeev Gupta, Dhanpat Rai Publication.
- Basic Electrical and Electronics Engineering, D.C Kulshreshtha-Tata McGraw Hill

COURSE OUTCOMES

After completion of the course students would be able to:

- CO 1. solve DC & AC circuits by applying fundamental laws & theorems
 - CO 2. compare the behavior of electrical and magnetic circuits for given input
 - CO 3. explain the working principle, construction. applications of rotating electrical machines
 - CO 4. explain the working principle, constructional details. losses & applications of single phase transformer.
 - CO 5. select the logic gates for various applications in digital electronic circuits.
 - CO 6. explain characteristics of diode and transistor.
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DEPARTMENT OF INFORMATION TECHNOLOGY

IT WORKSHOP
2160125

L	T	P	Total Credits
-	-	2	1

COURSE OBJECTIVES

- To make use of computers for various purposes like surfing the net, sending/ receiving emails, preparation of various documents and presentations, preparing small databases, maintenance of accounts.
- To acquire the knowledge of computer system, mother board and its processing unit.
- To be aware of different memories, windows installation, hardware and software troubleshooting.

Unit-I

Computer Hardware: Introduction to Hardware Peripherals like RAM, ROM, Keyboard, Hard disk drive, Mouse , Processors, Generation of processor , Working of SMPS , Study of various ports, Assembly and Disassembly of Computer, Study of Networking Cable and it's types, Installation and Partition of Hard Disk, Troubleshooting & Fault finding.

Unit-II

Operating System and software installations: Introduction to Operating System, Types of Operating System (Windows and Linux), Evolution of Operating System, Introduction of Software, Types of Software, Installation steps for Operating System (Windows, Linux etc), Creating Virtual Machine using VMware/ VirtualBox.

Unit-III

Word & Excel Orientation: Overview of Microsoft office word / Excel, New Features of Microsoft Office, Working with Documents in Microsoft Word /Excel. Saving the File, Formatting the Text. Alignment of Text, Applying Fonts, Spell Checking. Inserting Header and Footer , Charts and Graphics in Microsoft Word/Excel, Working with Tables, functions and Macros in Microsoft Word/Excel, Validating Data in Microsoft Excel. Using formulae in Excel, Creating project/certificates/Newsletter using Word.**PowerPoint Presentation:** Introduction to Microsoft PowerPoint, Use of Standard Formatting toolbar. Working with Charts and Tables. Editing slides, Changing templates, Slide Layouts. Inserting clipart &

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DEPARTMENT OF INFORMATION TECHNOLOGY

Pictures into slide, Slide Transitions, Animation, Inserting sound and movies into slides, Create & Deliver dynamic presentation.

Unit-IV

Computer Application: Microsoft Disk Operating System (MS-DOS): Internal Commands, External Commands, Batch File etc. Overview of Linux, Common Linux Features, **Essential Linux commands**, Advantage of Linux, Creating E-mail Account, E-mail Writing, Blog Writing, Net Surfing and Chatting, Customize Web Browser with the LAN proxy setting, Bookmarks, Search Toolbars and Pop up Blockers, Install Antivirus Software, Configure personal firewall and Window update, Customize browser to block pop ups, Cyber Hygiene.

Unit-V

Internet: Introducing the Networking concept using LAN & WAN, Introduction, Evolution and Uses of Internet, Concepts of Web Browser, Web Page and Web Site, Study of various Internet based services like Email, Social Network, Chat, Introduction to Cyber Security and Cyber Laws.

Server: Introduction to Server, Difference between server and normal desktop, Evolution of servers, Study of various servers. Web designing using HTML/CSS.

RECOMMENDED BOOKS

- Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
- The Complete Computer upgrade and repair book, 3rd edition Cheryl A Schmidt, WILEY Dreamtech.
- Introduction to Information Technology, IITL Education Solutions Limited, Pearson Education.
- PC Hardware and A+ Handbook - Kate J. Chase PHI (Microsoft)

COURSE OUTCOMES

After completion of the course student would be able to:

- CO1. understand the basic concept and structure of computer hardware and networking.
- CO2. demonstrate installation of windows and connections through ports at basic level.
- CO3. identify the existing configuration of the computers and peripherals.
- CO4. apply the knowledge about computer peripherals to identify/rectify problems onboard.
- CO5. explain the concept of Memory, Motherboard, Bus and SMPS.

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CO6. manage data backup and restore operations on computer and update application software.

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***Experiments List and Skill Based Mini
Project
of
Laboratory Courses
B. Tech I Semester
(Batch Admitted in 2022-23)
(Information Technology/Internet of Things
(IoT)/ Information Technology (Artificial
Intelligence and Robotics)/ Artificial
Intelligence and Data Science/ Artificial
Intelligence and Machine Learning)
Under Flexible Curriculum
[ITEM IT - 12]***

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DEPARTMENT OF INFORMATION TECHNOLOGY
COMPUTER PROGRAMMING
2160122/2230122/2240122/2270122/2280122

LIST OF PROGRAMS

1. Write a program to add two numbers and display its sum.
2. Write a Program to calculate and display the volume of a cylinder for height and radius parameters to be input from the user.
3. Write a program to realize the following expressions:
 - a. $V = u + at$
 - b. $S = ut + 1/2at^2$
 - c. $T = 2\sqrt{a + \sqrt{b + 9c}}$
4. Write a program to take input of name, rollno and marks obtained by a student in 5 subjects of 100 marks each and display the name, rollno with percentage score secured.
5. Write a program to swap values of two variables with and without using the third variable.
6. Write a program to illustrate the use of unary prefix and postfix increment and decrement operators.
7. Write a program to find the largest of three numbers using ternary operators.
8. Write a program to find the roots of quadratic equation.
9. Write a Program to Check Whether a Number is Prime or not.
10. Write a program to compute the grade of students using if else ladder as per MITS norms.
11. Write a program to check whether the entered year is leap year or not (a year is leap if it is divisible by 4 and divisible by 100 or 400.)
12. Write a program to print the sum of digits of a number using for loop.
13. Write a program to display the following pattern using for loops.

(i)

 **
 *

(ii)
 1
 2 2
 3 3 3
 4 4 4 4
 5 5 5 5 5

(iii)
 1
 1 2
 1 2 3
 1 2 3 4
 1 2 3 4 5

(iv)
 A
 AB
 ABC
 ABCD
 ABCDE

(v)
 *
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(vi)
 * * * * *
 * * * * *
 * * * * *
 * * * * *
 * * * * *
 * * * * *
 * * * * *
 * * * * *
 * * * * *
 * * * * *

(vii)
 1
 1 2 1
 1 2 3 2 1
 1 2 3 4 3 2 1
 1 2 3 4 5 4 3 2 1

(viii)
 ABCDEF
 ABCDE
 ABCD
 ABC
 AB
 A

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14. Write a program to calculate factorial of a number using recursion.
15. Write a program to add two matrices of the same order.
16. Write a program to add two complex numbers, use structure data-type to represent complex numbers.
17. Write a program to create 10 objects of a student class containing the student's name, ID, Semester and CGPA as data members, and getDetails(), setDetails() as member functions. The class should also contain static variables which keep track of the student with maximum CGPA in each semester. The class should also contain a constructor to initialize the data members.

COURSE OUTCOMES

After completing this, the students will be able to:

- CO1. apply basic programming concepts .
 - CO2. develop algorithms and flowchart for a given problem.
 - CO3. illustrate the concepts of procedural programming.
 - CO4. implement the concepts of object oriented programming.
 - CO5. design suitable programming solutions using procedural/object oriented programming paradigms.
 - CO6. develop computer programs to solve real world problems.
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COMPUTER PROGRAMMING

2160122/2230122/2240122/2270122/2280122

LIST OF SKILL BASED MINI PROJECT

1. Ram and Shyam are playing a game. Ram initially has the number A and Shyam has the number B . There are a total of N turns in the game, and Ram and Shyam alternatively take turns. In each turn the player whose turn it is, multiplies his or her number by 2. Ram has the first turn. Suppose after all the N turns, Ram's number has become C and Shyam's number has become D . Write a program to calculate the integer division of the maximum number among C and D by the minimum number among C and D .
2. There's an array A consisting of N non-zero integers $A_1..N$. A subarray of A is called alternating if we take any two adjacent elements in it, then one of them should be even and the other should be odd. For each x from 1 to N , write a program to compute the length of the longest alternating subarray that starts at x - that is, a subarray $A_{x..y}$ for the maximum possible $y \geq x$. The length of such a subarray is $y-x+1$.
3. Given an array A_1, A_2, \dots, A_N , count the number of subarrays of array A which are non-decreasing. A subarray $A[i..j]$, where $1 \leq i \leq j \leq N$ is a sequence of integers A_i, A_{i+1}, \dots, A_j . A subarray $A[i..j]$ is non-decreasing if $A_i \leq A_{i+1} \leq A_{i+2} \leq \dots \leq A_j$. Write a program to count the total number of such subarrays.
4. Two strings A and B are given, each consisting of lower case alphabets.
Write a program to find whether it is possible to choose some non empty strings s_1 and s_2 where s_1 is a substring of A , s_2 is a substring of B such that $s_1 + s_2$ is a palindromic string. Here '+' denotes the concatenation between the strings. And if there are such strings S_1 and S_2 then print S_1+S_2 .
5. There are N students standing in a row and numbered 1 through N from left to right. You are given a string S with length N , where for each valid i , the i -th character of S is 'x' if the i -th student is a girl or 'y' if this student is a boy. Students standing next to each other in the row are friends. The students are asked to form pairs for a project. Each pair must consist of a boy and a girl. Two students can only form a pair if they are friends. Each student can only be part of at most one pair. Write a program to find the maximum number of pairs that can be formed.
6. Following conditions are given based on three subjects marks
 - a. Physics marks must be greater than 50
 - b. Chemistry marks must be greater than 80

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c. English marks must be greater than 70

Students are awarded grade 10 if all three conditions are met. Grade 9 is given if conditions a and b are met. Grade 8 is given if conditions b and c are met. Grade 7 is given if a and c are met. Grade is 6 if only one condition is met . Grade is 5 if none of the three conditions are met. Write a program to display the grade of students , based on the values of physics, chemistry and English, given by the user. Use object oriented programming to implement the system.

7. Library Systems is aimed to computerize the library management operations, e.g. Registering a Student, Issuing a book, Handling Books Return, etc. Design an OOPS system to implement the same.
 8. The Question Bank computerized the MCQ based exams. It takes input from a file having questions and their answers and presents them randomly before the exam takers. Use OOPS concepts to implement the question bank system.
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IT WORKSHOP (2160125) LIST OF PROGRAMS

1. Design Resume on Word.
 2. Prepare powerpoint presentation on one latest technology.
 3. Write a request and apology email.
 4. Run MS-DOS commands/Linux commands.
 5. Study of Computer Hardware (RAM, ROM, Keyboard, Hard disk drive, Mouse, processors, hard disk etc).
 6. Installation and partition of hard disk.
 7. Installations of OS (Windows/Linux etc).
 8. Disassemble and assemble the PC.
 9. Study of PC troubleshooting.
 10. Creating Virtual Machine using VMWARE.
 11. Design Webpage using HTML & CSS.
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DEPARTMENT OF INFORMATION TECHNOLOGY

DATA STRUCTURES

2160221/2230222/2240222/2270221/2280221

L	T	P	Total Credits
3	-	2	4

COURSE OBJECTIVES

- To be familiar with the use of data structures as the foundational base for computer solutions to problems.
- To understand various techniques of searching and sorting.
- To understand basic concepts about stacks, queues, lists, trees and graphs.

Unit-I

Introduction to Data Structures: Algorithms & their characteristics, asymptotic notations. arrays and its representations, index to address translation. **Link list:** Introduction, implementation of linked list, operations, circular link list, doubly linked list, polynomial manipulation using linked list.

Unit-II

Stacks: Concepts and implementation of stacks, operations on stack, conversion of infix to postfix notation, evaluation of postfix expression, recursion.

Queues: Concepts and implementation, operations on queues, dequeue, priority queues, circular queues and application.

Unit-III

Trees: Types, terminology, binary tree -representations, traversal. conversion of general tree to binary tree, binary search tree, threaded binary tree and height balanced tree.

Unit-IV

Graphs: Background. graph theory terminologies, representation of graphs- sequential & linked representation. path matrix, graph traversals- BFS, DFS. spanning trees, applications of graph.

Unit-V

Searching & Sorting: Linear search, binary search, bubble sort. selection sort, insertion sort, quick sort. merge sort, radix sort and heap sort, comparison between sorting techniques. hashing and collision resolution techniques.

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DEPARTMENT OF INFORMATION TECHNOLOGY

RECOMMENDED BOOKS

- Data Structures, Algorithms and Applications in C++, Sartaj Sahni, 2nd Edition.
- An Introduction to Data Structures with Applications, Jean-Paul Tremblay, Mcgraw hill.
- Data Structures & Algorithms, Aho, Hopcroft & Ullman, original edition, Pearson Publication.

COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. outline the basics of Algorithms and their performance criteria.
 - CO2. explain the working of linear/Non Linear data structures.
 - CO3. identify the appropriate data structure to solve specific problems.
 - CO4. analyze the performance of various Data Structures & their applications.
 - CO5. evaluate the time/space complexities of various data structures & their applications.
 - CO6. design the optimal algorithmic solutions for various problems.
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DEPARTMENT OF INFORMATION TECHNOLOGY

DISCRETE STRUCTURES
2230221/2240221

L	T	P	Total Credits
2	1	-	3

COURSE OBJECTIVES

- To perceive the knowledge of basic algebra
- To describe function and its relation
- To familiarize propositional logic
- To know about the graph theory and its application in computer engineering
- To familiarize the discrete numeric function and generating function

Unit-I

Finite and Infinite Sets, Mathematical Induction, Principles of Inclusion and Exclusion, Multisets, Functions and Relations, Binary Relations, Equivalence Relations and Partitions, Partial Ordering Relations and Lattices, Chains, Pigeonhole Principle.

Unit-II

Propositional Logic, Syntax, Semantics of ATF (Atomic Formula), WFF (Well Formed Formula's), Validity and Satisfiability of WFF by Quine's Method, Normal and Closure Form of Propositional Calculus.

Unit-III

Introduction and Basic Terminology of Graphs, Planner Graphs, Multi-Graphs and Weighted Graph, Shortest Path in Weighted Graph, Introduction to Eulerian Paths and Circuits, Hamiltonian Paths and Circuits, Introduction to Trees, Rooted Trees. Path Length in Rooted Trees, Spanning Trees and Cut Trees.

Unit-IV

Introduction to Discrete Numeric Functions and Generating Functions. Introduction to Recurrence Relations and Recursive Algorithms, Linear Recurrence Relations With Constant Coefficients, Homogeneous Solutions, Particular Solutions and Total Solutions.

Unit-V

Introduction to Group. Subgroups, Generations and Evaluation of Power. Cosets and Lagrange's Theorem, Group Codes, Isomorphism and Automorphism, Homomorphism and Normal Sub Groups, Ring, Integral Domain and Field.

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RECOMMENDED BOOKS

- J. Tremblay and Manohar: Discrete Mathematical Structures with Application to Computer science. Narsingh Deo: Graph Theory.
- Kenneth Rosen: Discrete mathematics and its applications (6th edition).2006. McGraw-Hill
- C. Liu, D. Mohapatra: Elements of Discrete Mathematics. 2008. Tata McGraw-Hill.
- T. Koshy: Discrete mathematics with applications.2003. Academic Press.
- J. Hein: Discrete structures, logic and computability.2009. Jones & Bartlett Publishers.

COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. explain the basic concept of set theory, propositional logic, graph theory, discrete numeric function and algebraic structure.
- CO2. illustrate the knowledge of course content and distinguish between them in terms of their applications.
- CO3. identify the concepts of graph and tree for solving problems in the computer science.
- CO4. apply the concepts of studied topics with suitable technique faced in engineering problems
- CO5. analyze the set theory, propositional logic, graph theory, discrete numeric function and algebraic structure to examine the real world problem.
- CO6. build analytical skill and interpret applications of engineering beneficial in real time troubleshooting.

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Visibility Modes, Types of Inheritance: Single Level, Multilevel, Multiple, Hybrid, Multipath. Association, Aggregation and composition. Array manipulation and visualization using numpy and matplotlib libraries.

RECOMMENDED BOOKS

- Python Crash Course: A Hands-On, Project-Based Introduction to Programming, By Eric Matthes.
 - Learn Python the Hard Way: third Edition T.R. Padmanabhan, Programming with Python, Springer, first Ed., 2016.
 - Kenneth Lambert, Fundamentals of Python: First Programs, Cengage Learning, first Ed., 2012.
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COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. define basics syntax and features of python programming language
 - CO2. solve computational problem using python language.
 - CO3. take part in online coding platforms.
 - CO4. inspect the python program for errors.
 - CO5. design a program using the features of object oriented concept.
 - CO6. construct the python code for real world problem using the libraries.
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DEPARTMENT OF INFORMATION TECHNOLOGY

DATABASE MANAGEMENT SYSTEM

2160223/2230224/2240224/2270223/2280223

L	T	P	Total Credits
2	1	2	4

COURSE OBJECTIVES

- To understand the different issues involved in the design and implementation of a database system.
- To study the physical and logical database designs, database modelling, relational, hierarchical and network models.
- To understand and use data manipulation language to query, update and manage a database.

Unit-I

DBMS: Database Approach v/s Traditional File Approach, Advantages of Database System, Database Users and Administrator, Database System Environment, Application Architectures, Schemas, Instances, Data Independence, Data Models: Hierarchical Data Model, Network Data Model & Relational Data Model, Comparison between Models.

Entities and Relationship Model: Entity types, Entity sets, Attributes and Keys, Relationship Types and Sets, Constraints, Design issue, E-R Diagram, Weak Entity Sets.

Unit-II

Relational Model: Structure of Relational Databases: Relation, Attribute, Domain, Tuples, Degree, Cardinality, Views, Database Relations, Properties of Relations, Attributes, Keys, Attributes of Relation, Domain Constraints, Integrity Constraints.

Relational Algebra: Concepts and Operations: Select, Project, Division, Intersection, Union, Division, Rename, Join etc.

Unit-III

SQL: Purpose of SQL, Data Definition Language (DDL) Statements, Data Manipulation Language (DML) Statements Update Statements & Views in SQL, Data Control Language (DCL), Triggers.

Unit-IV

Relational Database Design: Purpose of Normalization, Data Redundancy and Update Anomalies, Functional Dependency, Process of Normalization, Various Normal Forms:

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1NF, 2NF, 3NF, BCNF, Decomposition, Desirable Properties of Decomposition: Dependency Preservation, Lossless Join, Problems with Null Valued & Dangling Tuple, Multivalued Dependencies.

Unit-V

Transaction Management: Transaction Concept, Transaction State, Concurrent Executions, Serializability: Conflict and View Serializability, Concurrency Control: Lock-Based Protocol, Recovery: Log-Based Recovery.

RECOMMENDED BOOKS

- Database System Concepts, Abraham Silberschatz-Henry F. Korth-S. Sudarshan, McGraw-Hill 6th Edition.
- Database Management System, Raghu Ramakrishnan Johannes Gehrke, McGraw Hill 3rd Edition.
- Fundamentals of Database System, Elmasri & Navathe, Addison-Wesley Publishing, 5th Edition.
- An Introduction to Database Systems, Date C. J, Addison-Wesley Publishing, 8th Edition.

COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. demonstrate the concepts of different types of database system.
 - CO2. apply relational algebra concepts to design database system.
 - CO3. make use of queries to design and access database system.
 - CO4. analyze the evaluation of transaction processing and concurrency control.
 - CO5. determine the normal form of the relation.
 - CO6. design a ER diagram/database system for a real world application.
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DEPARTMENT OF INFORMATION TECHNOLOGY

COMPUTER SYSTEM ORGANIZATION

2160224

L	T	P	Total Credits
2	1	-	3

COURSE OBJECTIVE

- To provide the fundamental knowledge of a computer system and its processing units.
- To provide the details of input & output operations, memory management and performance measurement of the computer system.
- To understand how computer represents and manipulate data.

Unit -I

Introduction: Von Newman Model, Various Subsystems: Input Unit, Output Unit, Memory Unit, CPU, Accumulator, Memory Registers, Program Counter, System Bus, Register Transfer and Micro Operations: Register Transfer Language, Register Transfer, Bus and Memory Transfers, Register Transfer Micro-Operations, Arithmetic Micro-Operations, Logic Micro-Operations, Shift Micro-Operations.

Unit- II

Computer Arithmetic: Addition and Subtraction with Signed-Magnitude, Multiplication Algorithms, Division Algorithms, Floating-Point Arithmetic Operations.

Central Processing Unit (CPU): General Purpose Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC), Hardwired and Micro Programmed Control.

Unit -III

Microprocessors: Introduction of 8085 Microprocessor: Architecture, Instruction Set, Addressing Modes, Interrupts and Basic Assembly Language Programming.

Unit -IV

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA), Input-Output Processor (IOP), Data Transfer-Serial/ Parallel, Simplex/ Half Duplex/ Full Duplex.

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Unit-V

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory- Organization and Mappings, Memory Management Hardware, Introduction to Pipelining & Multiprocessors.

RECOMMENDED BOOKS

- Computer System Architecture, Morris Mano, PHI.
 - Microprocessor Architecture, Programming and Applications with the 8085, Gaonkar, Penram International Publishing (India) Pvt.Ltd.
 - Computer Organization, Carl Hamacher, THM.
 - Computer Architecture and Organization, J P Hayes, Mc-Graw Hills, New Delhi.
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COURSE OUTCOMES

After completion of the course students would be able to:

- CO1. recall the basic building blocks of computer Architecture.
 - CO2. compare different memories.
 - CO3. apply the concept of memory mapping, multiprocessor and pipelining in solving real world problems.
 - CO4. analyze various modes of Input-Output data transfer.
 - CO5. evaluate the arithmetic related to the number system.
 - CO6. develop the skill of writing low level programming.
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DEPARTMENT OF INFORMATION TECHNOLOGY

OPERATING SYSTEM
2270224/2280224

L	T	P	Total Credits
2	1	-	3

COURSE OBJECTIVES

- To provide basic knowledge of computer operating system structures and functioning.
- To compare several different approaches to memory management, file management and process management.
- To understand various problems related to concurrent operations and their solutions.

Unit I

Basics of Operating System: Generations, Types, Structure, Services, System Calls, System Boot, System Programs, Protection and Security.

Unit II

Process Management: Process Concepts, Process States, Process Control Block, Scheduling-Criteria, Scheduling Algorithms and their Evaluation, Threads, Threading Issues.

Unit III

Process Synchronization: Background, Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Monitors.

Deadlock: System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery from Deadlock.

Unit IV

Memory Management: Main Memory, Swapping, Contiguous Memory Allocation, Paging, Structure of Page Table, Segmentation, Virtual Memory, Demand Paging, Page Replacement Algorithms, Allocation of Frames, Thrashing.

Unit V

Storage Management: Mass-Storage Structure, Overview, Disk Structure, Disk Attachment, Disk Scheduling.

File System Interface: The Concept of a File, Access Methods, Directory Structure, File System Structure, Allocation Methods, Free-Space Management.

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RECOMMENDED BOOKS

- Operating System Concepts, Silberschatz, Ninth Edition, Willey Publication.
- Operating Systems, internals and Design Principles, Stallings, Seventh Edition, Pearson Publication.
- Modern Operating Systems, Tanenbaum, Fourth Edition. Pearson Publication.

COURSE OUTCOMES

After the successful completion of this course, the student will be able to:

- CO1. define the basic concept of operating systems.
 - CO2. explain the working procedure of the operating system.
 - CO3. analyze the various operating system problems and issues.
 - CO4. determine the solutions for various operating system problems and issues.
 - CO5. evaluate the performance of various scheduling and allocation techniques.
 - CO6. elaborate the working of various scheduling and allocation techniques.
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***List of Experiments and
Skill Based Mini Projects
of***

Laboratory Courses

B. Tech II Semester

(Batch Admitted in 2022-23)

(Information Technology/ Internet of Things (IoT)/

Artificial Intelligence and Robotics/Artificial

Intelligence & Data Science (AI&DS) / Artificial

Intelligence & Machine Learning (AI&ML))

Under Flexible Curriculum

[ITEM IT - 12]

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DEPARTMENT OF INFORMATION TECHNOLOGY

DATA STRUCTURES

2160221/2230222/2240222/2270221/2280221

LIST OF EXPERIMENTS

1. Write a program for implementing the following sorting methods to arrange a list of integers in ascending order:
 - a. Selection sort
 - b. Quick sort
 - c. Merge sort
 2. Write a program to implement Stack using array.
 3. Write a program to count the number of nodes in the binary search tree.
 4. Write a program to implement stack using linked list.
 5. Write a program to implement AVL Tree.
 6. Write a program to implement Breadth First Search and Depth First Search.
 7. Write a program to implement graph using array.
 8. Write a program to implement Spanning Tree.
 9. Write a program to implement Heap Sort.
 10. Write a program to implement binary search algorithm.
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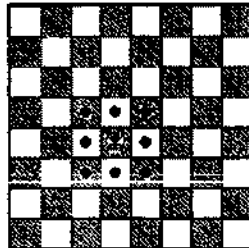
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DATA STRUCTURES

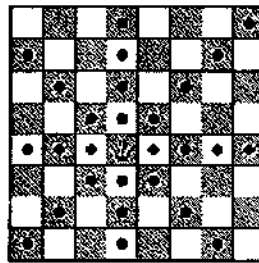
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LIST OF SKILL BASED MINI PROJECT

1. Write a program to implement King Travails on the standard 8x8 chess board. (The king moves one square in any direction, horizontally, vertically, or diagonally.)



2. Write a program to implement Queen Travails on the standard 8x8 chess board. (The queen may move in any straight line, horizontal, vertical, or diagonal.)



3. Implement the Phone directory application using doubly-linked lists.
 4. Design and solve any puzzles with only one solution, such as mazes. (DFS can be adapted to find all solutions to a maze by only including nodes on the current path in the visited set.)
 5. Write a program to evaluate any arithmetic expressions using STACK.
 6. Write a program to implement priority queue for airport check in process.
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DEPARTMENT OF INFORMATION TECHNOLOGY
PYTHON PROGRAMMING LAB
2160222/2230223/2240223/2270222/2280222

LIST OF PROGRAMS

1. Write a program to demonstrate different number data types in python.
2. Write a program to perform different arithmetic operations on numbers in python.
3. Write a program to create, concatenate and print a string and accessing substring from a given string.
4. Write a python program to create, append and remove lists in python.
5. Write a program to demonstrate working with tuples in python.
6. Write a program to demonstrate working with dictionaries in python.
7. Write a python program to find the factorial of a number using recursion.
8. WAP to swap two integers without using a third variable. The swapping must be done in a different method in a different class.
9. WAP to find the greater of two given numbers in two different classes using friend function.
10. Write a python program to define a module and import a specific function in that module to another program.

COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. write, test, and debug simple Python programs.
 - CO2. solve computational problem using python language.
 - CO3. familiar with basics syntax and features of python programming language.
 - CO4. use Python lists, tuples, dictionaries for representing compound data.
 - CO5. design a program utilizing the features of object oriented concept.
 - CO6. utilize some of the libraries available for solving problems.
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DEPARTMENT OF INFORMATION TECHNOLOGY

PYTHON PROGRAMMING LAB

2160222/2230223/2240223/2270222/2280222

LIST OF SKILL BASED MINI PROJECT

1. Implement a calculator using Tkinter library.
 2. Design and implementation of Animal Kingdom Classification.
 3. Design and implementation of a real-time, User friendly Currency Converter.
 4. Design and implementation of a File Manager which supports various types of files.
 5. Design a program for Number Guessing using random number generator library. Make a play game with the defined library.
 6. Design any game of your choice like tic-tac-toe etc.
 7. Implement a contact book (command line project) capable of storing user data like name, address, phone number, email etc. Use any database for storing the information so that updation and deletion can also be carried out.
 8. Implement binary search algorithm by creating a list from random numbers between any predefined ranges.
 9. Design a program for spam filtering.
 10. Design a dice rolling simulator generating random number from 1 to 6 every time dice is rolled.
 11. Implement countdown clock and timer.
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DEPARTMENT OF INFORMATION TECHNOLOGY

DATABASE MANAGEMENT SYSTEM

2160223/ 2230224/ 2240224/ 2270223/ 2280223

LIST OF PROGRAMS

While creating tables, databases the name should have a prefix of your roll number.

Ex. If your roll number is 55 then every table name must start with 55 TABLE_NAME. 1. Write program name 2. Write description of command used for executing the query. 3. Write commands in bold letters. 4. Take the screenshot of the output.

1. Implementation of DDL commands of SQL with suitable examples.
 - a. Create table
 - b. Alter table
 - c. Drop Table
2. Implementation of DML commands of SQL with examples.
 - a. Insert
 - b. Update
 - c. Delete
3. Implementation of different type of function with suitable example
 - a. Number function
 - b. Aggregate function
 - c. Character function
 - d. Conversion function
 - e. Data function
4. Implementation of different type of operators in SQL.
 - a. Arithmetic operators
 - b. Logical operators
 - c. Set operator
 - f. Comparison Operator
 - g. Special operator
5. Implementation of type of joins.
 - a. Inner Join
 - b. Outer Join
 - c. Natural Join etc.
6. Study and implementation of
 - a. Group by & having clause
 - b. order By clause
 - c. Indexing
7. Study of Implementation of
 - a. Sub queries
 - b. Views
8. Study & implementation of different type of constraints.
9. Study & implementation of database backup & recovery command. Study & implementation of Rollback, commit, savepoint.
10. Creating Database /Table Space
 - a. Managing Users: Create User, Delete User
 - b. Managing roles: Grant. Revoke.

