

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

**Department  
of  
Computer Science and Engineering**

**Agenda and Minutes  
of  
The BoS Meeting**

**BoS Meeting  
Conducted on 04<sup>th</sup> June 2022.**

## Agenda of the BoS Meeting

(Approved by Academic Development Cell of the institute - BoS Meeting  
 conducted on 04<sup>th</sup> June 2022.

### Instructions for preparing BoS Proceedings

{All information is to be uploaded on the webpage under suitable heading (such as Board of Studies) and separate links to be provided for each category mentioned below}

Minutes should have a summary/cover page mentioning all the significant changes made in the following Given format

#### Courses where revision was carried out\*

(Course/subject name)	Course Code	Year/Date of introduction	Year/Date of revision	Percentage of content added or replaced	Agenda Item No.	Page No.	Link of relevant documents/minutes
Nil	-	-	-	-	-	-	-

#### Courses focusing on employability/entrepreneurship/ skill development\*

1.

(Course/subject name)	Course Code	Activities/contents which have a bearing on increasing skill and employability	Agenda Item No.	Page No.	Link of relevant documents/minutes
Networking with TCP/IP	150711	TCP/IP stands for Transmission Control Protocol/Internet Protocol and is a suite of communication protocols used to interconnect network devices on the internet.	3	1	
Data Mining & Warehousing	150712	Data warehousing is a method of organizing and compiling data into one database, whereas data mining deals with fetching important data from databases. Data mining attempts to depict meaningful patterns through a dependency on the data that is compiled in the data warehouse	3	1	
Software Testing	150756	Software testing is the process of evaluating and verifying that a software product or application does what it is supposed to do. The benefits of testing include preventing bugs, reducing development costs and improving performance.	4	1	
Big Data Computing	150757	Handling and Processing the modern world data	4	1	
Introduction To Machine Learning	150758	Solving the Real world problem using Machine Learning Techniques	4	1	
Soft Computing	900208	Soft computing is the use of approximate calculations to provide imprecise but usable solutions to complex computational problems	5	2	
Network Security	900209	Network security is a broad term that covers a multitude of technologies, devices and processes. In its simplest term, it is a set of rules and	5	2	

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		configurations designed to protect the integrity, confidentiality and accessibility of computer networks and data using both software and hardware technologies.			
R Programming	900220	Statistical techniques for scientific analysis of data	5	2	
Data Science	150511	Data science is an interdisciplinary field that uses scientific methods, processes, algorithms and systems to extract knowledge and insights from noisy, structured and unstructured data, and apply knowledge from data across a broad range of application domains.	9	4	
Information Security	150513	Information security protects sensitive information from unauthorized activities, including inspection, modification, recording, and any disruption or destruction.	9	4	
Python for Data Science		Analysis on Real Data Set	12	5	

### New Courses added\*

(Course/subject name)	Course Code	Activities/contents which have a bearing on increasing skill and employability	Agenda Item No.	Page No.	Link of relevant documents/minutes
Data Science	150511	Data science is an interdisciplinary field that uses scientific methods, processes, algorithms and systems to extract knowledge and insights from noisy, structured and unstructured data, and apply knowledge from data across a broad range of application domains.	9	5	
Introduction to Computer and Network Performance Analysis using Queuing Systems	Yet to be Proposed	Analyzing the performance of any computer or networked system: such as Web application servers, packet scheduling disciplines, operating system schedulers, cellular telephony networks is an important step in the design and deployment of such systems.	12	6	
Programming In Modern C++	Yet to be Proposed	Programming in C++ is so fundamental that all companies dealing with systems as well as application development (including web, IoT, embedded systems) have a need for the same.	7	4	
Software Project Management	Yet to be Proposed	Project planning involves making cost, effort, and duration estimation and preparing various types of plans such as schedule, configuration management, risk management, quality management, staffing plan, etc	7	5	

Feedback on curriculum received from stakeholders: Analysis & ATR\*

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Stakeholder	Student	Faculty	Alumni	Employer
No. of responses	309	31	76	67
Link of Analysis	<u>Annexure-15</u>	<u>Annexure-15</u>	<u>Annexure-15</u>	<u>Annexure-15</u>
ATR Link				
Link showing Excel sheet of Google Form details of stakeholders				

\* Separate page(s) for each of the above four points: Agenda point wise minutes to be appended with each point and a separate link to be given in the appropriate column for each point

2. The course committees constituted vide Dean Academics Notice no 1297 dated 15/4/2021 need to be reconstituted this year to accommodate the newly joined faculty members.
3. The BoS minutes along with the cover/summary page (under point number 1, above) must be uploaded on the departmental web page and link for the same must be shared with the office of the Dean Academics.
4. Stakeholder feedback analysis must also contain an action taken report (ATR). The details/data of the stakeholder responded through GOOGLE form (such as Name, organization, mail id, phone no if available) must also be shared along with the feedback for the alumni/employer.  
The following must be uploaded on the departmental web page and link for the same must be shared with the office of the Dean Academics.
5.
  - (i) The Stakeholder feedback collected & analyzed to find the index out of five
  - (ii) Action taken report
  - (iii) Google form showing responses from alumni, employer, student, faculty etc.
6. Minutes should have a footer with department name, page number, month of meeting.
7. Each page should be signed by all faculty, scanned and then submitted to the Dean Academics office.

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**BoS Agenda Items**

**Item 1** To confirm the minutes of previous BoS meeting held in the month of December 2021  
*Minutes of the last BoS held on 22 December 2021 are confirmed by the house.*

**Item 2** To prepare and finalize the scheme structure of B.Tech. VII Semester with the provision of Two Departmental Electives (DEs) and Two Open Category (OC) Course (in which one Departmental Elective is to be offered in online modewith credit transfer) for the batch admitted in 2019-20.  
**The scheme for B.Tech VII Semester, CSE discipline (under flexible curriculum) were discussed and finalized.**  
**The same is enclosed in**  
Annexure I

**Item 3** To prepare and finalize the syllabus of courses to be offered (for batch admitted in 2019-20) under Departmental Elective (DE) Course (in traditional mode) for B.Tech. VII Semester along with their Cos  
**The courses to be offered under Departmental Elective (DE-3) category (in offline mode) for B.Tech VII Semester, CSE discipline (under flexible curriculum) were discussed and finalized for Batch admitted in 2019-20. Subjects are: -**

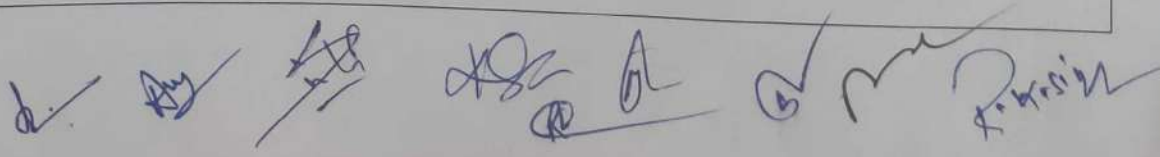
Departmental Elective(DE-3)	Course Code
Networking with TCP/IP	150711
Data Mining & Warehousing	150712
Distributed System	150713

Syllabus (along with their COs) are attached in Annexure-2

**Item 4** To propose the list of courses which the students can opt from SWAYAM/NPTEL/MOOC based Platforms, to be offered in *online mode under Departmental Elective (DE) Course (DE-4)*, with credit transfer in the B.Tech. VII Semester under the flexible curriculum (Batch admitted in 2019-20)  
**The list of Departmental Elective (DE-4) courses to be offered from SWAYAM/NPTEL/MOOC based learning platform (in online mode) for B.Tech VII Semester, CSE discipline (under flexible curriculum) were discussed and finalized, as per the following detail.**

Departmental Elective (DE- 4)		Weeks	Course Code
Course ID: noc22-cs61	Software Testing	12	150756
Course ID: noc22-cs65	Big Data Computing	12	150757
Course ID: noc22-cs97	Introduction To Machine Learning	8	150758

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



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To prepare and finalize the syllabus of courses to be offered (*for batch admitted in 2019-20*) under the *Open Category (OC) Courses* (in traditional mode) for B.Tech. *VII semester* students of other departments along with their Cos

The courses to be offered under Open Category (OC) Courses for B.Tech VII Semester (for the students of other departments) under flexible curriculum were discussed and finalized for Batch admitted in 2019-20. Subjects are: -

OC-2	Code
Soft Computing	900208
Network Security	900209
OC-3	
R Programming	900220
Computer Networks	900222

Item  
5

It is further discussed that the Open Category (OC) courses are meant only for the students of other departments; therefore, the above list of courses may be kept dynamic (as per the need and demand from other departments). Syllabus (along with their COs) are attached in Annexure-3

To prepare and finalize the Experiment list/ Lab manual for Departmental Laboratory Course (DLC) to be offered in B.Tech. VII semester (*for batches admitted in 2019-20*)  
The Departmental Laboratory Course (DLC) for B.Tech VII Semester, CSE discipline (under flexible curriculum) were discussed and finalized.  
The same is enclosed in Annexure- 4

Item  
6

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 B.Tech. VII semester students (for the batch admitted in 2019-20)] and for B.Tech. V semester (for the batch admitted in 2020-21)]*

Item  
7

To propose the list of "Additional Courses" which can be opted for getting an  
1) Honours (for students of the host department)  
2) Minor Specialization (for students of other departments)  
*[These will be offered through SWAYAM/NPTEL/MOOC based Platforms for the V semester (for the batch admitted in 2020-21) and for VII semester students (for the batch admitted in 2019-20)]* The courses available on SWAYAM/NPTEL/MOOC based learning platforms for Honours and Minor Specialization were discussed and identified. The same is listed, as mentioned below

1) Courses for "Honours" V Semester

Honours" V Semester		Weeks
Course ID: noc22-cs122	The Joy of Computing using Python	12
Course ID: noc22-cs102	Programming In Java	12
Course ID: noc22-cs103	Programming In Modern C++	12

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## Courses for "Minor Specialization" - V Semester

Minor Specialization V Semester		Weeks
Course ID: noc22-cs78	Introduction to Operating Systems	8
Course ID: noc22-cs88	Computer Architecture And Organization	12
Course ID: noc22-cs70	Programming, Data Structures And Algorithms Using Python	8

## Courses for "Honours" - VII Semester

Honours" VII Semester		Weeks
Course ID: noc22-cs110	Multi-Core Computer Architecture - Storage and Interconnects	8
Course ID: noc22-cs81	Parameterized Algorithms	12
Course ID: noc22-cs107	Software Project Management	12

## Courses for "Minor Specialization"- VII semester

Minor Specialization V Semester		Weeks
Course ID: noc22-cs71	Design and analysis of algorithms	8
Course ID: noc22-cs61	Software Testing	12
Course ID: noc22-cs111	Computer Graphics	8

Item 8

To prepare and recommend the *scheme structure of B.Tech. V Semester under the flexible curriculum (Batch admitted in 2020-21)*

The scheme for B.Tech V Semester, CSE discipline (under flexible curriculum) were discussed and finalized.

The same is enclosed in Annexure 5

Item 9

To prepare and recommend the syllabi for all *Departmental Core (DC) Courses* of B.Tech. V Semester (for batch admitted in 2020-21) under the flexible curriculum along with their COs.

Departmental Core (DC) Courses of V Semester were discussed and finalized for Batch admitted in 2020-21. Subjects are: -

Department Core (DC subjects)
150511- Data Science
150512- Networking with TCP/IP
150513- Information Security
150514- Compiler Design

The same is enclosed in Annexure 6

Item 10

To prepare and recommend the Experiment list/ Lab manual for all the Laboratory Courses to be offered in B.Tech. V semester (for batch admitted in 2020-21)

Experiment list/ Lab manual for all the Laboratory Courses of V Semester were discussed and finalized for Batch admitted in 2020-21.

The same is enclosed in Annexure 7

[This will also include all the emerging area programmes]

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Item 11	<p>To prepare and recommend the suggestive list of projects which can be assigned under the 'Skill based mini-project' category in various laboratory components based courses to be offered in B.Tech. V Semester (for the batch admitted in 2020-21).</p> <p>Skill based mini-project for Courses of V Semester were discussed and finalized for Batch admitted in 2020-21.</p> <p>The same is enclosed in <u>Annexure 8</u></p> <p>[This will also include all the emerging area programmes]</p>											
Item 12	<p>To propose the list of courses from SWAYAM/NPTEL/MOOC Platforms to be offered (for batch admitted in 2020-21) in online mode under <i>Self-Learning/ Presentation</i>, in the B.Tech. V Semester</p> <p>[This will also include all the emerging area programmes]</p> <table border="1" data-bbox="279 504 1444 750"> <tr> <td>Course ID: noc22-cs74</td> <td>Python for Data Science</td> </tr> <tr> <td>Course ID: noc22-cs114</td> <td>Introduction to Computer and Network Performance Analysis using Queuing Systems</td> </tr> <tr> <td>Course ID: noc22-cs112</td> <td>Demystifying Networking</td> </tr> <tr> <td>Course ID: noc22-mg111</td> <td>Stress Management</td> </tr> <tr> <td>Course ID: noc22-mg96</td> <td>Gender Justice And Workplace Security</td> </tr> </table>		Course ID: noc22-cs74	Python for Data Science	Course ID: noc22-cs114	Introduction to Computer and Network Performance Analysis using Queuing Systems	Course ID: noc22-cs112	Demystifying Networking	Course ID: noc22-mg111	Stress Management	Course ID: noc22-mg96	Gender Justice And Workplace Security
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Course ID: noc22-cs112	Demystifying Networking											
Course ID: noc22-mg111	Stress Management											
Course ID: noc22-mg96	Gender Justice And Workplace Security											
Item 13	<p>To prepare and recommend the <i>Scheme &amp; Syllabi (along with the Course Outcomes)</i> of B.Tech. III semester of the newly started B. Tech. programmes in the emerging areas (AI &amp; ML, AI &amp; DS, CSD) (started from 2021-22 Session) {Applicable for the concerned departments}</p> <p>The scheme &amp; Syllabus for B.Tech III Semester, CSD discipline (under flexible curriculum) were discussed and finalized.</p> <p>The Scheme is enclosed in <u>Annexure 9</u></p> <p>The Syllabus is enclosed in <u>Annexure 10</u></p>											
Item 14	<p>To prepare and recommend the list of experiments and skill based mini projects of B.Tech. III semester of the newly started B. Tech. programmes in the emerging areas (AI &amp; ML, AI &amp; DS, CSD) (started from 2021-22 Session) {Applicable for the concerned departments}</p> <p>The skill based mini projects for B.Tech III Semester, CSD discipline (under flexible curriculum) were discussed and finalized.</p> <p>The Scheme is enclosed in <u>Annexure 11</u></p>											
Item 15	<p>To review, prepare, finalize and recommend the <i>Scheme &amp; Syllabi (along with the Course Outcomes)</i> of III semester B. Tech. programmes (batch admitted 2021-22 Session) {(all traditional and emerging area programmes (IT-IoT, AIR, EE-IoT, MAC))}</p> <p>The same scheme approved through earlier BOS for admitted batch 2020-21 is adopted for batch admitted in 2021-22.</p> <p><u>Annexure 11(a)</u></p>											
Item 16	<p>To review, prepare, finalize and recommend the list of experiments/ Lab manual and skill based mini projects for various laboratory courses to be offered in III Semester (for the batch admitted in 2021-22).{(all traditional and emerging area programmes (IT-IoT, AIR, EE-IoT, MAC))}</p> <p>For CSD(included in item no 13,annexure-10) and for CSE the same list of experiments approved through earlier BOS for admitted batch 2020-21 is adopted for batch admitted in 2021-22.</p>											
Item 17	<p>To propose the list of courses from SWAYAM/NPTEL/MOOC Platforms to be offered (for batches admitted in 2021-22) in online mode under <i>Self-Learning/ Presentation</i>, in the III Semester {(all traditional and emerging area programmes (IT-IoT, AIR, EE-IoT, MAC, AI&amp;DS, AI&amp; ML, CSE/ CSD))}</p> <table border="1" data-bbox="279 1758 1444 1960"> <tr> <td>Course ID: noc22-cs68</td> <td>C Programming and Assembly Language</td> </tr> <tr> <td>Course ID: noc22-cs79</td> <td>Introduction to Quantum Computing: Quantum Algorithms and Qiskit</td> </tr> <tr> <td>Course ID: noc22-hs74</td> <td>Patent Drafting for Beginners</td> </tr> <tr> <td>Course ID: noc22-mg62</td> <td>Decision-Making Under Uncertainty</td> </tr> </table>		Course ID: noc22-cs68	C Programming and Assembly Language	Course ID: noc22-cs79	Introduction to Quantum Computing: Quantum Algorithms and Qiskit	Course ID: noc22-hs74	Patent Drafting for Beginners	Course ID: noc22-mg62	Decision-Making Under Uncertainty		
Course ID: noc22-cs68	C Programming and Assembly Language											
Course ID: noc22-cs79	Introduction to Quantum Computing: Quantum Algorithms and Qiskit											
Course ID: noc22-hs74	Patent Drafting for Beginners											
Course ID: noc22-mg62	Decision-Making Under Uncertainty											
Item 18	<p>To review the <i>Scheme &amp; Syllabi, list of experiments and skill based mini projects</i> of First semester of the B. Tech. programmes (for the batch 2022-23).(all traditional and emerging area programmes)</p> <p>Scheme of First Sem CSE admitted July 2022 is attached in <u>annexure 12(a)</u></p> <p>Scheme of First Sem CSD admitted July 2022 is attached in <u>annexure 12(b)</u></p>											