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DEPARTMENT OF INFORMATION TECHNOLOGY

COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. construct database schema for a given problem domain.
 - CO2. apply integrity constraints on a database schema using a state-of-the-art RDBMS.
 - CO3. apply SQL queries using DDL and DML to design and access database systems.
 - CO4. make use of operators and functions used in query.
 - CO5. distinguish Tables and Views for database systems.
 - CO6. develop a small project for a real world scenario.
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DEPARTMENT OF INFORMATION TECHNOLOGY

DATABASE MANAGEMENT SYSTEM

2160223/ 2230224/ 2240224/ 2270223/ 2280223

LIST OF SKILL BASED MINI PROJECT

- Design, develop, and implement the specified queries for the following problems using Oracle, MySQL, MS SQL Server, or any other DBMS under LINUX/Windows environment.
- Design ER-Diagram, Create Schema and insert at least 5 records for each table. Add appropriate database constraints

Mini Skill Project 1

Consider the following schema for a Library Database:

BOOK (Book_id, Title, Publisher_Name, Pub_Year)

BOOK_AUTHORS (Book_id, Author_Name)

PUBLISHER (Name, Address, Phone)

BOOK_COPIES (Book_id, Programme_id, No-of_Copies)

BOOK_LENDING (Book_id, Programme_id, Card_No, Date_Out, Due_Date)

LIBRARY_PROGRAMME (Programme_id, Programme_Name, Address)

Write SQL queries to

1. Retrieve details of all books in the library – id, title, name of publisher, authors, number of copies in each Programme, etc.
2. Get the particulars of borrowers who have borrowed more than 3 books, but from Jan 2017 to Jun 2017.
3. Delete a book in BOOK table. Update the contents of other tables to reflect this data manipulation operation.
4. Partition the BOOK table based on year of publication. Demonstrate its working with a simple query.
5. Create a view of all books and its number of copies that are currently available in the Library.

Mini Skill Project 2

Consider the following schema for Order Database:

SALESMAN (Salesman_id, Name, City, Commission)

CUSTOMER (Customer_id, Cust_Name, City, Grade, Salesman_id)

ORDERS (Ord_No, Purchase_Amt, Ord_Date, Customer_id, Salesman_id)

Write SQL queries to

1. Count the customers with grades above Bangalore's average.
2. Find the name and numbers of all salesman who had more than one customer.
3. List all the salesman and indicate those who have and do not have customers in their cities (Use UNION operation.)
4. Create a view that finds the salesman who has the customer with the highest order of a day.
5. Demonstrate the DELETE operation by removing salesman with id 1000. All his orders must also be deleted.

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DEPARTMENT OF INFORMATION TECHNOLOGY

Mini Skill Project 3

Consider the schema for Movie Database:

ACTOR (Act_id, Act_Name, Act_Gender)

DIRECTOR (Dir_id, Dir_Name, Dir_Phone)

MOVIES (Mov_id, Mov_Title, Mov_Year, Mov_Lang, Dir_id)

MOVIE_CAST (Act_id, Mov_id, Role)

RATING (Mov_id, Rev_Stars)

Write SQL queries to

1. List the titles of all movies directed by 'Hitchcock'.
2. Find the movie names where one or more actors acted in two or more movies.
3. List all actors who acted in a movie before 2000 and in a movie after 2015 (use JOIN operation).
4. Find the title of movies and number of stars for each movie that has at least one rating and find the highest number of stars that movie received. Sort the result by movie title.
5. Update rating of all movies directed by 'Steven Spielberg' to 5.

Mini Skill Project 4

Consider the schema for College Database:

STUDENT (USN, SName, Address, Phone, Gender)

SEMSEC (SSID, Sem, Sec)

CLASS (USN, SSID)

COURSE (Subcode, Title, Sem, Credits)

IAMARKS (USN, Subcode, SSID, Test1, Test2, Test3, FinalIA)

Write SQL queries to

1. List all the student details studying in fourth semester 'C' section.
2. Compute the total number of male and female students in each semester and in each section.
3. Create a view of Test1 marks of student USN '1BI15CS101' in all Courses.
4. Calculate the FinalIA (average of best two test marks) and update the corresponding table for all students.
5. Categorize students based on the following criterion:
If FinalIA = 17 to 20 then CAT = 'Outstanding'
If FinalIA = 12 to 16 then CAT = 'Average'
If FinalIA < 12 then CAT = 'Weak'
Give these details only for 8th semester A, B, and C section students.

Mini Skill Project 5

Consider the schema for Company Database:

EMPLOYEE (SSN, Name, Address, Sex, Salary, SuperSSN, DNo)

DEPARTMENT (DNo, DName, MgrSSN, MgrStartDate)

DLOCATION (DNo, DLoc)

PROJECT (PNo, PName, PLocation, DNo)

WORKS_ON (SSN, PNo, Hours)

Write SQL queries to

1. Make a list of all project numbers for projects that involve an employee whose last name is 'Scott', either as a worker or as a manager of the department that controls the project.
2. Show the resulting salaries if every employee working on the 'IoT' project is given a 10 percent raise.
3. Find the sum of the salaries of all employees of the 'Accounts' department, as well as the maximum salary, the minimum salary, and the average salary in this department.

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DEPARTMENT OF INFORMATION TECHNOLOGY

4. Retrieve the name of each employee who works on all the projects controlled by department number 5 (use NOT EXISTS operator).
5. For each department that has more than five employees, retrieve the department number and the number of its employees who are making more than Rs. 6,00,000.

Mini Skill Project 6

A university registrar's office maintains data about the following entities:

- (a) courses, including number, title, credits, syllabus, and prerequisites;
- (b) course offerings, including course number, year, semester, section number, instructor(s), timings, and classroom;
- (c) students, including student-id, name, and program; and
- (d) instructors, including identification number, name, department, and title. Further, the enrollment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modeled.

Construct an E-R diagram for the registrar's office. Document all assumptions that you make about the mapping constraints.

Mini Skill Project 7

Construct an E-R diagram for a car-insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents.

Mini Skill Project 8

Construct an E-R diagram for a hospital with a set of patients and a set of medical doctors. Associate with each patient a log of the various tests and examinations conducted.

Mini Skill Project 9

Design an E-R diagram for keeping track of the exploits of your favourite sports team. You should store the matches played, the scores in each match, the players in each match and individual player statistics for each match. Summary statistics should be modeled as derived attributes.

Mini Skill Project 10

Consider a database used to record the marks that students get in different exams of different course offerings.

- a. Construct an E-R diagram that models exams as entities, and uses a ternary relationship, for the above database.
- b. Construct an alternative E-R diagram that uses only a binary relationship between students and course-offerings. Make sure that only one relationship exists between a particular student and course-offering pair, yet you can represent the marks that a student gets in different exams of a course offering.

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Gaps in CO Attainment Levels

for

Session January - June 2022 Semester

and

***Proposed Corrective Measures for Improvement
(Information Technology/ Internet of Things (IoT)/
Artificial Intelligence and Robotics/ Artificial
Intelligence & Data Science/ Artificial Intelligence &
Machine Learning)***

[ITEM IT-13]

Session: Jan-June 2022

Course Name	Course Outcomes	Level of Direct Assessment ent %	Level of Indirect Assessment ent %	Level of Overall Assessment ent %	Target of Level	Target of Level	Gap	Attained/ Not Attained	Action Taken
160211: Data Structure	C01	66	2.8	66.4	3	2.64	60	2	-0.84
	C02	61.6	2.2	91.3	3	2.33	60	2	-0.33
	C03	62.4	2.2	69.9	3	2.39	60	2	-0.39
	C04	60	2.0	89.9	3	2.2	60	2	-0.2
	C05	57.6	1.8	88.4	3	2.01	60	2	-0.01
	C06	55.2	1.5	91.3	3	1.82	60	2	0.18
160311: Digital Electronics	C01	68	2.8	76.8	3.0	2.84	65	2.5	-0.34
	C02	61.6	2.2	62.3	2.2	2.17	65	2.5	0.33
	C03	69	2.9	73.9	3.0	2.92	65	2.5	-0.42
	C04	76	3.0	71.0	3.0	3.00	65	2.5	-0.50
	C05	55.2	1.5	63.8	2.4	1.69	65	2.5	0.81
	C06	70	3.0	75.4	3.0	3.00	65	2.5	-0.50
160212: OOPs	C01	61.5	2.2	79.2	3	2.32	65	2.6	0.18
	C02	59	1.8	57.6	1.8	1.87	65	2.5	0.63
	C03	69.2	2.8	43.2	0	2.33	65	2.5	0.16
	C04	64.1	2.4	79.2	3	2.52	65	2.5	0
	C05	76.9	3.0	60	2	2.8	65	2.5	0
	C06	68.6	2.7	57.6	1.6	2.48	65	2.5	0.02
160411: Computer Graphics	C01	96.00	3.0	93.00	3.00	3.00	60	3.00	0
	C02	95.00	3.0	93.00	3.00	3.00	60	3.00	0
	C03	88.00	3.0	87.00	3.00	3.00	60	3.00	0
	C04	80.00	3.0	87.00	3.00	3.00	60	3.00	0
	C05	96.00	3.0	93.00	3.00	3.00	60	3.00	0
	C06	82.00	3.0	87.00	3.00	3.00	60	3.00	0

Students are encouraged to observe, to gain insight into possible approaches/solutions/algorithms to real life problems.

Research oriented mini skill projects are encouraged to develop and hone their research skills.

more practical approach and problems will be introduced with students.

Additional topic specific tests should be conducted

Extra classes to be conducted for slow learners beyond the regular planned classes.

Students are motivated to develop mini-projects focusing on real world problems.

Design of more converter should be initiated to make the work of students as per with industrial standards.

More practical approach and problems will be introduced with students using K-map simplification technique.

Level of target should be increased

Arrangement of Remedial Classes

Discussed extra Tutorial- sheets

Arrangement of Remedial Classes

More HQT questions should be added

Level of questions should be improved.

Students are encouraged to participate in various coding competitions which involves the design and development of OOPS based software.

Understand the basic concepts of computer graphics.

Develop solutions to problems demonstrating usage of control structures, modularity, PO and other standard language constructs

Understand the basic concepts of computer graphics.

Demonstrate scan conversion problems using programming language.

Implement the concepts of geometric transformation of 2D and 3D objects.

Apply coding and filling techniques for modifying an object.

Understand the practical implementation of modeling and rendering.

Demonstrate the concept of viewing of 2D objects.

Level of questions should be improved.

Discussed extra Tutorial- sheets

More HQT questions should be added

Level of questions should be improved.

More projects on solving complex problems will be included.

More projects given to students are quite complex to help them in understanding complex problems.

Understand the basic concepts of computer graphics.

Semester II

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Semester IV	(240401) Computer architecture and Microprocessor	CO1	demonstrate the computer architecture and microprocessor for defining basic component and functional units.	76	3	88	3	78.4	3	70	3	0	Each CO target level is required to be reset to higher level which is to be attained through higher order thinking questions
		CO2	develop the fundamental concept to understand the working of computer architecture and microprocessor.	80.8	3	82.67	3	81.17	3	70	3	0	
		CO3	explain the basic concept of input output and memory organization.	93.6	3	85.33	3	91.95	3	70	3	0	
		CO4	develop the skill of writing assembly language programming.	88	3	86.67	3	87.73	3	70	3	0	
		CO5	build a system using peripheral devices and controllers for 8086 microprocessors.	92.8	3	85.33	3	91.31	3	70	3	0	
		CO6	apply the concept of computer architecture and microprocessor in solving real world problems.	82.4	3	86.67	3	83.25	3	70	3	0	
	(240402) Cloud computing	CO1	demonstrate the computer architecture and microprocessor for defining basic component and functional units.	78.4	3	83	3	79.32	3	60	2	-1	Target level is needed to be updated. Analytical approach is to be employed to enhance the direct level attainments for each CO.
		CO2	develop the fundamental concept to understand the working of computer architecture and microprocessor.	73.6	3	81	3	75.08	3	60	2	-1	
		CO3	explain the basic concept of input output and memory organization.	78.4	3	83	3	79.32	3	60	2	-1	
		CO4	develop the skill of writing assembly language programming.	85.6	3	77	3	83.88	3	60	2	-1	
		CO5	build a system using peripheral devices and controllers for 8086 microprocessors.	80	3	75	3	79	3	60	2	-1	
		CO6	apply the concept of computer architecture and microprocessor in solving real world problems.	80	3	81	3	80.2	3	60	2	-1	
	(240404) Machine Learning and optimization	CO1	Summarize different kind of machine learning algorithms.	88.80	3	88.80	3	88.8	3	60	2	-1	The course attains all COs except CO5 which needs more real life problems/ projects to be assigned to the students. Additionally, target level can be increased.
		CO2	Demonstrate a familiarity with major optimization algorithms.	76.80	3	76.80	3	79.2	3	60	2	-1	
		CO3	Apply optimization algorithms to solve real world problems.	69.60	2.96	69.60	2.96	71.04	3	60	2	-1	
		CO4	Formulation of design problems as mathematical programming problems.	67.20	2.72	67.20	2.72	67.68	2.77	60	2	-0.768	
		CO5	Examine supervised and unsupervised learning methods for real-life problems.	52.00	1.2	52.00	1.2	55.04	1.5	60	2	0.496	
		CO6	Deploy machine learning models for real time problems.	60.00	2	60.00	2	60	2	60	2	0	

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 Department of Information Technology

CO Attainment of B.Tech. IT (01)

Session: Jan - June 2022

	Course Name	Course outcomes	Direct Attainment %	Level of Direct Attainment	Indirect Attainment %	Level of Indirect Attainment	Overall Attainment %	Overall level of Attainment	Target	Target of level	Gap	Attained/ Not Attained	Action Taken
Semester II	230201: Digital logic and design	CO1 explain the basic components and function	60.8	2.08	85.5	3	66	2.57	60	2	-0.57	Attained/ Not Attained	Though all the COs are attained, the target level can further be enhanced and more practical problems will be assigned to test the skills .
		CO2 explain the basic components and function	55.2	1.52	97.1	3	64	2.36	60	2	-0.36		
		CO3 develop the understanding of combination	57.6	1.76	94.2	3	65	2.49	60	2	-0.49		
		CO4 analyse the basic concept of sequential cir	59.2	1.92	88.4	3	65	2.50	60	2	-0.50		
		CO5 analyse the basic concept of sequential cir	60.8	2.08	89.9	3	67	2.66	60	2	-0.66		
		CO6 reduce the Boolean functions to mitigate h	71.2	3	80.5	3	73	3.00	60	2	-1.00		
	(230202): Data structure	CO1 tell the concepts of classes & objects and their significance in real world.	81.16	3	72.80	3	79	3.00	60	2	-1.00		Although all the COs are attained, the level of higher order thinking questions will be assigned. Moreover, Cos attainment can further be improved by improving the indirect attainment through more practical real life problems.
		CO2 explain the benefits of object oriented design.	78.26	3	72.80	3	77	3.00	60	2	-1.00		
		CO3 build C++ classes using appropriate encapsulat	82.61	3	72.80	3	81	3.00	60	2	-1.00		
		CO4 analyze the utilization of inheritance and polym	79.71	3	60.80	2.08	76	3.00	60	2	-1.00		
		CO5 choose appropriate object orient programming	75.36	3	60.80	2.08	72	3.00	60	2	-1.00		
		CO6 tell the concepts of classes & objects and their	81.16	3	60.80	2.08	77	3.00	60	2	-1.00		
	(230203) Object oriented Programming and Methodology	CO1 explain the benefits of object oriented design.	85.5	3	72.80	3	75	3.00	60	2	-1.00		Since significant attainment gaps are filled, each CO target level should be increased. Further, The direct and indirect attainments will be improved by setting good analytical skill set problems.
		CO2 build C++ classes using appropriate encapsulat	87.0	3	72.80	3	76	3.00	60	2	-1.00		
		CO3 analyze the utilization of inheritance and polym	82.6	3	72.80	3	75	3.00	60	2	-1.00		
		CO4 choose appropriate object orient programming	82.6	2.08	60.80	3	65	2.52	60	2	-0.52		
		CO5 choose appropriate object orient programming	81.2	2.08	60.80	3	65	2.49	60	2	-0.49		
		CO6 develop solutions to problems demonstrating u	79.7	2.08	60.80	3	65	2.46	60	2	-0.46		
(230401) Computer architecture and Microprocessor	CO1 demonstrate the computer architecture	76.0	3	88	3	78	3.00	60	2	-1.00	Each CO target level is required to be reset to higher level which has to be reattained through higher order thinking questions and more realistic problems.		
	CO2 develop the fundamental concept to ur	80.8	3.0	82.7	3.0	81	3.00	60	2.0	-1.00			
	CO3 explain the basic concept of input outp	93.6	3.0	85.3	3.0	92	3.00	60	2.0	-1.00			
	CO4 develop the skill of writing assembly la	88.0	3.0	86.7	3.0	88	3.00	60	2.0	-1.00			
	CO5 build a system using peripheral devices	92.8	3.0	85.3	3.0	91	3.00	60	2.0	-1.00			
	CO6 apply the concept of computer archite	82.4	3.0	86.7	3.0	83	3.00	60	2.0	-1.00			