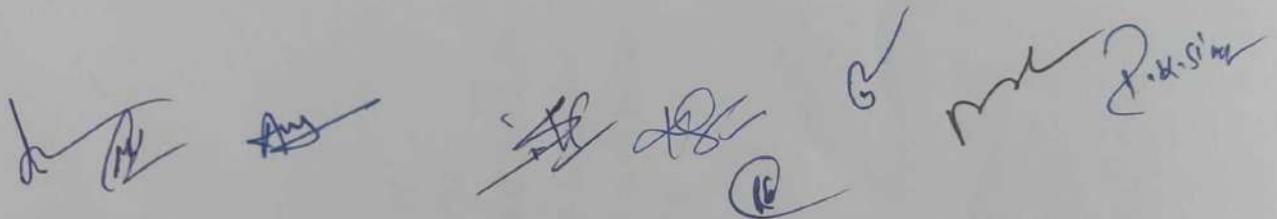
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	Syllabus is Same as approved by BoS for Admitted year 2021
Item 19	To review the CO attainments, to identify gaps and to suggest corrective measures for the improvement in the CO attainment levels for (i) 1 year November 2021 – February 2022 Semester (ii) July-December 2021 Session for II to IV year students <u>Annexure-13</u>
Item 20	To review PO attainment of 2017-2021 batch, CO-PO mapping matrix with attainments and gap analysis <u>Annexure-14</u>
Item 21	To review curricula feedback from various stakeholders, its analysis and impact {Stakeholder feedback analysis must also contain an Action Taken Report (ATR) and the details/data of the stakeholders who have responded through GOOGLE form (such as Name, organization, mail id, phone no., if available) must also be shared along with the feedback of the alumni/employer} <u>Annexure-15</u>
Item 22	To review the Course Outcomes (COs) feedback of various courses, its analysis, and ATR <u>Annexure-16</u>
Item 23	Any other matter

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Annexure-1

*Scheme of  
B.Tech VII  
For batch admitted 2019-20  
(Computer Science & Engineering)  
Under Flexible Curriculum  
[Item-2]*



Scheme of Examination

B.Tech.VII Semester(Computer Science and Engineering) *for batch admitted in Academic Session 2019-2020*

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/ Assignment	End Sem.	Lab Work & Session al	Assignment						Exam
1.	DE	DE	Departmental Elective (DE-3)	70	20	10	-	-	-	-	100	3	-	-	3
2.	DE	DE	Departmental Elective*(DE-4)	-	-	-	-	-	25	75	100	2	-	-	2
3.	OC	OC	Open Category(OC-2)	70	20	10	-	-	-	-	100	2	1	-	3
4.	OC	OC	Open Category(OC-3)	70	20	10	-	-	-	-	100	3	-	-	3
5.	100008	MC	Intellectual Property Rights (IPR) (MC)	70	20	10	-	-	-	-	100	2	-	-	2
6.	150701	DLC	Departmental Lab(DLC-6)	-	-	-	50	50	-	-	100	-	-	4	2
7.	150702	DLC	Summer Internship Project-III (04weeks) (Evaluation)(DLC-7)	-	-	-	50	50	-	-	100	-	-	4	2
8.	150703	DLC	Creative Problem Solving(Evaluation)(DLC)	-	-	-	25	25	-	-	50	-	-	2	1
Total				280	80	40	125	125	25	75	750	12	1	10	18
Additional Courses for obtaining Honours or minor Specialization by desirous students				Permitted to opt for maximum two additional courses for the award of Honours or Minor specialization											

DE-3(Through Traditional Mode)		
S. No.	Subject Code	Subject Name
1.	150711	Networking with TCP/IP
2.	150712	Data Mining & Warehousing
3.	150713	Distributed Systems

DE-4*		
S. No.	Subject Code	Subject Name
1.	150756	Software Testing
2.	150757	Big Data Computing
3.	150758	Introduction To Machine Learning

OC-2		
S. No.	Subject Code	Subject Name
1.	900208	Soft Computing
2.	900209	Network Security

OC-3		
S. No.	Subject Code	Subject Name
1.	900220	R Programming
2.	900222	Computer Networks

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

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

Honours* (to be opted by students of Parent Department)	Minor Specialization* (to be opted by students of Other Department)
Multi-Core Computer Architecture - Storage and Interconnects	Design and analysis of algorithms
Software Project Management	Software Testing
Parameterized Algorithms	Computer Graphics

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

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ANNEXURE – 2

*Syllabi  
of  
Departmental Elective (DE) Courses  
B.Tech VII Semester  
(Computer Science & Engineering)  
Under Flexible Curriculum  
[ITEM-3]*



Department of Computer Science and Engineering

**NETWORKING WITH TCP/IP**  
**150711 (DE-3)**

**COURSE OBJECTIVES**

- To build an understanding of the fundamental concepts of TCP/IP with computer networking.
  - To familiarize the student with the basic taxonomy and terminology of the TCP/IP area.
  - To understand the network traffic, congestion, controlling and resource allocation.
- 

**Unit-I**

**Introduction :** ARPANET, ISDN and Broadband ISDN, Protocols and Standards, Internet Administration, ATM Model, SONET & SDH, TCP/IP Protocol Suite, Network Addressing at various layer

**Unit-II**

**IP Layer:** Connection Oriented & Connection less Internet Working, IPV4 Addressing, Subnetting, Supernetting. Delivery and Forwarding of IP Packets, IPV4, IPV6, ARP, RARP, ICMPv4, IGMP, Mobile IP, Unicast Routing Protocols (RIP, OSPF, and BGP), Multicasting and Multicast Routing Protocols.

**Unit-III**

**TCP and UDP Layer:** TCP Reliable data transfer, Connection Establishment & Release, TCP Frame, Header Checksum, Sliding Window Concept for error control, congestion control and TCP timer, UDP Format, Pseudo header, Encapsulation, Checksum, Multiplexing & Demultiplexing. Stream Control Transmission Protocol.

**Unit-IV**

**Application Layer:** Client-Server Paradigm, DHCP, DNS, TELNET, FTP, TFTP, World Wide Web and HTTP, Electronic Mail: SMTP, POP, IMAP, and MIME, SNMP, BOOTP.

**Unit-V**

**Multimedia and Next Generation Protocol:** Voice over IP, Real Time Transport Protocol, IPv6 Addressing, IPv6 Protocol, ICMPv6, Firewall, PGP, HTTPS.

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### RECOMMENDED BOOKS

- Data and Computer Communication, W. Stalling, Pearson
- Internetworking with TCP/IP - Vol. – I, D.E. Comer, PHI
- Data Communication & Networking, B.A. Forouzan
- ISDN and Broad band ISDN with Frame Relay & ATM, W. Stalling
- LANs, Keiser

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### COURSE OUTCOMES

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

- CO1. define the concept of computer network and various layered architecture.
- CO2. compare the classless and class full addressing of IPV4 .
- CO3. identify the different types of networking devices and their functions within a network.
- CO4. analyze various protocols of computer networks for assisting network design and implementation.
- CO5. design client server applications and communication model and protocols for communication.
- CO6. elaborate various TCP/IP protocol for achieving multimedia and security services.

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Department of Computer Science and Engineering

**DATA MINING & WAREHOUSING**  
**150712 (DE-3)**

**COURSE OBJECTIVES**

- To understand the value of data mining in solving real-world problems.
  - To gain understanding of algorithms commonly used in data mining tools.
  - To develop ability for applying data mining tools to 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 &

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their Comparison, Mining Multilevel Association Rules, Multidimensional Association Rules, Constraint Based Association Rule Mining.

#### 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.

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#### 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. classify various databases systems and data models of data warehouse.

CO2. compare various methods for storing & retrieving data from different data sources/repository.

CO3. apply pre-processing techniques for construction of data warehouse.

CO4. analyse data mining for knowledge discovery & prediction.

CO5. explain data mining methods for identification of association for transactional databases.

CO6. develop various classification and clustering algorithms for data using data mining.

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*Ans.*



Department of Computer Science and Engineering

**DISTRIBUTED SYSTEMS**  
**150713 (DE-3)**

**COURSE OBJECTIVES**

- To provide students contemporary knowledge of distributed systems.
- To equip students with skills to analyze and design distributed applications.
- To gain experience in the design and testing of a large software system, and to be able to communicate that design to others.

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**Unit - I**

**Introduction to Distributed Systems:** Architecture for Distributed System, Goals of Distributed System, Hardware and Software Concepts, Distributed Computing Model, Advantages & Disadvantage Distributed System, Issues in Designing Distributed System.

**Unit -II**

**Distributed Share Memory:** Basic Concept of Distributed Share Memory (DSM), DSM Architecture & Its Types, Design & Implementations Issues in DSM System, Structure of Share Memory Space, Consistency Model and Thrashing.

**Unit - III**

**Distributed File System:** Desirable Features of Good Distributed File System, File Model, File Service Architecture, File Accessing Model, File Sharing Semantics, File Catching Scheme, File Application & Fault Tolerance.

**Unit - IV**

**Inter Process Communication and Synchronization:** Data Representation & Marshaling, Group Communication, Client Server Communication, RPC-Implementing RPC Mechanism, Stub Generation, RPC Messages. Synchronization: - Clock Synchronization, Mutual Exclusion, Election Algorithms - Bully & Ring Algorithms.

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### Unit - V

**Distributed Scheduling and Deadlock** Distributed Scheduling- Issues in Load Distributing, Components for Load Distributing Algorithms, Different Types of Load Distributing Algorithms, Task Migration and its issues. Deadlock- Issues in deadlock detection & Resolutions, Deadlock Handling Strategy, Distributed Deadlock Algorithms. Case Study of Distributed System: Amoeba, Mach, Chorus.

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### RECOMMENDED BOOKS

- Distributed Operating System Concept & Design, Sinha, PHI .
  - Distributed System Concepts and Design, Coulouris & Dollimore, Pearson Pub.
  - Distributed Operating System, Andrew S. Tanenbaum, Pearson.
- 

### COURSE OUTCOMES

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

- CO1. Tell the basic elements and concepts related to distributed system technologies
  - CO2. Demonstrate knowledge of the core architectural aspects of distributed systems.
  - CO3. Identify how the resources in a distributed system are managed by algorithm.
  - CO4. Examine the concept of distributed file system and distributed shared memory.
  - CO5. Compare various distributed system algorithms for solving real world problems.
  - CO6. Develop application for achieving various services of distributed system
- 

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*Syllabi  
of  
Open Category (OC) Courses  
offered by Department of CSE in  
B.Tech VII Semester  
Under Flexible Curriculum*

*[ITEM-5]*



Department of Computer Science and Engineering

**SOFT COMPUTING**  
**900208 (OC-2)**

**COURSE OBJECTIVES**

- To provide the student with the basic understanding of neural networks and fuzzy logic fundamentals, Program the related algorithms and Design the required and related systems.
- To understand the fundamental theory and concepts of neural networks, neuro-modeling, several neural network paradigms and its applications.
- To understand the basics of an evolutionary computing paradigm known as genetic algorithms and its application to engineering optimization problems.

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**Unit-I**

**Introduction and Fundamental Concept of ANN:** Basic models of Artificial Neural Networks, Terminologies of ANNs McCulloch-Pitts Neurons, Linear Separability, Hebb Network, **Supervised Learning Networks:** Introduction, Perceptron Networks, Back Propagation Networks, Radial Basis Function Networks, Hopfield networks.

**Unit-II**

**Unsupervised Learning:** Fixed weight Competitive Nets, Kohonen Self-Organizing Map, Learning vector quantization. Counter propagation Networks, Adaptive Resonance Theory Network.

**Unit-III**

**Fuzzy Set Theory:** Fuzzy Sets, Fuzzy Membership Functions, Operations on Fuzzy Sets, Fuzzy Relations, Fuzzy rules, Fuzzy Reasoning, **Defuzzification:** Lambda-Cuts for Fuzzy sets (Alpha-Cuts), Lambda-Cuts for Fuzzy Relations. Fuzzy Inference System: Introduction, Mamdani Fuzzy Model, Takagi-Sugeno Fuzzy Model.

**Unit-IV**

**Introduction:** Biological Background, Traditional optimization and Search Techniques, Basic Terminologies in GA, Operators in Genetic Algorithm, Stopping Condition for

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Genetic Algorithm Flow, Classification of Genetic Algorithm, Comparison with Evolutionary algorithm, Application of Genetic algorithm.

#### Unit-V

**Hybrid Soft Computing Techniques:** Introduction, Neuro-fuzzy Hybrid system, Adaptive Neuro fuzzy inference system(ANFIS), Genetic Neuro Hybrid system, Application of Soft Computing Techniques.

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#### RECOMMENDED BOOKS

- Principles of Soft Computing, S. N. Sivanandam and S. N. Deepa , Wiley
- Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis and Applications-S. Rajasekaran & G.A. Vijayalakshmi Pai, PHI.
- Introduction to Soft Computing Neuro-Fuzzy and Genetic Algorithms, Samir Roy and Udit Chakraborty, Pearson.
- Neural Networks and Learning Machines-Simon Haykin PHI.
- Fuzzy Logic and Engineering Application, Tomthy Ross, TMH

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#### COURSE OUTCOMES

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

- CO1. define basic concepts of neural network and fuzzy systems.
- CO2. compare solutions by applying various soft computing approaches on a given problem.
- CO3. develop and train different supervised and unsupervised learning.
- CO4. classify various nature inspired algorithms according to their application aspect.
- CO5. compare the efficiency of various hybrid systems.
- CO6. design a soft computing model for solving real world problems.

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Department of Computer Science and Engineering

**NETWORK SECURITY**  
**900209 (OC-2)**

**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.

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#### Unit -IV

**IP & Web Security Overview:** SSL (Secure Socket Layer), TLS (Transport Layer Security), SET (Secure Electronic Transaction). **IDS (Intrusion Detection System):** 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, Footprinting, Scanning: Types: Port, Network, Vulnerability), Sniffing in Shared and Switched Networks, Sniffing Detection & Prevention, Spoofing.

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#### 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 Prosise, Tata McGraw Hill.

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#### COURSE OUTCOMES

After completion of the course students would be able to:

- CO1: define various aspects of network security.
- CO2: illustrate fundamentals of number theory and cryptography.
- CO3: apply security mechanisms to achieve principles of network security.
- CO4: analyze the cause for various existing network attacks.
- CO5: examine the vulnerabilities in applications over internet.
- CO6: develop a secure protocol for achieving various network security services.

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Department of Computer Science and Engineering

**COMPUTER NETWORKS**  
**900222 (OC-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.

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**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.

**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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#### 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.

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#### 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.

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#### 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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*Experiment List of  
DLC Course offered by  
Department of CSE  
in B.Tech VII Semester  
Under Flexible Curriculum*

*[ITEM-6]*

**MACHINE LEARNING LAB**  
**150701**

**COURSE OBJECTIVES:**

- To provide the fundamental knowledge of Machine Learning.
- To analyse the working of various techniques used in Machine Learning.
- To solve real world problems using machine learning algorithms.

---

Introduction to Machine Learning: Representation, process (Data Collection, Data Preparation, Model selection, Model Training, Model Evaluation and Prediction), Evaluation and Optimization. Data cleansing and pre-processing techniques. Types of Learning: Supervised, Unsupervised and reinforcement learning. Regression vs classification problems. Performance parameters. Supervised machine learning techniques: Linear and multilinear regression, Nearest Neighbors classification, Tree based classification, Gini index and information gain, ID3 and CART algorithms, SVM. Unsupervised machine learning techniques: Introduction, types-Partitioning, density based, DBSCAN, distribution model-based, hierarchical, Agglomerative and Divisive, Common Distance measures, K-means clustering algorithm.

**RECOMMENDED BOOKS:**

1. Pattern Recognition and Machine Learning, Christopher M. Bishop.
2. Introduction to machine learning with Python: a guide for data scientists, Müller, Andreas C., and Sarah Guido, O'Reilly Media, Inc., 2016.
3. Artificial Intelligence: A Modern Approach by Stuart J. Russell and Peter Norvig, Prentice Hall.