Madhav Institute of Technology and Science, Gwalior
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 Department of Information Technology

Session: Jan - June 2022

	Course Name	Course outcomes	Direct Attainment %	Level of Direct Attainment	Indirect Attainment %	Level of Indirect Attainment	Overall Attainment %	Overall level of Attainment	Target	Target of level	Gap	Attained/ Not Attained	Action Taken
Semester IV	(230402) Cloud computing	CO1 Define various basic concepts related to cl	96.00	3.0	97	3.0	96	3.00	60	2	-1.00		The observed attainment gaps are significantly filled and direct and indirect attainments are also high. So, Analytical problems will be framed and target levels for each CO can be increased.
		CO2 Identify the architecture, infrastructure an	96.00	3.0	91	3.0	95	3.00	60	2	-1.00		
		CO3 Apply suitable virtualization concept	86.40	3.0	88	3.0	87	3.00	60	2	-1.00		
		CO4 Choose the appropriate programming mod	92.80	3.0	88	3.0	92	3.00	60	2	-1.00		
		CO5 Analyse various security issues in cloud cor	89.60	3.0	97	3.0	91	3.00	60	2	-1.00		
		CO6 Compose virtualization, security and progr	88.80	3.0	94	3.0	90	3.00	60	2	-1.00		
	(230404) IoT Architecture & Protocols	CO1 explain the fundamental concepts of IoT A	71.20	3	73	3	72	3.00	60	2	-1.00		Each CO target level is required to be reset to higher level. Moreover, complex problems can be assigned.
		CO2 illustrate the basic taxonomy & termi	71.20	3	67	2.6667	70	3.00	60	2	-1.00		
		CO3 develop a concept for understanding IoT t	92.80	3	71	3	89	3.00	60	2	-1.00		
		CO4 build the skill for establishing communicat	87.20	3	75	3	85	3.00	60	2	-1.00		
		CO5 analyze various IoT Application layer Protc	60.00	2	75	3	63	2.29	60	2	-0.29		
		CO6 design IoT-based systems for real-world p	88.80	3	83	3	88	3.00	60	2	-1.00		

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Department of Information Technology

Jan June 2022

Course Name	Course Objective	Direct Assessment	Level of Direct Assessment	Indirect Assessment (in %)	Level of Indirect Assessment	Overall Level of Assessment	Target	Delta	Action Taken
270201 Digital Logic Design	CO1 explain the basic components and functional units to define computer architecture	83.2	2.3	79.7	3.0	2.46	2.00	-0.46	More numerical type problem should be discussed and included in examination paper
	CO2 explain different number systems and basic operations employed at machine level.	64.0	2.4	79.7	3.0	2.52	2.00	-0.52	More complex assignments and tutorials are to be given to students for better understanding.
	CO3 develop the understanding of combinational circuits.	60.1	2.0	78.3	3.0	2.21	2.00	-0.21	Complex theoretical problem of combinational circuits should be included in class session.
	CO4 analyse the basic concept of sequential circuits.	64.8	2.5	75.4	3.0	2.58	2.00	-0.58	Discuss more practical examples in class room session and complex sequential circuits will discuss with students.
	CO5 compare and differentiate various memories used in computers.	69.6	3.0	78.3	3.0	2.97	2.00	-0.97	Higher order thinking question should be discussed in class session.
	CO6 reduce the Boolean functions to mitigate hardware complexity issues.	60.0	2.0	75.4	3.0	2.20	2.00	-0.20	Higher order thinking question and numerical problems should be included. Subsequent extra classes should be conducted beyond the regular planned classes.
270202 Data Structure	CO1 outline the basic of algorithms and their performance criteria.	58	1.8	59	1.9	1.78	2.5	0.72	More complex questions should be added.
	CO2 explain the working of linear/non linear data structures.	69.7	3.0	69.6	3.0	2.97	2.5	-0.47	More complex questions should be added.
	CO3 identify the appropriate data structure to solve specific problems.	79	3.0	64	2.4	2.88	2.5	-0.38	Extra Tutorial- sheets will discuss with students during extra classes.
	CO4 analyze the performance of various data structures and their applications.	55	1.5	50	1.0	1.37	2.5	1.13	More complex and numerical questions should be discussed and added in examination paper.
	CO5 evaluate the time/space complexities of various data structures & their applications.	75.7	3.0	75.0	3.0	3.00	2.5	-0.50	More complex questions should be added.
	CO6 design the optimal algorithmic solutions for various problems.	78.7	3.0	68.8	2.9	2.98	2.5	-0.48	More complex questions should be added.
270203 Object Oriented Programming and methodology	CO1 tell the concepts of classes & objects and their significance in real world.	76.00	3.0	81.15	3.0	3.00	2.00	-1.00	More problem solving question related to class and objects should be included in examination.
	CO2 explain the benefits of object oriented design.	76.00	3.0	84.05	3.0	3.00	2.00	-1.00	Complex programming activities will include for better understanding the concepts of OOP.
	CO3 build C++ classes using appropriate encapsulation and design principles.	63.20	2.3	85.50	3.0	2.46	2.00	-0.46	Real world problem will discuss to student and ask them to write pseudo-code and flowchart of
	CO4 analyze the utilization of inheritance and polymorphism in the solution of problems.	62.40	2.2	81.15	3.0	2.39	2.00	-0.39	Discuss more programming solutions to student for analyzing programming problems.
	CO5 choose appropriate object oriented programming concepts for solving real world problems.	69.60	3.0	79.71	3.0	2.97	2.00	-0.97	More practical problem will give to student for testing, debugging and implementing the same.
	CO6 develop solutions to problems demonstrating usage of control structures, modularity, I/O and other standard language constructs.	75.20	3.0	76.81	3.0	3.00	2.00	-1.00	More complex real world programming problem will include in examination paper.

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Curricula Feedback from Various Stakeholders
for
July - November 2022 Semester &
March - July 2022 Semester
(Information Technology)
[ITEM IT - 14]

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute. Affiliated to RGPV, Bhopal)

Department of Information Technology

Analysis Report of Feedback on Course Curriculum Collected from various Stakeholders

S.No.	Feedback Report	Page No.
1.	COURSE CURRICULUM FEEDBACK (March 2022 to July 2022) (2 nd Sem)	1
2.	COURSE CURRICULUM FEEDBACK (July 2022 to Nov. 2022) (3 rd Sem)	10
3.	COURSE CURRICULUM FEEDBACK (July 2022 to Nov. 2022) (5 th Sem)	21
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5.	Alumni Feedback (Batch 2018 -2022)	37
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Session wise analysis and impact report: March-July 2022 (2nd sem.)

Based on the feedback data received from total 394 (Approximate) students and 08 faculty members (Second semester- IT, IT-AIR, IT-IoT, AIML, AIDS) for the academic session March to July 2022, following points have been analysed:

- It has been observed that, in second semester 38.98% of students are strongly agreed, 38.44% of students are agreed, 14.87% of students are neutral, 2.47% of students are disagreed and only 0.86% of students are strongly disagreed with the syllabus/ content that they have studied in the second semester.
- Students have suggested to add "Stack and STL (standard template library) topics" in Objected oriented programming and methodology
- Some students have suggested for removing Digital logic families from Digital logic design.
- It has been observed that, in second semester 72.85% of faculty members are strongly agreed, 25.71% of faculty members are agreed, with the curriculum, syllabus/ content that they have taught in the second semester.

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COURSE CURRICULUM FEEDBACK (by Students on MOODLE): Sample Size: 27 (Avg.)

Subject Code	Subject Name	Student Feedback (Comments)		Response to student comments / Analysis
230201	Digital Logic Design (IoT)	Mention the course / contents which in your opinion is outdated & needs to be removed.	Remove Digital logic families	Topics of Digital logic design will update and remove in syllabus, after discussion with subject faculty.
230203	Object Oriented Programming & Methodology (IoT)	Mention the course / contents which in your opinion is outdated & needs to be removed.	Stack	These topics will study in upcoming semesters. (Already part of curriculum)
		Name course / contents which needs to be updated.	STL should be included	
Link		https://drive.google.com/drive/folders/1dhm7dMKWRkQ_dM0wQMJK5rVljpkfFzVx?usp=share link		
Action/ Taken (threshold value 3.5)		After discussion with HOD and faculty members, topics of Digital logic design and object oriented programming will update and include in curriculum. Digital Logic families are the fundamental topics of Digital logic design. Moreover, this topic is also part of syllabus for higher level competitive exams like GATE.		

Subject Code	Subject Name	1. The course is well designed	2. The syllabus units are balanced	3. The course will be useful for you in future	4. The learning material was available to you	5. The content was clear and easy to understand	6. The course meets your expectations	7. The course was relevant and updated for present needs
160211	Data Structures (IT)	4.26	4.26	4.37	4.43	4.26	4.26	4.26
160212	Object Oriented Programming & Methodology (IT)	4.28	4.12	4.28	4.40	4.32	4.32	4.24

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160213	Digital Electronics (IT)	4.17	4.17	4.26	4.04	4.00	3.96	4.17
240201	Digital Logic Design (AIR)	4.19	4.23	4.35	4.08	4.08	4.08	4.23
240202	Data Structures (AIR)	4.63	4.59	4.65	4.71	4.63	4.15	4.24
240203	Object Oriented Programming & Methodology (AIR)	4.10	4.10	3.86	3.93	4.00	4.24	4.17
230201	Digital Logic Design (IoT)	4.21	4.28	4.38	4.14	4.10	4.10	4.28
230202	Data Structures (IoT)	4.63	4.59	4.65	4.71	4.63	4.15	4.24
230203	Object Oriented Programming & Methodology (IoT)	4.30	4.15	4.22	4.41	4.33	4.33	4.26
280201	Digital Logic Design (AIML)	4.00	4.07	4.07	3.79	3.79	3.93	3.93
280202	Data Structures (AIML)	4.15	4.00	4.24	4.35	4.24	4.29	4.24
280203	Object Oriented Programming & Methodology (AIML)	4.30	4.15	4.22	4.41	4.33	4.33	4.26
270201	Digital Logic Design (AIDS)	4.05	3.95	3.80	3.85	4.15	4.05	4.05
270202	Data Structures (AIDS)	4.15	4.00	4.24	4.35	4.24	4.29	4.24
270203	Object Oriented Programming & Methodology (AIDS)	4.57	4.79	4.70	4.85	4.68	4.20	4.35
Course Satisfaction Index (CSI) (on a scale of 5) (5: Excellent, 4: Very Good, 3: Good, 2: Average, 1: Below Average)								

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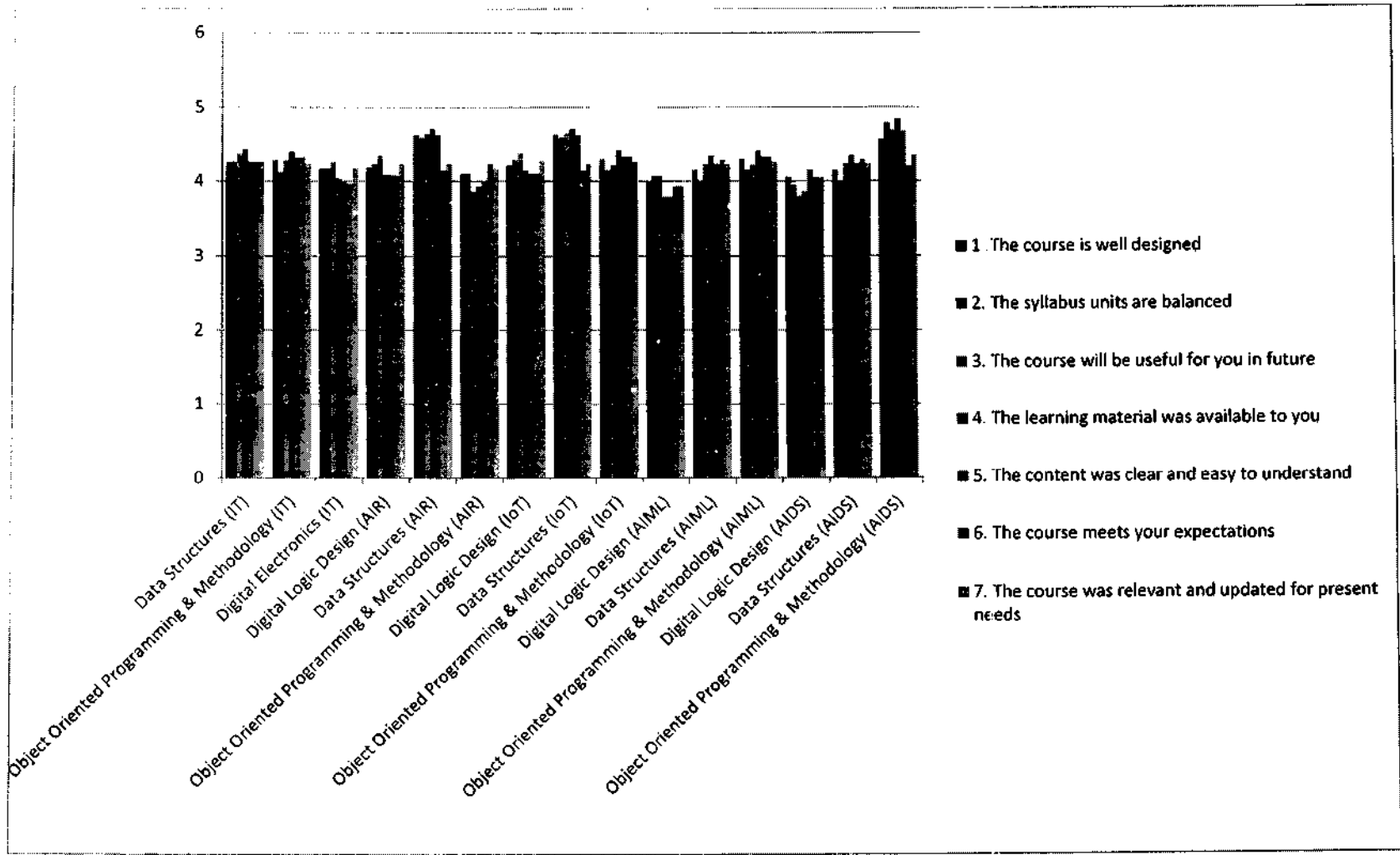
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Subject Code	Subject Name	Semester	Faculty Name	Strongly Agree in %	Agree in %	Neutral in %	Disagree in %	Strongly disagree in %
160211	Data Structures (IT) (35)	2	Dr. Saumil Maheswari	59.18	18.78	17.14	2.45	2.45
160212	Object Oriented Programming & Methodology (IT) (25)	2	Prof. Namrata Agrawal	39.43	49.14	11.43	0.00	0.00
160213	Digital Electronics (IT) (23)	2	Dr. Tej Singh	32.92	50.31	13.66	1.24	1.86
240201	Digital Logic Design (AIR) (29)	2	Dr. Tej Singh	36.81	48.35	12.09	1.10	1.65
240202	Data Structures (AIR) (16)	2	Dr. Vikram Rajpoot	32.07	18.95	11.08	4.66	0.58
240203	Object Oriented Programming & Methodology (AIR) (29)	2	Dr. Dhananjay Bisen	43.84	23.65	28.08	3.45	0.99
230201	Digital Logic Design (IoT) (26)	2	Dr. Tej Singh	39.90	45.32	12.32	0.99	1.48
230202	Data Structures (IoT) (17)	2	Dr. Vikram Rajpoot	32.07	18.95	11.08	4.66	0.58
230203	Object Oriented Programming & Methodology (IoT) (27)	2	Dr. Dhananjay Bisen	40.21	48.68	10.58	0.53	0.00
280201	Digital Logic Design (AIML) (14)	2	Dr. Pawan Dubey	34.69	34.69	22.45	6.12	2.04
280202	Data Structures (AIML) (17)	2	Prof. Namrata Agrawal	35.81	49.78	14.41	0.00	0.00
280203	Object Oriented Programming & Methodology (AIML) (26)	2	Dr. Bhagat Singh Raghuwanshi	40.21	48.68	10.58	0.53	0.00
270201	Digital Logic Design (AIDS) (20)	2	Dr. Nidhi Saxena	32.14	41.43	20.00	5.71	0.71
270202	Data Structures (AIDS) (17)	2	Prof. Namrata Agrawal	35.81	49.78	14.41	0.00	0.00
270203	Object Oriented Programming & Methodology (AIDS) (40)	2	Dr. Vikram Rajpoot	49.65	30.16	13.74	5.54	0.58
			Average	38.98	38.44	14.87	2.47	0.86