**COURSE OUTCOMES:** After completing the course, the student will be able to:

**CO1:** Understand basic concepts of Machine Learning.

**CO2:** Illustrate various data cleansing and pre-processing techniques.

**CO3:** Separate regression and classification problems.

**CO4:** Analysis the data for applying various supervised and unsupervised machine learning techniques.

**CO5:** Evaluate different machine learning models based on performance parameters.

**CO6:** Design machine learning solutions for real world problems.

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

**Program List**

1. Perform Creation, indexing, slicing, concatenation and repetition operations on Python built-in data types: Strings, List, Tuples, Dictionary, Set
2. Solve problems using decision and looping statements.
3. Apply Python built-in data types: Strings, List, Tuples, Dictionary, Set and their methods to solve any given problem
4. Manipulation of NumPy arrays- Indexing, Slicing, Reshaping, Joining and Splitting.
5. Computation on NumPy arrays using Universal Functions and Mathematical methods.
6. Import a CSV file and perform various Statistical and Comparison operations on rows/columns.
7. Create Pandas Series and DataFrame from various inputs.
8. Import any CSV file to Pandas DataFrame and perform the following:
  1. Visualize the first and last 10 records
  2. Get the shape, index and column details
  3. Select/Delete the records(rows)/columns based on conditions.
  4. Perform ranking and sorting operations.
  5. Do required statistical operations on the given columns.
  6. Find the count and uniqueness of the given categorical values.
  7. Rename single/multiple columns.
9. Import any CSV file to Pandas DataFrame and perform the following:
  1. Handle missing data by detecting and dropping/ filling missing values.
  2. Transform data using different methods.
  3. Detect and filter outliers.
  4. Perform Vectorized String operations on Pandas Series.
  5. Visualize data using Line Plots, Bar Plots, Histograms, Density Plots and Scatter Plots.
10. Use scikit-learn package in python to implement following machine learning models to solve real world problems using open source datasets:
  1. Linear Regression model.
  2. Multi-linear regression model.
  3. Decision tree classification model.
  4. Random forest model.
  5. SVM model.
  6. K-means clustering model.

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*Scheme of  
B.Tech Vth Semester CSE  
offered by Department of CSE  
Under Flexible Curriculum*

[ITEM-8]

**MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR**  
 (A Govt. Aided UGC Autonomous Institute Affiliated to RGPV, Bhopal)  
 Scheme of Examination  
 B.Tech. V Semester (Computer Science and Engineering)

**For batches admitted in Academic Session 2020-21**

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 Sem.		Mid Sem. Exam.	Quiz/Assignment	End Sem.	Lab Work & Sessional	Skill based mini project							
				End Term Evaluation	<sup>3</sup> Proficiency in subject/course												
1.	150511	DC	Data Science	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	MCQ
2.	150512	DC	Networking with TCP/IP	50	10	20	20	-	-	-	100	3	-	-	3	Blended (2/1)	PP
3.	150513	DC	Information Security	50	10	20	20	60	20	20	200	3	-	2	4	Blended (2/1)	PP
4.	150514	DC	Compiler Design	50	10	20	20	-	-	-	100	3	1	-	4	Blended (2/1)	PP
5.	150515	DC	Artificial Intelligence	50	10	20	20	-	-	-	100	2	1	-	3	Blended (2/1)	PP
6.	150516	DLC	Minor Project-I**	-	-	-	-	60	40	-	100	-	-	4	2	Offline	SO
7.	150517	DLC	Summer Internship Project-II (Evaluation) (DLC-4)	-	-	-	-	60	-	-	60	-	-	4	2	Offline	SO
8.	150518	SEMINAR/SELF STUD	Self-learning/Presentation (SWAYAM/NPTEL/MOOC) #	-	-	-	-	-	40	-	40	-	-	2	1	Online and Mentoring	SO
9.	2000XXX	CLC	Novel Engaging Course	-	-	-	-	50	-	-	50	-	-	2	1	interactive	SO
<b>Total</b>				250	50	100	100	290	120	40	950	13	3	16	24		
10.	1000006	MAC	Disaster Management	50	10	20	20	-	-	-	100	2	-	-	Grade	Online	MCQ
11.	1000005	MAC	Project Management and Financing	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**

<sup>1</sup>proficiency in course/subject-includes the weightage towards ability/skill/competence/knowledge level/ expertise attained etc. in that particular course/subject.

<sup>2</sup>MCQ: Multiple Choice Question    <sup>3</sup>AO: Assignment + Oral    <sup>4</sup>PP: Pen Paper    <sup>5</sup>SO: Submission + Oral

<sup>6</sup>The Minor Project-I may be evaluated by an internal committee for awarding sessional marks.

<sup>7</sup>Compulsory registration for one online course using SWAYAM/NPTEL/MOOC, evaluation through attendance, assignments and presentation

Note: Students of 2020-21 admitted batch needs to appear and complete an additional MAC course of 30 Hrs. duration on Project Management & Financing. / other modules related to futuristic technologies (Drones/ Robotics etc.)

Mode of Teaching						Mode of Examination						Total Credits
Theory		Blended		Lab	NEC	Theory		Lab	SIP/SLP/NEC			
Offline	Online	Offline	Online			Offline	Interactive		PP	A+O	MCQ	
-	-	11	5	7	1	18			3	3	24	
-	-	46	21	29	4	75			12.5	12.5	Credits %	

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*Syllabi of  
Departmental Courses (DC) Courses  
B.Tech V Semester  
For batch admitted 2020-21  
(Computer Science and Engineering)  
Under Flexible Curriculum  
[Item-9]*



**DATA SCIENCE**

**150511**

**COURSE OBJECTIVES:**

- To provide the fundamental knowledge of Data Sciences.
- To analyse the working of various techniques used in Data Sciences.
- To understand the basic representation and exploratory data analysis used in Data Sciences.

---

**Unit – I:**

**Introduction to Data Science:** Introduction, Definition, applications of Data Science, Impact of Data Science, Data Analytics Life Cycle, role of Data Scientist.

**Basics of Python:** Essential Python libraries, Python Introduction- Features, Identifiers, Reserved words, Indentation, Comments, Built-in Data types and their Methods: Strings, List, Tuples, Dictionary, Set, Type Conversion- Operators. Decision Making: Looping-Loop Control statement, Math and Random number functions. User defined functions, function arguments & its types.

**Unit – II:**

**Vectorized Computation:** The NumPy ndarray- Creating ndarrays- Data Types for ndarrays- Arithmetic with NumPy Arrays- Basic Indexing and Slicing, Boolean Indexing, Transposing Arrays. Universal Functions: Fast Element, Wise Array Functions, Mathematical and Statistical Methods – Sorting Unique and Other Set Logic.

**Unit – III:**

**Data Analysis:** Series, DataFrame, Essential Functionality: Dropping Entries, Indexing, Selection, and Filtering- Function Application and Mapping- Sorting and Ranking. Summarizing and Computing Descriptive Statistics – Mean, Standard Deviation, Skewness and Kurtosis. Unique Values, Value Counts, and Membership. Reading and Writing Data in Text Format.

**Unit – IV:**

**Inferential Statistics in Data Science:** Types of Learning, Linear Regression- Simple Linear Regression, Implementation, plotting and fitting regression line. Multiple Linear Regression, Introduction, implementation, comparison with simple linear regression, Correlation Matrix, F-Statistic, Identification of significant features. Polynomial regression.

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# MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

## Unit – V:

**Exploratory Data Analysis and Visualisation:** Handling Missing Data, Data Transformation: Removing Duplicates, Transforming Data Using a Function or Mapping, Replacing Values, Detecting and Filtering Outliers, Functions in pandas. Plotting with pandas: Line Plots, Bar Plots, Histograms and Density Plots, Scatter or Point Plots.

## RECOMMENDED BOOKS:

1. Cathy O'Neil and Rachel Schutt , "Doing Data Science", O'Reilly, 2015.
2. David Dietrich, Barry Heller, Beibei Yang, "Data Science and Big data Analytics", EMC 2013
3. Artificial Intelligence: A Modern Approach by Stuart J. Russell and Peter Norvig, Prentice Hall.
4. 4. Pattern Recognition and Machine Learning, Christopher M. Bishop

**COURSE OUTCOMES:** After completing the course, the student will be able to:

CO1: Define basic concepts of Data Sciences.

CO2: Illustrate various concepts of python that are used in data sciences.

CO3: Identify various methods for the representation and manipulation of vectors.

CO4: Analysis the data for applying various statistical modelling approaches.

CO5: Identify hidden patterns in data and transform it using data science techniques.

CO6: Apply regression techniques to solve real world problems.

# MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

## PROGRAM LIST

1. Perform Creation, indexing, slicing, concatenation and repetition operations on Python built-in data types: Strings, List, Tuples, Dictionary, Set
2. Solve problems using decision and looping statements.
3. Apply Python built-in data types: Strings, List, Tuples, Dictionary, Set and their methods to solve any given problem
4. Handle numerical operations using math and random number functions.
5. Manipulation of NumPy arrays- Indexing, Slicing, Reshaping, Joining and Splitting.
6. Computation on NumPy arrays using Universal Functions and Mathematical methods.
7. Import a CSV file and perform various Statistical and Comparison operations on rows/columns.
8. Create Pandas Series and DataFrame from various inputs.
9. Import any CSV file to Pandas DataFrame and perform the following:
  1. Visualize the first and last 10 records
  2. Get the shape, index and column details
  3. Select/Delete the records(rows)/columns based on conditions.
  4. Perform ranking and sorting operations.
  5. Do required statistical operations on the given columns.
  6. Find the count and uniqueness of the given categorical values.
  7. Rename single/multiple columns.
10. Import any CSV file to Pandas DataFrame and perform the following:
  1. Handle missing data by detecting and dropping/ filling missing values.
  2. Transform data using different methods.
  3. Detect and filter outliers.
  4. Perform Vectorized String operations on Pandas Series.
  5. Visualize data using Line Plots, Bar Plots, Histograms, Density Plots and Scatter Plots.
11. Use the scikit-learn package in python to implement the regression model and its related methods.

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

SKILL BASED MINI-PROJECTS

Implement the below mentioned models using python programming and related libraries:

- Health Insurance Cost Prediction model.
- Salary Prediction model.
- Loan Amount Prediction model.
- Crop Yield Prediction Model.
- Stock Prediction Model.

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# MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

## Department of Computer Science and Engineering

### Networking with TCP/IP

150512

#### COURSE OBJECTIVES

- To understand TCP/IP Internetworking and Addressing.
- To understand framing, Routing, Address resolution and Error reporting mechanism used in the Internet
- To understand the working of Application layer protocols
- To Troubleshoot networking issues

**Unit-1** TCP/IP model, Addressing- Physical, logical and port addressing, IPv4 addresses: Classful addressing, Classless addressing. Special addresses, DHCP and NAT. Subnetting and Supernetting, IPv6 addressing.

**Unit-2** IP Datagram- format, options, fragmentations, checksum, IPsec. Address Resolution Protocol (ARP), Reverse address resolution protocol (RARP). Internet Control message protocol (ICMP).

**Unit-3** TCP: TCP Reliable data transfer, Connection Establishment & Release, TCP Frame, Header Checksum, Sliding Window Concept for error control, congestion control and TCP timers.

UDP: Format, Pseudo header, Encapsulation, Checksum, Multiplexing & Demultiplexing. Stream Control Transmission Protocol

**Unit-4** Routing Protocols- RIP, OSPF and BGP, Application Layer: DNS, FTP, TFTP, Mail Transfer protocols, TELNET, HTTP, Voice over IP.

**Unit-5** Troubleshooting Principles, Ping, Traceroute, nslookup and Netstat, Study of network packet analyzer tools: Wireshark, CISCO packet Tracer etc. Scanner Tools: Nmap, Nessus etc.

#### Reference Books:-

- Data and Computer Communication - W. Stalling, Pearson
- Internetworking with TCP/IP - Vol. - I - D.E. Comer, PHI
- Data Communication & Networking -B.A. Forouzan
- ISDN and Broad band ISDN with Frame Relay & ATM - W. Stalling
- LANs - Keiser

#### COURSE OUTCOMES

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

CO1. Outline of the basic functionality of TCP/IP layers.

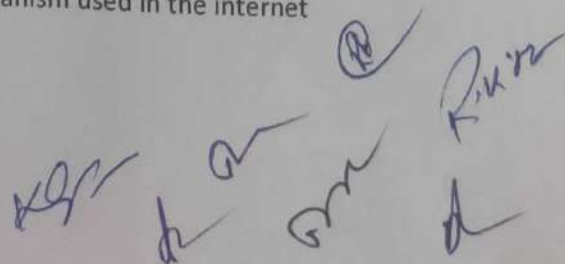
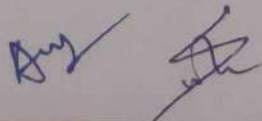
CO2. Analyze various addressing mechanism used in the internet

CO3. Elaborate the framing, Routing and Address translation mechanism used in the internet

CO4. Analyze the working of Application layer protocols

CO5. Simulate network protocols & Topologies

CO6. Install, maintain and troubleshoot a TCP/IP Network



**MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR**

*Department of Computer Science and Engineering*

**INFORMATION SECURITY**

**150513**

**COURSE OBJECTIVES**

- To provide conceptual understanding of Information security principles, issues, challenges and mechanisms.
- To understand how to apply encryption techniques to secure data in transit across data networks.

**Unit-I**

Security: Principles and Attacks, Basic Number Theory, Fundamentals of Cryptography, Steganography, Cryptanalysis, Code Breaking, Block Ciphers and Stream Ciphers, Substitution Ciphers, Transposition Ciphers, Caesar Cipher, Play-Fair Cipher, Hill Cipher

**Unit-II**

Cryptography: Symmetric Key Cryptography, Public Key Cryptography, Principles of Public Key Cryptosystem, Classical Cryptographic Algorithms: RC4, 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, 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), Firewalls: Types, Functionality and Policies.

**Unit-V**

Phishing: Attacks and its Types, Buffer Overflow Attack, Session Hijacking, 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.

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**COURSE OUTCOMES**

After completion of the course students would be able to:

- CO1. explain attacks, hash algorithms and authentication mechanisms.
- CO2. illustrate fundamentals of number theory and security principles.
- CO3. Apply various algorithms to achieve principles of network security.
- CO4. analyse 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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**LIST OF EXPERIMENTS:**

1. Perform encryption, decryption using the following substitution techniques I. Ceaser cipher II. Hill Cipher
2. Perform encryption and decryption using following transposition techniques Rail fence - Row & Column Transformation
3. Implement Playfair Cipher with key entered by user.
4. Implement polyalphabetic Cipher
5. Implement AutoKey Cipher
6. Implement Hill Cipher.
7. Implement Rail fence technique
8. Implement Simple Columner Transposition technique
9. Implement Simple Columner Transposition technique
10. Demonstrate intrusion detection system (ids) using any tool (snort or any other s/w)

**SKILL BASED MINI PROJECTS**

1. Email monitoring
2. Web application firewall
3. Log Analyzer
4. Malware Analysis Sandbox
5. Encryption Software
6. Caesar code Decoder
7. User authentication system
8. Image Steganography system
9. Anomaly detection, intrusion and its prevention

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**COMPILER DESIGN**

**150514**

**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, 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, Compiler Design Tools.

**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.

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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, Syntax and Semantic Errors.

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, 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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Annexure-7

*Experiment list/ Lab manual for all the Laboratory Courses  
B.Tech V Semester  
For batch admitted 2020-21  
(Computer Science and Engineering)  
Under Flexible Curriculum  
[Item-10]*



ADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR - 474005

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*Department of Computer Science and Engineering*

**DATA SCIENCE**

**150511**

**EXPERIMENT LIST**

1. Perform Creation, indexing, slicing, concatenation and repetition operations on Python built-in data types: Strings, List, Tuples, Dictionary, Set
2. Solve problems using decision and looping statements.
3. Apply Python built-in data types: Strings, List, Tuples, Dictionary, Set and their methods to solve any given problem
4. Handle numerical operations using math and random number functions.
5. Manipulation of NumPy arrays- Indexing, Slicing, Reshaping, Joining and Splitting.
6. Computation on NumPy arrays using Universal Functions and Mathematical methods.
7. Import a CSV file and perform various Statistical and Comparison operations on rows/columns.
8. Create Pandas Series and DataFrame from various inputs.
9. Import any CSV file to Pandas DataFrame and perform the following:
  1. Visualize the first and last 10 records
  2. Get the shape, index and column details
  3. Select/Delete the records(rows)/columns based on conditions.
  4. Perform ranking and sorting operations.
  5. Do required statistical operations on the given columns.
  6. Find the count and uniqueness of the given categorical values.
  7. Rename single/multiple columns.
10. Import any CSV file to Pandas DataFrame and perform the following:
  1. Handle missing data by detecting and dropping/ filling missing values.
  2. Transform data using different methods.
  3. Detect and filter outliers.
  4. Perform Vectorized String operations on Pandas Series.
  5. Visualize data using Line Plots, Bar Plots, Histograms, Density Plots and Scatter Plots.
11. Use the scikit-learn package in python to implement the regression model and its related methods.

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### SKILL BASED MINI-PROJECTS

Implement the below mentioned models using python programming and related libraries:

- Health Insurance Cost Prediction model.
- Salary Prediction model.
- Loan Amount Prediction model.
- Crop Yield Prediction Model.
- Stock Prediction Model.

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*Department of Computer Science and Engineering*

**INFORMATION SECURITY**

**150513**

**LIST OF EXPERIMENTS:**

1. Perform encryption, decryption using the following substitution techniques I. Ceaser cipher II. Hill Cipher
2. Perform encryption and decryption using following transposition techniques Rail fence - Row & Column Transformation
3. Implement Playfair Cipher with key entered by user.
4. Implement polyalphabetic Cipher
5. Implement AutoKey Cipher
6. Implement Hill Cipher.
7. Implement Rail fence technique
8. Implement Simple Columnar Transposition technique
9. Implement Simple Columnar Transposition technique
10. Demonstrate intrusion detection system (ids) using any tool (snort or any other s/w)

**SKILL BASED MINI PROJECTS**

1. Email monitoring
2. Web application firewall
3. Log Analyzer
4. Malware Analysis Sandbox
5. Encryption Software
6. Caesar code Decoder
7. User authentication system
8. Image Steganography system
9. Anomaly detection, intrusion and its prevention

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Annexure-8

*Skill Based Mini-Projects*  
*B.Tech V Semester*  
*For batch admitted 2020-21*  
*(Computer Science and Engineering)*  
*Under Flexible Curriculum*  
*[Item-11]*



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*Department of Computer Science and Engineering*

**DATA SCIENCE**

**150511**

**SKILL BASED MINI-PROJECTS**

Implement the below mentioned models using python programming and related libraries:

- Health Insurance Cost Prediction model.
- Salary Prediction model.
- Loan Amount Prediction model.
- Crop Yield Prediction Model.
- Stock Prediction Model.





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*Department of Computer Science and Engineering*

**INFORMATION SECURITY  
150513  
SKILL BASED MINI -PROJECTS**

1. Email monitoring
2. Web application firewall
3. Log Analyzer
4. Malware Analysis Sandbox
5. Encryption Software
6. Caesar code Decoder
7. User authentication system
8. Image Steganography system
9. Anomaly detection, intrusion and its prevention

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Annexure-9

***Scheme of  
B.Tech IIIrd Semester Computer Science and Design (CSD)  
offered by  
Department of CSE  
Under Flexible Curriculum***

**[ITEM-13]**







MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR-474005

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Annexure-10

*Syllabi of  
Departmental Courses (DC) Courses  
B.Tech III Semester  
For batch admitted 2020-21  
(Computer Science & Design)  
Under Flexible Curriculum  
[Item-13]*

Department of Engineering Mathematics and Computing

Discrete Mathematics  
290301

Objective of Course

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

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**UNIT 1:**

Sets, Subsets, Power sets, Complement, Union and Intersection, Demorgan's law Cartesian products, Relations, relational matrices, properties of relations, equivalence relation, functions, Injection, Surjection and Bijective mapping, Composition of functions, Permutations, the characteristic functions and Mathematical induction.

**UNIT 2:**

Partial order set, Hasse diagrams, upper bounds, lower bounds, Maximal and minimal element, first and last element, Lattices, sub lattices, Isotonicity, distributive inequality, Lattice homomorphism, lattice isomorphism, complete lattice, complemented lattice distribution lattice.

**UNIT 3:**

Group axioms, permutation group, sub group, co-sets, normal subgroup, semi group, Lagrange theorem, fields, minimal polynomials, reducible polynomials, primitive polynomial, polynomial roots, applications.

**UNIT 4:**

Finite graphs, incidence and degree, isomorphism, sub graphs and union of graphs, connectedness, walk, paths and circuits, Eulerian and Hamiltonian graphs. Trees: properties of trees, pendant vertices in tree, center of tree, spanning trees and cut vertices, binary tree, matrix representation of graph, incidence and adjacency matrix and their properties, applications of graphs in computer science.

**UNIT 5:**

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

Course Outcomes

After completing this course, the students will be able to:

CO's	Description of CO's
CO1	Acquire Knowledge of set theory
CO2	Analyse the concept of Lattices
CO3	Identify the concept of Group Theory
CO4	Derive the Inferences from Graph theory
CO5	Illustrate the Discrete numeric function and recursive relation

**Recommended Books:**

1. J.P Tremblay and Manohar: Discrete Mathematical Structures with Application to Computer science, McGraw-Hill, 1st Edition 2017.
2. Narsingh Deo: Graph Theory, PHI Learning, 2014.
3. C.L Liu: Element of Discrete Mathematics, Mc Graw Hill, 4th Edition 2016.
4. Rosen: Discrete Mathematics and its Applications, McGraw Higher Ed, 7th Edition 2008.
5. I.N. Herstein: Topics in Algebra, Wiley, 2<sup>nd</sup> Edition 2006.

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Department of Computer Science and Engineering

**DESIGN & ANALYSIS OF ALGORITHMS**  
**290302 (DC)**

**COURSE OBJECTIVE:**

- To introduce the topic of algorithms as a precise mathematical concept.
- To demonstrate the familiarity with major algorithm design paradigms and methods of analysis.
- To design efficient algorithms for common computer engineering problems.
- To enhance the skills using well-known algorithms and data structures for solving real-life problems.

---

**Unit-I**

**Introduction to Computational Model:** RAM model, Algorithms and its importance, Recurrences and Asymptotic Notations, Growth of function, Mathematical Analysis of Non-Recursive and Recursive Algorithm, Review of Sorting & Searching Algorithms, Basic Tree and Graph Concept: Binary Search Trees, Height Balanced Tree, B-Trees and Traversal Techniques.

**Unit-II**

**Divide and Conquer Method:** Introduction and its Examples such as Finding the maximum and minimum, Binary Search, Merge Sort, Quick Sort and Strassen's Matrix Multiplication.

**Unit-III**

**Greedy Method:** Introduction, Characteristics, greedy activity selection. **Minimum Cost Spanning Trees:** Prim's and Kruskal's Algorithm, knapsack Problem, Single Source Shortest Path: Dijkstra's single source shortest path algorithm, Huffman Coding.

**Unit-IV**

**Dynamic Programming:** Introduction, The principle of Optimality, Examples of Dynamic Programming Methods such 0/1 Knapsack, Travelling salesman problem, Floyds All Pairs Shortest Path, Longest Common Subsequence and Reliability Design.

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Department of Computer Science and Engineering

**DESIGN AND ANALYSIS OF ALGORITHM**  
**290302(DC)**

**List of Programs**

1. WAP to implement the following using array as data structure and analyze its time Complexity.
  - a. Insertion sort
  - b. Selection sort
  - c. Bubble sort
  - d. Quick sort
  - e. Bucket sort
  - f. Radix sort
  - g. Heap sort
  - h. Merge sort
2. WAP to implement Linear and Binary Search and analyze its time complexity.
3. WAP to implement Matrix Chain Multiplication and analyze its time complexity.
4. WAP to implement Longest Common Subsequence Problem and analyze its time Complexity.
5. WAP to implement Optimal Binary Search Tree Problem and analyze its time complexity.
6. WAP to implement Huffman Coding and analyze its time complexity.
7. WAP to implement Dijkstra's Algorithm and analyze its time complexity.
8. WAP to implement Bellman Ford Algorithm and analyze its time complexity.
9. WAP to implement DFS and BFS and analyze their time complexities.
10. WAP to Implement 0/1 knapsack using dynamic programming.

---

**COURSE OUTCOMES**

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

- CO1. Relate the principles of algorithm design in solving problems.
- CO2. Demonstrate basic algorithms and different problem solving strategies.
- CO3. Build creativeness and confidence to solve non-conventional problems.
- CO4. Analyze running times of algorithms using asymptotic analysis.
- CO5. Compare various algorithm design approaches for solving real world problems.
- CO6. Design and implement optimization algorithms in specific applications

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Department of Computer Science and Engineering

**OPERATING SYSTEMS**  
**290303 (DC)**

**COURSE OBJECTIVES**

- Provide basic knowledge of computer operating system structures and functioning.
- Compare several different approaches to memory management, file management and process management
- Understand various problems related to concurrent operations and their solutions.

**Unit-I**

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

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

**Unit-II**

**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 form Deadlock.

**Unit-III**

**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-IV**

**Storage management:** Mass-Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, RAID Structure.

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### Unit-V

**File system interface:** File Concept, Access Methods, Directory Structure, File System Structure, Allocation Methods, and Free-Space Management.