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COURSE CURRICULUM FEEDBACK (by Faculty on MOODLE)

Action / taken (threshold value 3.5)
As per given suggestions of faculty members, it is observed that faculties have satisfied with course content and curriculum/ syllabus of second semester. The curriculum is capable of inculcating life-long learning abilities in students. Syllabus is updated as per the requirement of current scenario.
Link: https://drive.google.com/drive/folders/10mWJAe2VRPsSvZPiTzv6OdVIP5K6LiV?usp=share link

Subject Code	Subject Name	Faculty Name	1. The availability of books & E-learning material in the institute is good. (Please give your opinion)	2. The Courses and content are up to date. Please suggest if you feel any new course(s) need to be introduced to meet current needs & technological changes?	3. The course curriculum/syllabi are helpful in meeting the higher studies/place ment requirements according to present global trends. (Please give suggestions if any)	4. The course / contents in your domain/area are well designed and frequently updated, hence need no changes at present.[If you feel some changes (new content to be added or outdated content to be removed) are needed, please suggest]	5. The curriculum is capable of inculcating life-long learning abilities in students. (Any suggestions, please give below)
160211	Data Structures (IT)	Dr. Saumil Maheswari	5	5	5	5	5
160212	Object Oriented Programming & Methodology (IT)	Prof. Namrata Agrawal	5	5	5	5	5
160213	Digital Electronics (IT)	Dr. Tej Singh	4	5	4	4	4
240201	Digital Logic Design (AIR)	Dr. Tej Singh	5	5	5	5	4
240202	Data Structures (AIR)	Dr. Vikram Rajpoot	4	5	5	5	4

240203	Object Oriented Programming & Methodology (AIR)	Dr. Dhananjay Bisen	4	5	5	5	5
230201	Digital Logic Design (IoT)	Dr. Tej Singh	5	5	5	5	5
230202	Data Structures (IoT)	Dr. Vikram Rajpoot	5	5	5	5	5
230203	Object Oriented Programming & Methodology (IoT)	Dr. Dhananjay Bisen	5	5	5	5	4
280201	Digital Logic Design (AIML)	Dr. Pawan Dubey	4	4	5	4	4
280202	Data Structures (AIML)	Prof. Namrata Agrawal	4	5	5	5	5
280203	Object Oriented Programming & Methodology (AIML)	Dr. Bhagat Singh Raghuwanshi	5	5	5	5	5
270201	Digital Logic Design (AIDS)	Dr. Nidhi Saxena	5	5	5	5	5
270203	Object Oriented Programming & Methodology (AIDS)	Dr. Vikram Rajpoot	4	5	5	5	5

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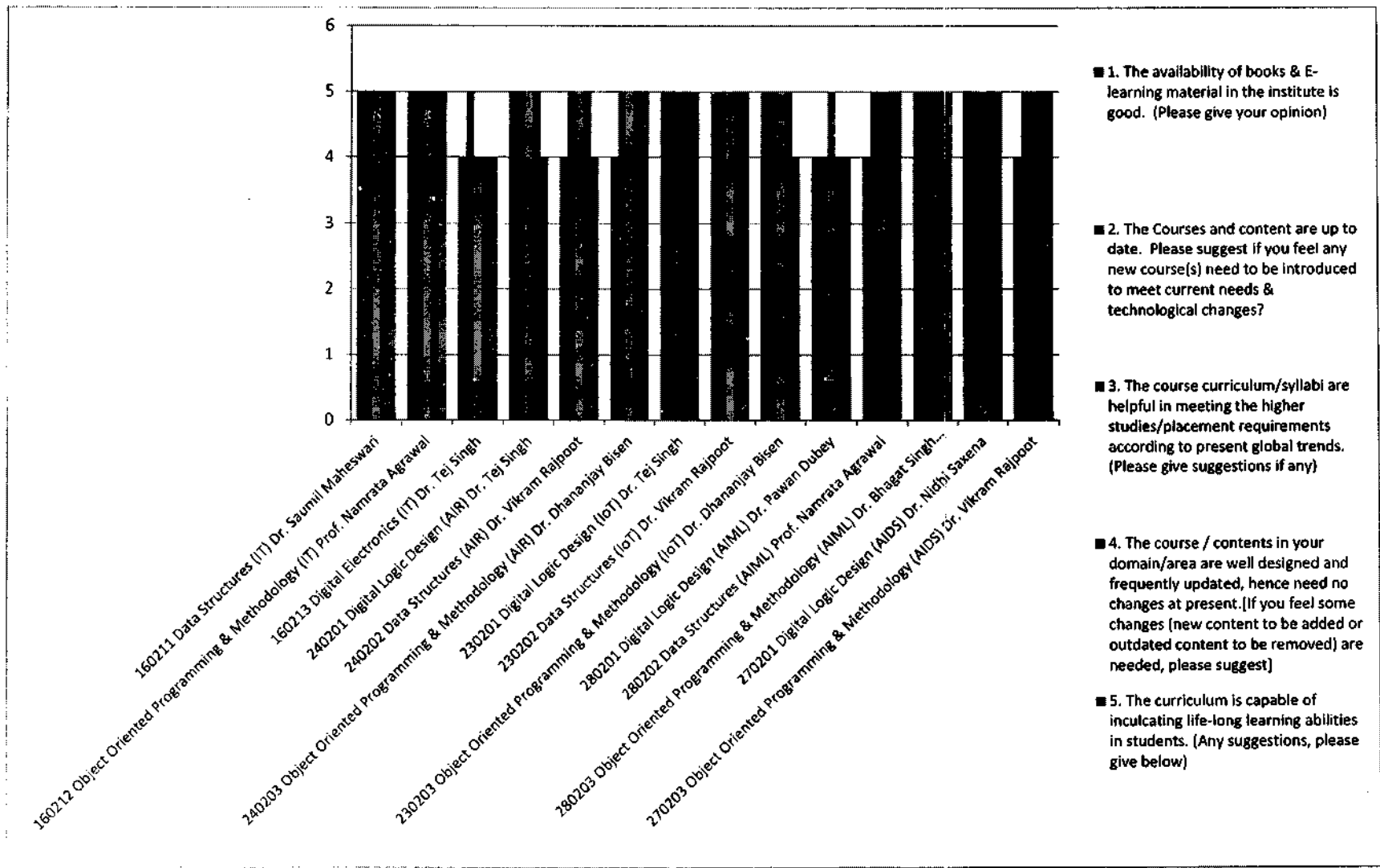
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Curriculum Evaluation Point	Response in %				
	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
The availability of books & E-learning material in the institute is good	0	0	0	42.85	57.14
The Courses and content are up to date.	0	0	0	7.14	92.85
The course curriculum/syllabi are helpful in meeting the higher studies/placement requirements according to present global trends.	0	0	0	7.14	85.71
The course / contents in your domain/area are well designed and frequently updated, hence need no changes at present.	0	0	0	35.71	64.28
The curriculum is capable of inculcating life-long learning abilities in students.	0	0	0	35.71	64.29
	0.00	0.00	0.00	25.71	72.85

Session wise analysis and impact report: July-Dec 2022 (3rd sem.)

Based on the feedback data received from students and faculty members (3rd semester- IT, IT-AIR, IT-IoT, AIML, AIDS) for the academic session July to Dec 2022, following points have been analysed:

- It has been observed that, in 3rd semester 39.01% of students are strongly agreed, 33.24% of students are agreed, 20.80% of students are neutral, 4.94% of students are disagreed and only 2.01% of students are strongly disagreed with the syllabus/ content that they have studied in the 3rd semester.
- Students have suggested to include Management, Cyber security, Moral values under Departmental elective and Moral values under open elective.
- It has been observed that, in 3rd semester 75.71% of faculty members are strongly agreed, 12.86% of faculty members are agreed, and 7.14% of faculty members are neutral with the syllabus/ content that they have taught in the 3rd semester.

COURSE CURRICULUM FEEDBACK (by Students on MOODLE): Sample Size: 27 (Avg.)

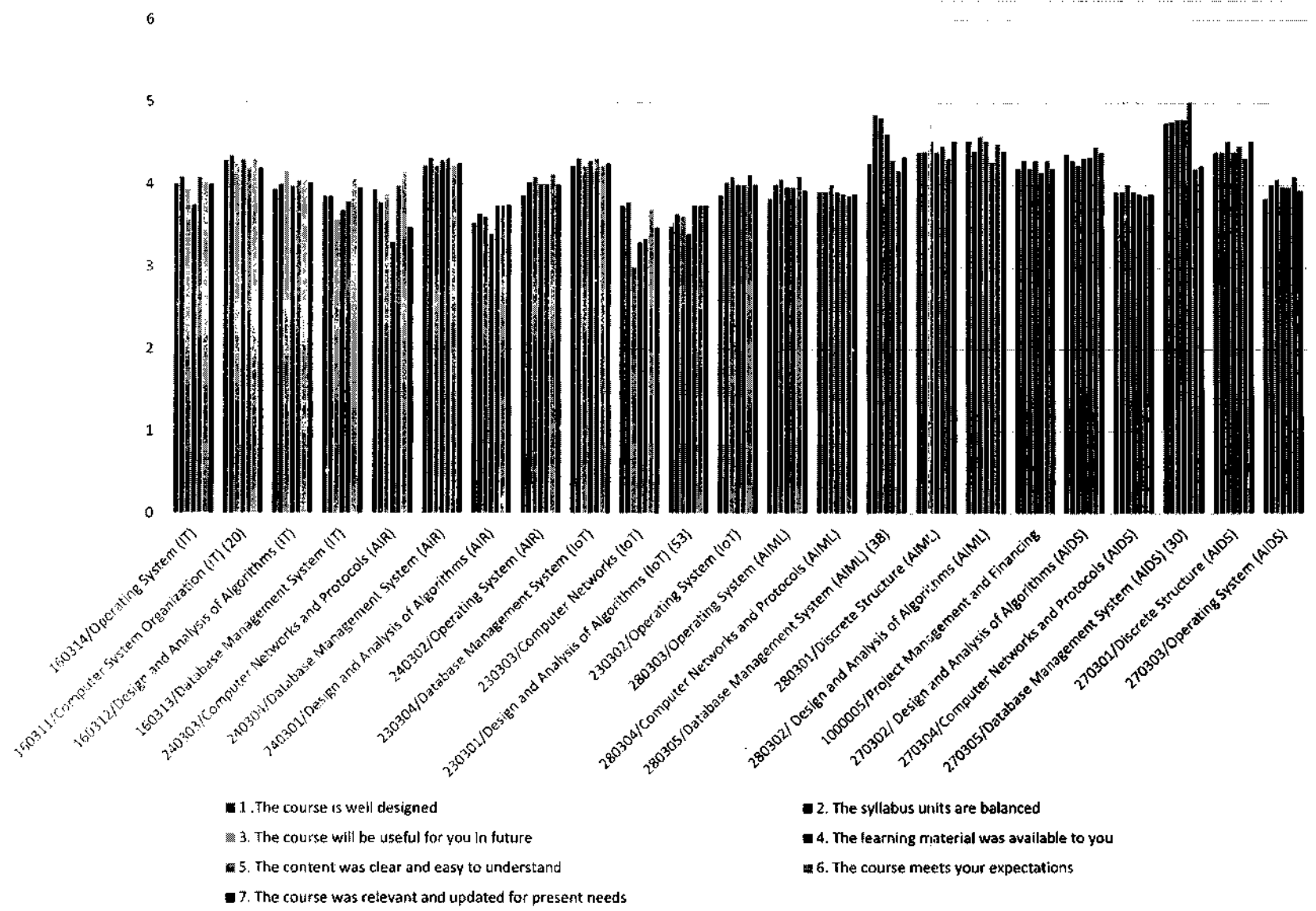
Subject Name with code	Student Feedback (Comments)		Response to student comments / Analysis
280305/Database Management System (AIML)	Departmental electives	Management, Cyber security, Moral values	Cyber security and project management are the part of curriculum in upcoming semester.
	Open electives	Moral values	
Link	https://drive.google.com/drive/folders/1qxivYBm01cKOX6Ck252IL4ohuUm7Hv?usp=share_link		
Action Taken	Management and Cyber security as subjects under curriculum in next semester Moral values will include in curriculum in open elective, after discussion with Head of department and faculty members.		

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Subject name with code	1. The course is well designed	2. The syllabus units are balanced	3. The course will be useful for you in future	4. The learning material was available to you	5. The content was clear and easy to understand	6. The course meets your expectations	7. The course was relevant and updated for present needs
160314/Operating System (IT)	4.00	4.09	3.94	3.75	4.09	4.03	4.00
160311/Computer System Organization (IT) (20)	4.30	4.35	4.25	4.30	4.20	4.30	4.20
160312/Design and Analysis of Algorithms (IT)	3.94	4.00	4.15	3.98	4.04	4.04	4.02
160313/Database Management System (IT)	3.86	3.86	3.57	3.68	3.79	4.07	3.96
240303/Computer Networks and Protocols (AIR)	3.94	3.78	3.89	3.30	3.98	4.15	3.48
240304/Database Management System (AIR)	4.23	4.32	4.23	4.29	4.32	4.23	4.26
240301/Design and Analysis of Algorithms (AIR)	3.53	3.64	3.62	3.40	3.75	3.75	3.75
240302/Operating System (AIR)	3.87	4.03	4.10	4.00	4.00	4.13	4.00
230304/Database Management System (IoT)	4.23	4.32	4.23	4.29	4.32	4.23	4.26
230303/Computer Networks (IoT)	3.74	3.78	3.00	3.30	3.35	3.70	3.48
230301/Design and Analysis of Algorithms (IoT) (53)	3.53	3.64	3.62	3.40	3.75	3.75	3.75
230302/Operating System (IoT)	3.87	4.03	4.10	4.00	4.00	4.13	4.00
280303/Operating System (AIML)	3.83	4.00	4.07	3.97	3.97	4.10	3.93

280304/Computer Networks and Protocols (AIML)	3.91	3.91	4.00	3.91	3.89	3.87	3.89
280305/Database Management System (AIML) (38)	4.26	4.85	4.82	4.62	4.30	4.18	4.34
280301/Discrete Structure (AIML)	4.40	4.40	4.53	4.40	4.47	4.33	4.53
280302/ Design and Analysis of Algorithms (AIML)	4.53	4.41	4.59	4.53	4.28	4.50	4.41
1000005/Project Management and Financing	4.20	4.30	4.20	4.30	4.15	4.30	4.20
270302/ Design and Analysis of Algorithms (AIDS)	4.37	4.29	4.24	4.32	4.34	4.46	4.39
270304/Computer Networks and Protocols (AIDS)	3.91	3.91	4.00	3.91	3.89	3.87	3.89
270305/Database Management System (AIDS) (30)	4.75	4.77	4.79	4.79	5.00	4.20	4.23
270301/Discrete Structure (AIDS)	4.40	4.40	4.53	4.40	4.47	4.33	4.53
270303/Operating System (AIDS)	3.83	4.00	4.07	3.97	3.97	4.10	3.93

A collection of handwritten signatures and initials in black ink, including a large stylized signature on the left, a signature with 'Bv/bv' written above it, and several other initials and signatures scattered across the bottom of the page.



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Subject Name	Semester	Faculty Name	Strongly Agree in %	Agree in %	Neutral in %	Disagree in %	Strongly disagree in %
160314/Operating System (IT)	3	Vivek Sharma	38.19	18.66	11.66	6.71	2.33
160311/Computer System Organization (IT) (20)	3	Dr. Tej Singh	45.00	35.71	13.57	0.00	0.00
160312/Design and Analysis of Algorithms (IT)	3	Bulbul Agrawal	46.50	26.44	14.89	7.29	4.86
160313/Database Management System (IT)	3	Akanchha Tiwari	36.22	35.20	40.81	11.22	13.26
240303/Computer Networks and Protocols (AIR)	3	Dr.Sanjiv Sharma	42.86	29.05	17.14	9.05	1.90
240304/Database Management System (AIR)	3	Dr.Saumil Maheshwari	47.00461	37.78802	10.13825	5.069124	0
240301/Design and Analysis of Algorithms (AIR)	3	Akanchha Tiwari	38.19	18.66	11.66	6.71	2.33
240302/Operating System (AIR)	3	MIR SHAHNAWAZ AHMAD	42.86	29.05	17.14	9.05	1.90
230304/Database Management System (IoT)	3	Dr.Saumil Maheshwari	47.00461	37.78802	10.13825	5.069124	0
230303/Computer Networks and Protocols (IoT)	3	Abhilash Sonkar	20.50	33.54	25.47	14.29	6.21
230301/Design and Analysis of Algorithms (IoT)	3	Akanchha Tiwari	30.18	36.65	29.64	19.40	4.31
230302/Operating System (IoT)	3	MIR SHAHNAWAZ AHMAD	42.86	29.05	17.14	9.05	1.90

A series of handwritten signatures and initials are located at the bottom of the page. From left to right, they include: a signature that appears to be 'Vivek', a signature that appears to be 'Tej Singh', the name 'Bulbul' written in a box, a signature that appears to be 'Sanjiv', a signature that appears to be 'Saumil', a signature that appears to be 'Akanchha', a signature that appears to be 'Abhilash', a signature that appears to be 'MIR SHAHNAWAZ AHMAD', and a signature that appears to be 'MIR SHAHNAWAZ AHMAD'.

280303/Operating System (AIML)	3	Dr.Sanjiv Sharma	39.52	31.90	17.62	9.05	1.90
280304/Computer Networks and Protocols (AIML)	3	Dr.NidhiSaxena	31.31	36.17	25.23	7.29	0.00
280305/Database Management System (AIML) (38)	3	Punit Kumar Johari	38.19	18.66	11.66	6.71	2.33
280301/Discrete Structure (AIML)	3	Namrata Agarwal	63.81	20.95	11.43	2.86	0.95
280302/ Design and Analysis of Algorithms (AIML)	3	Abhishek Dixit	54.46	38.84	5.36	1.34	0.00
1000005/Project Management and Financing	3	Dr.Pawan Dubey	44.00	36.71	16.57	2.72	0.00
270302/ Design and Analysis of Algorithms (AIDS)	3	Abhishek Dixit	51.92	33.10	12.89	1.74	0.35
270304/Computer Networks and Protocols (AIDS)	3	Dr.NidhiSaxena	31.31	36.17	25.23	7.29	0.00
270305/Database Management System (AIDS)	3	Punit Kumar Johari	26.24	19.83	11.37	3.50	0.29
270301/Discrete Structure (AIDS)	3	NamrataAgarwal	63.81	20.95	11.43	2.86	0.95
270303/Operating System (AIDS)	3	Dr.Sanjiv Sharma	39.52	31.90	17.62	9.05	1.90
		Average	39.01	33.24	20.80	4.94	2.01

COURSE CURRICULUM FEEDBACK (by Faculty on MOODLE)

Action / taken (threshold value 3.5)
New programmes (AIML, AIR, IoT, AIDS) have been started recently, so as per strength enough books are not available in library but it is already conveyed. As per the scenario, people refer online materials. Our Institute has provided e-learning materials.
Link: https://docs.google.com/spreadsheets/d/1k_6o-rnaSHFLToaRj1ROLNpICkm7dSv1/edit?usp=share_link&ouid=103207598631724072961&rtpof=true&sd=true

	Faculty Name	1. The availability of books & E-learning material in the institute is good. (Please give your opinion)	2. The Courses and content are up to date. Please suggest if you feel any new course(s) need to be introduced to meet current needs & technological changes?	3. The course curriculum/syllabi are helpful in meeting the higher studies/placement requirements according to present global trends. (Please give suggestions if any)	4. The course / contents in your domain/area are well designed and frequently updated, hence need no changes at present. [If you feel some changes (new content to be added or outdated content to be removed) are needed, please suggest]	5. The curriculum is capable of inculcating life-long learning abilities in students. (Any suggestions, please give below)
160314/Operating System (IT)	Vivek Sharma	2	3	3	3	4
160311/Computer System Organization (IT)	Dr. Tej Singh	5	5	5	5	5
160312/Design and Analysis of Algorithms (IT)	Bulbul Agrawal	5	5	5	5	5
160313/Database Management System (IT)	Akanchha Tiwari	5	5	5	5	4
240303/Computer Networks and Protocols (AIR)	Dr. Sanjiv Sharma	4	5	5	5	4

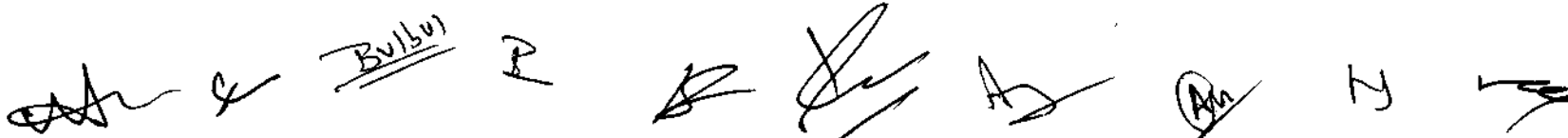
240304/Database Management System (AIR)	Dr.Saumil Maheshwari	4	5	5	5	5
240301/Design and Analysis of Algorithms (AIR)	Akanchha Tiwari	5	5	5	5	5
240302/Operating System (AIR)	MIR SHAHNAWAZ AHMAD	5	5	5	5	5
230304/Database Management System (IoT)	Dr.Saumil Maheshwari	5	5	5	5	4
230303/Computer Networks and Protocols (IoT)	Abhilash Sonkar	2	2	3	3	4
230301/Design and Analysis of Algorithms (IoT)	Akanchha Tiwari	4	5	5	5	5
230302/Operating System (IoT)	MIR SHAHNAWAZ AHMAD	5	5	5	5	5
280303/Operating System (AIML)	Dr.Sanjiv Sharma	2	2	2	2	2
280304/Computer Networks and Protocols (AIML)	Dr.Nidhi Saxena	4	4	5	5	5
280305/Database Management System (AIML)	Punit Kumar Johari	5	5	5	5	5
280301/Discrete Structure (AIML)	Namrata Agarwal	5	4	4	4	4
280302/ Design and Analysis of Algorithms (AIML)	Abhishek Dixit	4	5	5	5	5

1000005/Project Management and Financing	Dr.Pawan Dubey	5	5	5	5	5
270302/ Design and Analysis of Algorithms (AIDS)	Abhishek Dixit	4	5	5	5	5
270304/Computer Networks and Protocols (AIDS)	Dr.Nidhi Saxena	4	5	5	5	5
270305/Database Management System (AIDS)	Punit Kumar Johari	4	5	5	5	5
270301/Discrete Structure (AIDS)	NamrataAgarwal	4	5	5	5	5
270303/Operating System (AIDS)	Dr.Sanjiv Sharma	2	2	2	2	2

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Curriculum Evaluation Point	Response in %				
	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
The availability of books & E-learning material in the institute is good	0	14.29	0	28.17	57.14
The Courses and content are up to date.	0	7.14	7.14	0	85.71
The course curriculum/syllabi are helpful in meeting the higher studies/placement requirements according to present global trends.	0	0	12.29	0	85.71
The course / contents in your domain/area are well designed and frequently updated, hence need no changes at present.	0	0	12.29	0	85.71
The curriculum is capable of inculcating life-long learning abilities in students.	0	0	0	35.11	64.29
	0.00	5.35	6.34	12.66	75.71

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Session wise analysis and impact report: July-Dec 2022 (5th Sem.)

Based on the feedback data received from total 455 students and 12 faculty members (First semester- IT, IT-AIR, IoT) for the academic session July 2022 to Nov 2022, following points have been analysed:

- It has been observed that, in fifth semester 42.21% of students are strongly agreed, 27.78% of students are agreed, 18.76% of students are neutral, 3.34% of students are disagreed and only 0.47% of students are strongly disagreed with the syllabus/ content that they have studied in the fifth semester.
- Students have suggested to add Machine learning and java, data science using python, Artificial Intelligence, Quantum Computing, Game Development, Dynamic Programming for Campus Placements and System Design under new course, Minor specialization and departmental electives. (These subjects are already the part of curriculum in higher semesters)
- It has been observed that, in 5th semester 64.21% of faculty members are strongly agreed, 21.05% of faculty members are agreed, and 9.47% of faculty members are neutral and 5.26% faculty members are disagree with the syllabus/ content that they have taught in the fifth semester.

COURSE CURRICULUM FEEDBACK (by Students on MOODLE): Sample Size: 30 (Avg.)

Subject Name with code	Student Feedback (Comments)		Response to student comments / Analysis
240503/Theory of Computation	Quantum Computing, Game Development, Dynamic Programming for campus placements		As per request of students, Quantum computing and Game development will be suggested in upcoming semesters. Students are free to read any programming while campus placement. Faculty members as mentors help them to learn.
240505/Soft Computing Techniques	Honours:	Image Processing	These courses are already in next semesters.
	Minor specialization:	Data Science Related Course	
160513/Theory of Computation	System Design		Topic is already a part of syllabus.

230502/Data Sciences in IoT	Machine Learning, JAVA, Data science for engineers, Artificial intelligence, Data science using python, Networking, Data science using python, Data science using python	These subjects are already part of curriculum and will offer in higher semesters.
Link	https://drive.google.com/drive/folders/1gAiZA6UNsltaITBUBqxyzCYRoI9U0sMkx?usp=share link	
Action Taken	<p>Students have suggested to add Machine learning and Java, data science using python, Artificial Intelligence and System Design under new course. Minor specialization and departmental electives. (These subjects are already the part of curriculum in higher semesters)</p> <p>For these subjects Quantum Computing, Game Development, Dynamic Programming for Campus Placements have discussion with HOD sir. After discussion it is decided some topics are covered in their higher semester.</p>	

Subject Name with code	1. The course is well designed	2. The syllabus units are balanced	3. The course will be useful for you in future	4. The learning material was available to you	5. The content was clear and easy to understand	6. The course meets your expectations	7. The course was relevant and updated for present needs
240504/Robotics System and Control	4.13	3.98	4.25	4.11	4.07	4.05	4.07
240502/Data Science using Python	4.14	4	3.97	3.97	4.12	4.12	4.09
240501/Discrete Structures	4.65	4.61	4.67	4.72	4.65	4.14	4.29
240503/Theory of Computation	4.24	4.17	4	4.34	4.17	4.21	4.09
240505/Soft Computing Techniques	4.57	4.79	4.70	4.85	4.68	4.20	4.35
1000006/Disaster Management	4.42	4.29	4.08	4.21	4.25	4.04	4.00

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160515/Soft Computing Techniques	4.63	4.59	4.65	4.71	4.63	4.15	4.24
1000006/Disaster Management (IT) (28)	4.46	4.14	4.32	4.25	4.32	4.11	4.21
160514/Microprocessor and Interfacing	4.09	4.06	3.91	4.03	3.94	4.03	4.00
160511/Discrete Structures	4.12	3.99	4.19	4.09	4.15	4.09	4.06
160513/Theory of Computation	4.22	4.11	4.14	4.14	4.08	4.00	4.03
160512/Data Science using Python	4.25	4.35	4.387	4.16	4.25	4.16	4.12
230505/Soft Computing Techniques	3.94	3.92	3.81	3.92	3.92	3.90	3.90
230501/Discrete Structures	4.57	4.79	4.70	4.85	4.68	4.20	4.35
1000006/Disaster Management	4.36	4.11	4.39	4.25	4.32	4.11	4.21
230503/Theory of Computation	4.45	4.42	4.45	4.40	4.25	4.28	4.28
230502/Data Sciences in IoT	4.12	3.99	4.19	4.09	4.15	4.09	4.06
230504/Embedded System and IoT (31)	4.35	4.19	4.29	4.29	4.23	4.29	4.35
1000005/Project Management and Financing	4.00	4.03	4.11	3.95	3.97	3.95	3.95

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Subject Name	Semester	Faculty Name	Strongly Agree in %	Agree in %	Neutral in %	Disagree in %	Strongly disagree in %
240504/Robotics System and Control	5	Dr. Pawan Dubey	38.17	27.51	21.75	2.99	0.64
240502/Data Science using Python	5	Dr. Bhagat Singh Raghuwanshi	41.11	27.53	27.87	3.48	0.00
240501/Discrete Structures	5	Dr. Vikram Rajpoot	34.40	19.53	12.24	4.66	0.58
240503/Theory of Computation	5	Abhilash Sonkar	48.08	24.39	25.44	1.39	0.70
240505/Soft Computing Techniques	5	Punit Kumar Johari	39.65	22.16	13.70	5.54	0.58
1000006/Disaster Management	5	Dr. Dhananjay Bisen	40.48	39.88	17.26	2.38	0.00
160515/Soft Computing Techniques	5	Dr. Vikram Rajpoot	32.07	18.95	11.08	4.66	0.58
1000006/Disaster Management (IT) (28)	5	Dr. Tej Singh	48.27	35.93	12.31	3.94	0.98
160514/Microprocessor and Interfacing	5	Dr. Vikas Sejwar	33.39	33.33	24.24	3.03	0.00
160511/Discrete Structures	5	Namrata Agarwal	63.81	20.95	11.43	2.86	0.95
160513/Theory of Computation	5	Dr. Dhananjay Bisen	35.71	41.27	20.63	2.38	0.00
160512/Data Science using Python	5	MIR SHAHNAWAZ AHMAD	42.40	39.63	17.97	0.00	0.00
230505/Soft Computing	5	Dr. Bhagat Singh	26.95	32.08	27.22	2.16	2.16

Techniques		Raghuwanshi					
230501/Discrete Structures	5	Dr. Vikram Rajpoot	39.65	22.16	13.70	5.54	0.58
1000006/Disaster Management	5	Dr. Bhagat Singh Raghuwanshi	48.27	35.93	12.31	3.94	0.98
230503/Theory of Computation	5	Abhishek Dixit	56.87	24.8	16.17	1.89	0.27
230502/Data Sciences in IoT	5	Dr. Dhananjay Bisen	40.51	31.13	24.73	2.99	0.00
230504/Embedded System and IoT (31)	5	Dr. Tej Singh	63.14	5.00	29.10	2.76	0.00
1000005/Project Management and Financing	5	Dr. Nidhi Saxena	30.70	25.84	17.33	6.99	0.00
		Average	42.29	27.78	18.76	3.34	0.47

COURSE CURRICULUM FEEDBACK (by Faculty on MOODLE)

Action / taken (threshold value 3.5)
New programmes (IoT, AIR) have been started from Dec 2020, so as per strength enough books are not available in library but it is already conveyed. As per the scenario, people refer online materials. Our Institute has provided e-learning materials.
Link: https://docs.google.com/spreadsheets/d/1v2GttP7XxAzc3pJGV0vJ0uqFkOezKr8/edit?usp=share_link&oid=112550903938846637038&rtrof=true&sd=true

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Subject Name with code	Faculty Name	1. The availability of books & E-learning material in the institute is good. (Please give your opinion)	2. The Courses and content are up to date. Please suggest if you feel any new course(s) need to be introduced to meet current needs & technological changes?	3. The course curriculum/syllabi are helpful in meeting the higher studies/placement requirements according to present global trends. (Please give suggestions if any)	4. The course / contents in your domain/area are well designed and frequently updated, hence need no changes at present.[If you feel some changes (new content to be added or outdated content to be removed) are needed, please suggest]	5. The curriculum is capable of inculcating life-long learning abilities in students. (Any suggestions, please give below)
240504/Robotics System and Control	Dr. Pawan Dubey	2	3	3	3	4
240502/Data Science using Python	Dr. Bhagat Singh Raghawanshi	5	5	5	5	5
240501/Discrete Structures	Dr. Vikram Rajpoot	5	5	5	5	5
240503/Theory of Computation	Abhilash Sonkar	5	5	5	5	4
240505/Soft Computing Techniques	Punit Kumar Johari	4	5	5	5	4
1000006/Disaster Management	Dr. Dhananjay Bisen	4	5	5	5	5
160515/Soft Computing Techniques	Dr. Vikram Rajpoot	5	4	5	5	5
1000006/Disaster Management	Dr. Tej Singh	5	5	5	4	5

160514/Microprocessor and Interfacing	Dr. Vikas Sejwar	5	5	5	5	4
160511/Discrete Structures	Namrata Agarwal	2	2	3	3	4
160513/Theory of Computation	Dr. Dhananjay Bisen	4	5	5	5	4
160512/Data Science using Python	MIR SHAHNAWAZ AHMAD	4	5	5	5	5
230505/Soft Computing Techniques	Dr. Bhagat Singh Raghuvanshi	5	5	5	5	5
230501/Discrete Structures	Dr. Vikram Rajpoot	5	5	5	4	5
1000006/Disaster Management	Dr. Bhagat Singh Raghuvanshi	5	3	5	5	4
230503/Theory of Computation	Abhishek Dixit	2	2	3	3	4
230502/Data Sciences in IoT	Dr. Dhananjay Bisen	4	5	5	5	4
230504/Embedded System and IoT	Dr. Tej Singh	4	5	5	4	5
1000005/Project Management and Financing	Dr. Nidhi Saxena	5	4	5	3	5

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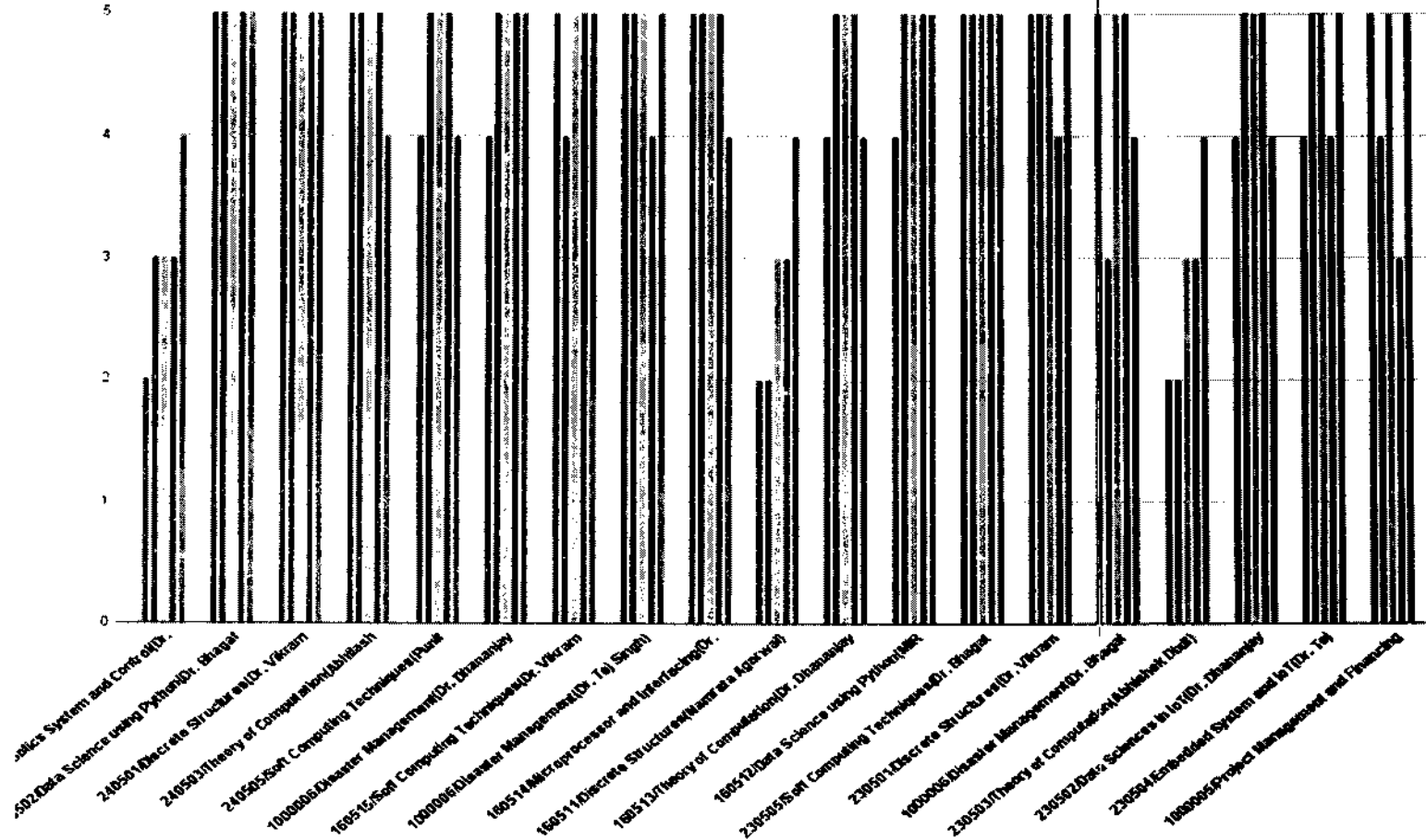
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- 1. The availability of books & E-learning material in the institute is good. (Please give your opinion)
- 2. The Courses and content are up to date. Please suggest if you feel any new course(s) need to be introduced to meet current needs & technological changes?
- 3. The course curriculum/syllabi are helpful in meeting the higher studies/placement requirements according to present global trends. (Please give suggestions if any)
- 4. The course contents in your domain/area are well designed and frequently updated, hence need no changes at present. (If you feel some changes (new content to be added or removed) please give below)
- 5. The curriculum is capable of inculcating life-long learning abilities in students. (Any suggestions, please give below)



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Curriculum Evaluation Point	Response in %				
	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
The availability of books & E-learning material in the institute is good	0	15.78	0	31.57	52.63
The Courses and content are up to date.	0	10.52	10.52	10.52	68.42
The course curriculum/syllabi are helpful in meeting the higher studies/placement requirements according to present global trends.	0	0	15.78	0	84.21
The course / contents in your domain/area are well designed and frequently updated, hence need no changes at present.	0	0	21.05	15.78	63.15
The curriculum is capable of inculcating life-long learning abilities in students.	0	0	0	47.36	52.63
	0.00	5.26	9.47	21.05	64.21

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Session wise analysis and impact report: July-Dec 2022 (7th sem.)

Based on the feedback data received from total 19 students and 03 faculty members (Seventh semester- IT) for the academic session July to Nov. 2022, following points have been analysed:

- It has been observed that, in 7th semester 17.78% of students are strongly agreed, 52.29% of students are agreed, 22.32% of students are neutral, 7.61% of students are disagreed and only 0% of students are strongly disagreed with the syllabus/ content that they have studied in the seventh semester.
- It has been observed that, in seventh semester 40% of faculty members are strongly agreed, 40% of faculty members are agreed, and 20% of faculty members are neutral with the syllabus/ content that they have taught in the seventh semester.

COURSE CURRICULUM FEEDBACK (by Students on MOODLE)

Link	https://drive.google.com/drive/folders/1b4NbOIOeX_mSpLjkyJDAJCvsgFeM0AfZ?usp=share link
Action Taken	As per student suggestions, some changes will be included in current soft computing syllabus to make it well balance and useful in future perspective.

Subject Name	1. The course is well designed	2. The syllabus units are balanced	3. The course will be useful for you in future	4. The learning material was available to you	5. The content was clear and easy to understand	6. The course meets your expectations	7. The course was relevant and updated for present needs
(DE-3) 160715/Soft Computing	3.6	3	2.8	3.4	3.6	3.8	3.6
100008/Intellectual Property Rights	4.27	3.91	4.09	3.91	4.09	3.73	3.91
(DE-3) 160716/Mobile Computing	4.29	3.86	4.14	4.00	4.14	3.86	3.86

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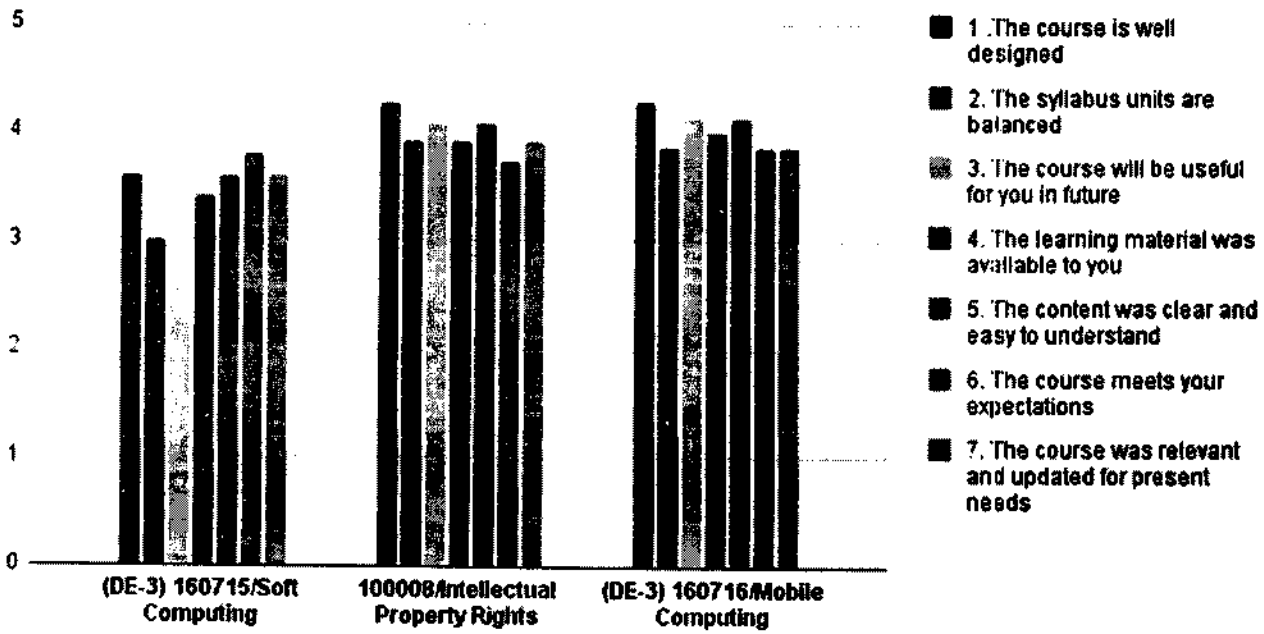
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Subject Name	Semester	Faculty Name	Strongly Agree in %	Agree in %	Neutral in %	Disagree in %	Strongly disagree in %
(DE-3) 160715/Soft Computing	7	Dr. Saumil Maheshwari	11.42	40	25.71	22.85	0
100008/Intellectual Property Rights	7	Dr. Vikram Rajpoot	19.48	59.74	20.78	0.00	0.00
(DE-3) 160716/Mobile Computing	7	Dr. Akhilesh Tiwari	22.45	57.14	20.41	0.00	0.00
		Average	17.78	52.29	22.32	7.61	0

COURSE CURRICULUM FEEDBACK (by Faculty on MOODLE)

Action / taken (threshold value 3.5)
All the faculties are satisfied with current course content and curriculum.
Link: https://docs.google.com/spreadsheets/d/1OFK34eZMayO6yC0FwBysyflLsK0kwciE/edit?usp=share_link&oid=112550903938846637038&rtpof=true&sd=true

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Subject Name with code	Faculty Name	1. The availability of books & E-learning material in the institute is good. (Please give your opinion)	2. The Courses and content are up to date. Please suggest if you feel any new course(s) need to be introduced to meet current needs & technological changes?	3. The course curriculum/syllabi are helpful in meeting the higher studies/placement requirements according to present global trends. (Please give suggestions if any)	4. The course / contents in your domain/area are well designed and frequently updated, hence need no changes at present. [If you feel some changes (new content to be added or outdated content to be removed) are needed, please suggest]	5. The curriculum is capable of inculcating life-long learning abilities in students. (Any suggestions, please give below)
(DE-3) 160715/Soft Computing	Dr. Saumil Maheshwari	4	3	4	3	4
100008/Intellectual Property Rights	Dr. Vikram Rajpoot	5	4	4	5	5
(DE-3) 160716/Mobile Computing	Dr. Akhilesh Tiwari	5	4	5	3	5

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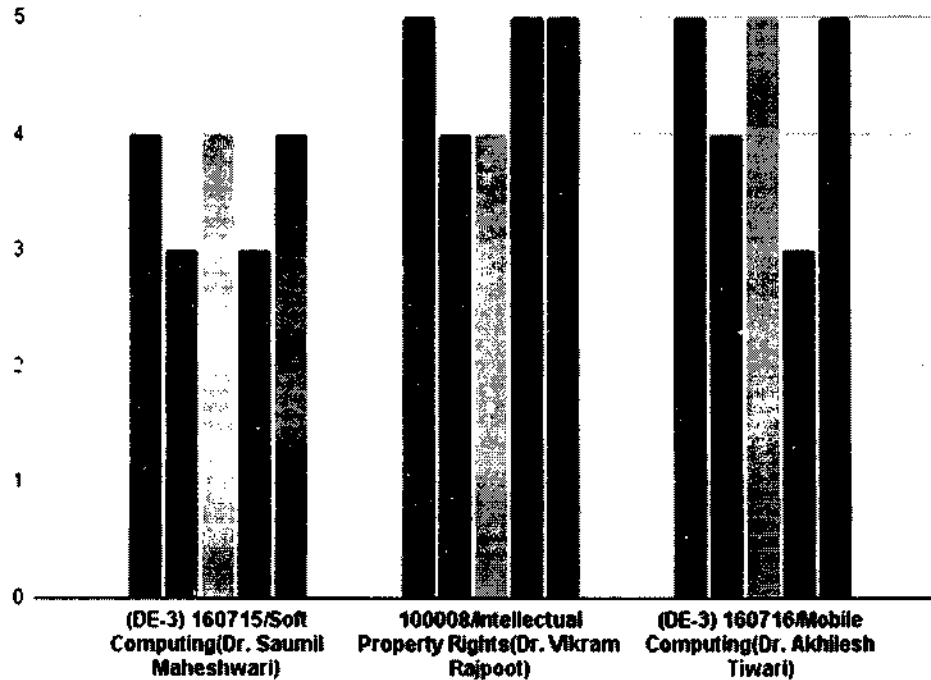
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- 1 The availability of books & E-learning material in the Institute is good. (Please give your opinion)
- 2 The Courses and content are up to date. Please suggest if you feel any new course(s) need to be introduced to meet current needs & technological changes?
- 3 The course curriculum/syllabi are helpful in meeting the higher studies/placement requirements according to present global trends. (Please give suggestions if any)
- 4 The course / contents in your domain/area are well designed and frequently updated, hence need no changes at present. (If you)
- 5. The curriculum is capable of inculcating life-long learning abilities in students.

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Curriculum Evaluation Point	Response in %				
	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
The availability of books & E-learning material in the institute is good	0	0	0	33.33	66.66
The Courses and content are up to date.	0	0	33.33	66.66	0
The course curriculum/syllabi are helpful in meeting the higher studies/placement requirements according to present global trends.	0	0	0	66.66	33.33
The course / contents in your domain/area are well designed and frequently updated, hence need no changes at present.	0	0	66.66	0	33.33
The curriculum is capable of inculcating life-long learning abilities in students.	0	0	0	33.33	66.66
	0.00	0.00	20.00	40.00	40.00

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute, Affiliated to RGPV, Bhopal)

Department of Information Technology

Alumni Feedback

Analysis and Impact report: (Batch 2017-2021)

Based on the feedback data received from total 46 Alumni of above mentioned batch following points have been analysed:

- It has been analyzed that 32.61% of students are strongly agreed, 50% of students are agreed, 15.22% of students are neutral, and 2.17% of students are disagreed with Course content which is interesting and as per Industry needs.
- It is found that 28.26 % of students are strongly agreed, 50% of students are agreed, 13.04% of students are neutral, and 8.69% of students are disagreed to apply, analyze, design and create products and solutions for real life engineering problems.

S. No.	Comments	Action Taken	Result
1	Need to more focus on programming using data structure, or split data structure in two parts so it will be beneficial for students to focus more and more.	To inculcate the habit of coding, mini skill project has already incorporated as a part of scheme.	Implemented
2	focus on development section, which is very useful for grab a job in service based companies	Mini skill project and proficiency in subjects enhance the students' power of thinking and coding.	Implemented
3	Try to add course regarding remove nervousness during interviews	Self-study & seminar gives a platform to the student where he can improve himself write communication.	Implemented

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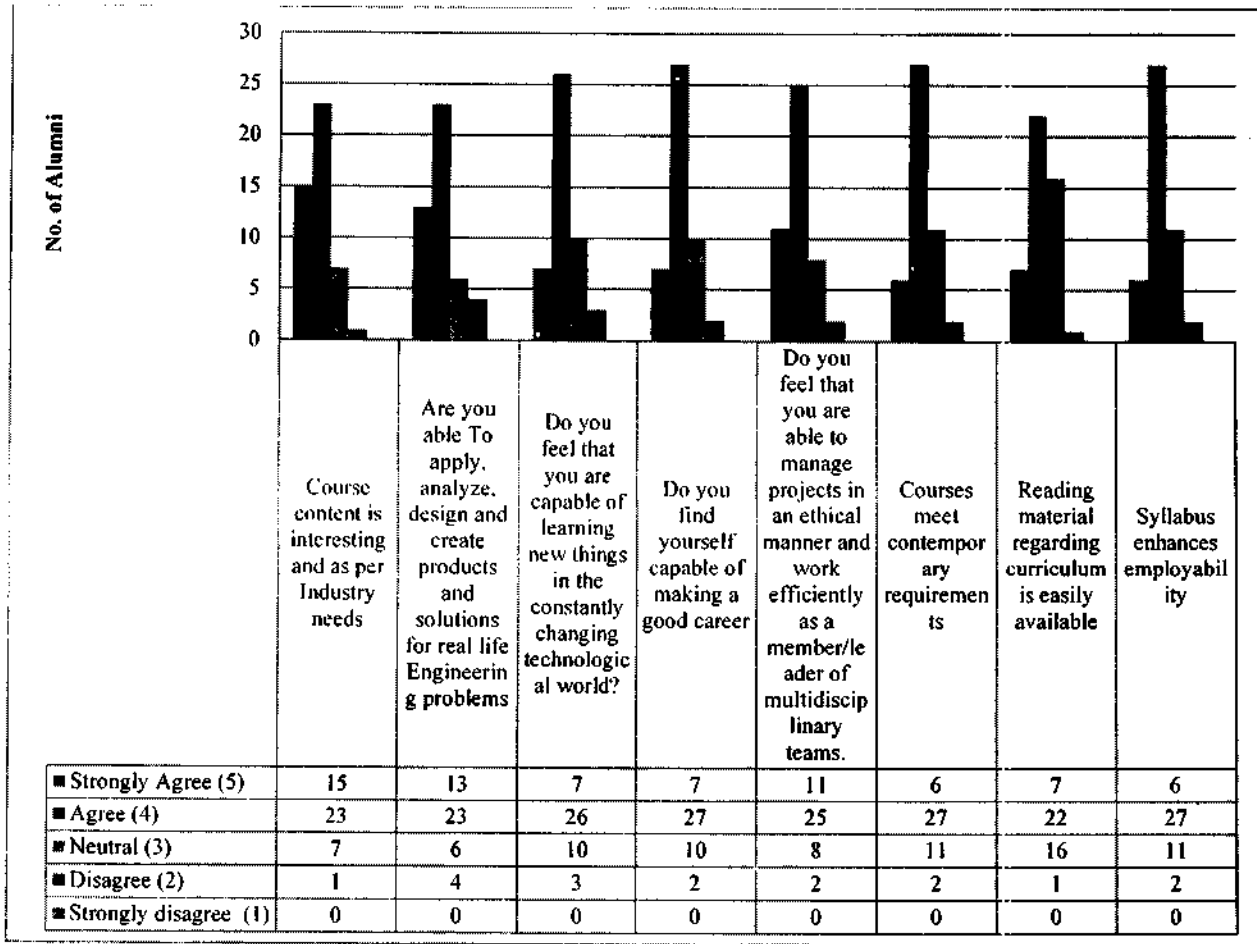
4	Small Projects based on domain should be given in every semester, so that students gain knowledge and develop interest	To inculcate the habit of coding, mini skill project has already incorporated as a part of scheme.	Implemented
5	Last 3 semester's subjects were totally from non IT background. Try to teach latest technology instead, so that it will be helpful for placements	According to the recent scenario, and request of so many students to teach at least 2-3 subjects from other discipline so that they can be more versatile.	Proposed for discussion
6	More practical Labs than Theory classes	Try to add practicals where not included, and add more practicals where already included for practice.	Discussed
7	Constant updation of curriculum to be industry ready	Suggestions required from industry. Workshops will be conducted with them and will take meetings from alumni.	Implemented
8	focus more on AI and machine learning	This course has already added in higher semesters.	Implemented
9	Internship and coding please	As a part of curriculum, department offers internships to lower semester students and allow higher semester students to go for internships rather than project. Department placement cell also suggest them good company's for internships.	Implemented
10	Data science problem solving	This course has already added in higher semesters.	Implemented
11	Basic need of understanding of current technology management	Mini skill project and proficiency in subjects enhance the students' power of thinking and coding.	Implemented
12	More technology and companies must be invited for placements	T&P cell and department is trying to contact with many companies continuously.	In progress
13	Include more practical lectures than theoretical ones	Try to add practicals where not included, and add more practicals where already included for practice.	Discussed
14	It should include international courses too like Coursera and edx	Students are free for attend any international courses	Discussed

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PARAMETERS	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly disagree (1)
Course content is interesting and as per Industry needs	15	23	7	1	0
Are you able To apply, analyze, design and create products and solutions for real life Engineering problems	13	23	6	4	0
Do you feel that you are capable of learning new things in the constantly changing technological world?	7	26	10	3	0
Do you find yourself capable of making a good career	7	27	10	2	0
Do you feel that you are able to manage projects in an ethical manner and work efficiently as a member/leader of multidisciplinary teams.	11	25	8	2	0
Courses meet contemporary requirements	6	27	11	2	0
Reading material regarding curriculum is easily available	7	22	16	1	0

Syllabus enhances employability	6	27	11	2	0
Link of the Alumni feedback	https://docs.google.com/spreadsheets/d/1hj_25OhnOoq8xWH9qY6tfzFoCqNZ0btTWTVMbH4by4/edit?usp=sharing				

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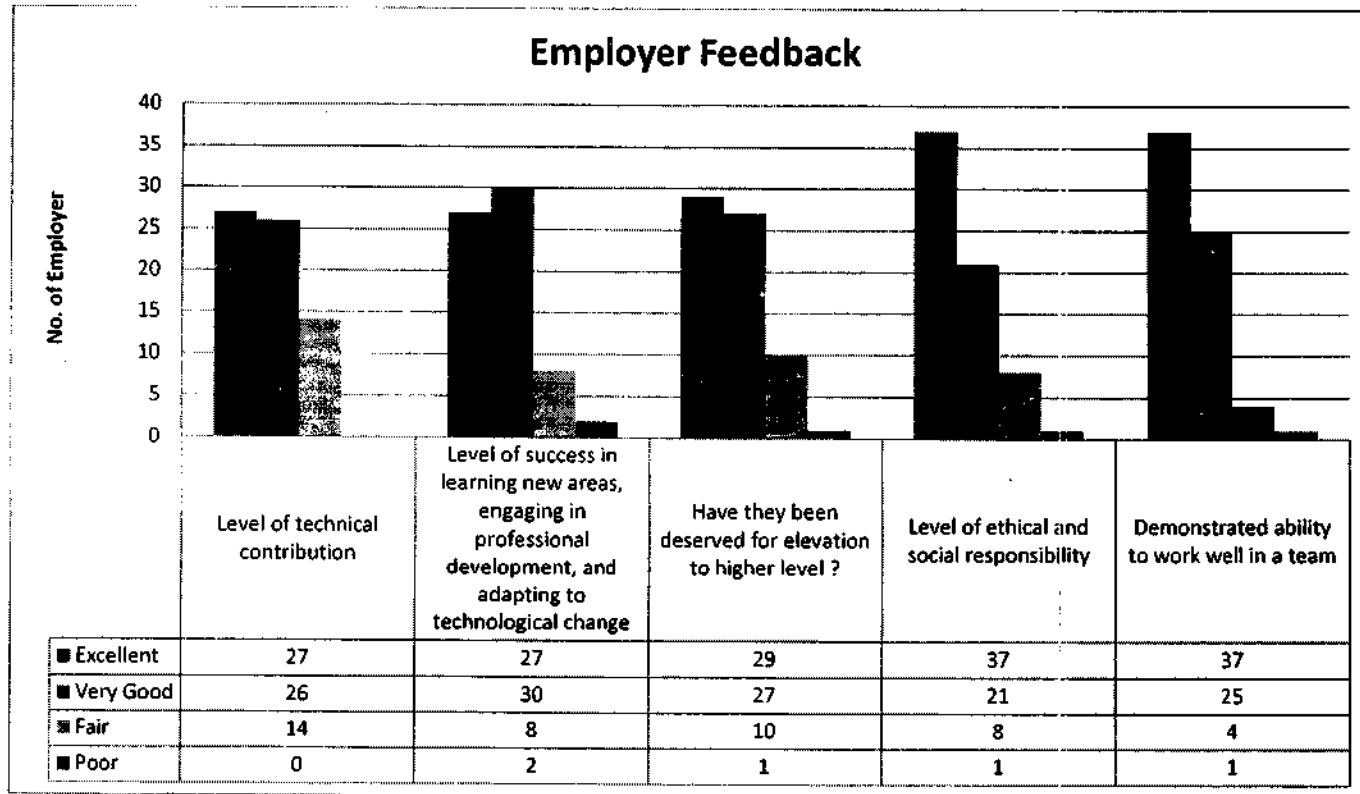


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EMPLOYER SATISFACTION SURVEY (2018-2021): Sample Size: 67

Parameter (MITS Student working under you or in your Organization)	Excellent	Very Good	Fair	Poor	Employer Satisfaction Index
Level of technical contribution	27	26	14	0	4.19
Level of success in learning new areas, engaging in professional development, and adapting to technological change	27	30	8	2	4.16
Have they been deserved for elevation to higher level?	29	27	10	1	4.22
Level of ethical and social responsibility	37	21	8	1	4.37
Demonstrated ability to work well in a team	37	25	4	1	4.43
Employer Satisfaction Index (ESI) (on a scale of 5) (5: Excellent, 4: Very Good, 3: Good, 2: Fair, 1: Poor)					

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Link of Employer Feedback

<https://docs.google.com/spreadsheets/d/10lj8MtXBQsDv8H2bmHfxVIOvQM3qTL3q/edit?usp=sharing&oid=109055627337813693303&rtppof=true&sd=true>

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***Course Outcomes (COs) feedback Analysis and
Impact Report
for
January - June 2022 Semester
(Information Technology/ Internet of Things
(IoT)/ Artificial Intelligence and Robotics/
Artificial Intelligence & Data Science/ Artificial
Intelligence & Machine Learning)
[ITEM IT - 15]***

DEPARTMENT OF INFORMATION TECHNOLOGY

Analysis and Impact Report of Course Outcomes (COs) feedback

1. Analytical problems will be framed and target levels for each CO can be increased.
2. Emphasis on the industry oriented, real world and complex problems in Course Outcomes.
3. High order thinking questions must be incorporated in the question paper.
4. Design the questions in the exam papers for enhancement of more CO's coverage.
5. Each CO target level is required to be reset to a higher level, which has to be retained through higher order thinking questions and more problems that are realistic.

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