**System Protection:** Goals, Principles, Domain of Protection, Access Matrix, Access Control.

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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. Outline the basic concept of operating systems
- CO2. Analyze the working of operating system
- CO3. Examine the working of various scheduling/allocation approaches
- CO4. Measure the performance of various scheduling/allocation approaches
- CO5. Analyze the various operating system problems/issues
- CO6. Develop the Solution of various operating system problems/issues

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COMPUTER SYSTEM ORGANIZATION  
290304 (DC)

COURSE OBJECTIVES

- 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-Neumann Model, Various Subsystems, CPU, Memory, I/O, System Bus, CPU and Memory Registers, Program Counter, Accumulator, Register Transfer and Micro Operations: Register Transfer Language, Register Transfer, Tree-State Bus Buffers, Bus and Memory Transfers, Arithmetic Micro-Operation, Logic Micro-Operation, Shift Micro- Operation Register Transfer Micro Operations, Arithmetic Micro-Operations, Logic Micro- Operations and Shift Micro-Operations.

Unit- II

**Computer Arithmetic:** Addition and Subtraction with Signed-Magnitude, Multiplication Algorithm, Division Algorithm, 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, I/O Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, DMA (DMA Controller, DMA Transfer),

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Input-Output Processor (IOP), Data Transfer- Serial/Parallel, Simplex/ Half Duplex/ Full Duplex.

#### Unit-V

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

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#### RECOMMENDED BOOKS

- Computer System Architecture, Morris Mano, PHI.
- Microprocessor Architecture, Programming and Applications with the 8085, Gaonkar,
- 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. Explain different memories and the functional units of a processor.
- CO3. Explain the concept of working of microprocessor, multiprocessor and pipelining.
- 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 Computer Science and Engineering

**COMPUTER GRAPHICS AND ANIMATION  
290305(DC)**

**COURSE OBJECTIVES**

- To provide an introduction to the theory and practice of computer graphics.
- To give a good exposure related to Computer Graphics algorithms and to design various graphics primitives.
- To enhance the proficiency in programming skills related to animation and graphics object Design

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**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: General Method, Mid-Point, DDA, Bresenham's Circle Generation Algorithm, And 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, Cohen Sutherland Line Clipping Algorithm etc., Polygon Clipping, Convex and Concave Polygon, Sutherland Hodgeman Polygon Clipping Algorithm etc., Area Filling, Hidden Surface Elimination: Z- Buffer algorithm and Painter's Algorithm.

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### Unit-V

**Color Models:** RGB, YIQ, CMY, HSV. **Computer Animation:** Introduction, Uses, key frames and tweening, types of animation, 2D and 3D animation, Principles and techniques of Animation.

**Image Manipulation and Storage:** Introduction to Digital Image Processing (DIP), Fundamental Steps and Components of DIP, Digital image enhancement, contrast stretching, Histogram Equalization, smoothing and median Filtering.

---

### RECOMMENDED BOOKS

- Computer Graphics, Donald Hearn and M.P. Becker, PHI Publication.
- Computer Graphics principle and Practice, Foley Vandam, Feiner, Hughes.
- Principles of Computers Graphics, Rogers, TMH.
- Computer Graphics, Sinha and Udai, TMH.
- Digital Image Processing, Gonzalez.
- Principle of multimedia Ranjan Parekh, TMH.

---

### COURSE OUTCOMES

After completion of the course students will be able to:

- CO1. Explain interactive Computer Graphics, various display devices and explore applications of computer graphics.
- CO2. Illustrate various line generations, circle generation, curve generation and shape Generation algorithms.
- CO3. Apply various 2-Dimensional and 3-Dimensional transformations and projections on Images.
- CO4. Classify methods of image clipping and various algorithms for Line and Polygon clipping.
- CO5. Choose appropriate filling algorithms, Hidden Surface Elimination algorithm and apply on various images.
- CO6. Analyis various color models, shading methods, animation and Digital Image Processing.

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Department of Computer Science and Engineering

**COMPUTER GRAPHICS AND ANIMATION**  
**290305(DC)**

**List of Experiments**

1. Installation and Introduction to OpenGL basics, graphic functions, commands for compiling and executing an OpenGL Program.
2. Write a Program to create an output window, to plot a point with given coordinates and other basic demonstrations.
3. Write a Program to implement DDA Line Drawing Algorithm.
4. Write a Program to implement Bresenham Line Algorithm.
5. Write a Program to implement Mid-Point Circle Algorithm.
6. Write a Program to implement following 2D transformations:
  - i. Translation of a point, line and polygon.
  - ii. Scaling of a line and polygon.
  - iii. Rotation of a line and polygon around origin.
7. Write a Program to implement:
  - i. Flood Filling Algorithm using polygon.
  - ii. Boundary Filling Algorithm using polygon.
8. Write a Program

---

**COURSE OUTCOMES**

After completion of the course students will be able to:

- CO1. Demonstrates the fundamental concepts of Computer Graphics and its applications.
- CO2. Explain and use hardware's and software's component of computer graphics
- CO3. Apply various image generation, manipulations and color model techniques in coding.
- CO4. Implement algorithms for create and manipulate image in programs.
- CO5. Develop the ability to write computer programs for create image and animation using graphics concepts.
- CO6. Develop application programs and projects in terms of image and animation using computer graphics.

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Department of Computer Science and Engineering

**Digital Circuit Design Lab**  
**290306 (DLC)**

**COURSE OBJECTIVES**

- To study and verify the truth tables of various logic gates
- To study and design various combinational circuits
- To study and design various sequential circuits
- To perform the analysis and design of various digital electronic circuits.

**Logic Gates:**

Study of various logic gates. Realization of various logic gates using universal logic gates.

**Combinational Circuit:**

Half Adder, Full Adder, Half-subtractor, Full Subtractor, Multiplexer & Demultiplexer , word comparator and parity checker etc.

**Sequential Circuit:**

RS, D, JK, Master slave flip flops, flip flops with various triggering methods and timing diagram.

**Counters and Registers:**

Asynchronous and Synchronous, Up/Down, Johnson Counter, MOD N, BCD counter using Decade counter, Ring counters, Shift registers, and Universal Shift Register etc.

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**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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## COURSE OUTCOMES

After completion of the course students would be able to:

- CO1: Understand the truth tables and functions of various logic gates.
  - CO2: Understand the importance of logic circuits
  - CO3: Design basic combinational logic circuits
  - CO4: Design various sequential logic circuits
  - CO5: Analyse and implement digital logic circuits.
  - CO6 : Develop and implement some basic Applications of digital electronics
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Department of Computer Science and Engineering  
**DIGITAL CIRCUIT DESIGN**  
290306 (DLC)

**List of Experiments**

1. To study and verify the truth table of various logic gates.
2. To realize Half Adder and Full Adder by using Basic logic gates
3. To realize Adder and Subtractor by using Basic logic gates
4. To design and set up 4:1 Multiplexer (MUX) using only NAND gates.
5. To design and set up 1:4 Demultiplexer (DE-MUX) using only NAND gates.
6. To realize One & Two Bit Comparator and study of 7485 magnitude comparator
7. To study and verify Truth Table of RS Flip Flop
8. To study and verify Truth Table of D type Flip Flop.
9. To study and verify Truth Table of JK type Flip Flop.
10. To study and verify Truth Table of T Flip Flop.
11. To study and verify Truth Table of JK Master Slave Flip Flop.

*Ans*  
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**MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR - 474005**  
(A Govt. Aided UGC Autonomous Institute Affiliated to RGPV, Bhopal, M.P.)

Department of Computer Science and Engineering

**SELF-LEARNING/PRESENTATION (SWAYAM/NPTEL/ MOOC)**  
**150316 (SEMINAR / SELF STUDY)**

S.No.	Course Name	Duration	Offered by	Course Link
1	C Programming and Assembly Language	4 Weeks	IIT Madras	<a href="https://onlinecourses.nptel.ac.in/noc21_cs81/preview">https://onlinecourses.nptel.ac.in/noc21_cs81/preview</a>

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

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*Skill based mini-project of  
Laboratory Courses  
B.Tech III  
Semester  
(Computer Science and Design)  
Under Flexible Curriculum  
[Item-14]*



Department of Computer Science and Engineering  
**COMPUTER GRAPHICS AND ANIMATION**  
290304(DC)

**Skill Based Projects**

1. Develop a project to implement a stretch band effect. In which a user will click on the screen and drag the mouse / arrow keys over the screen coordinates. The line should be updated like rubber-band and on the right-click gets fixed.
2. Develop a project to implement the DDA algorithm for drawing line. In this project a programmer is expected to shift the origin to the center of the screen and divide the screen into required quadrants.
3. Develop a project with menu option to input the line coordinates from the user to generate a line using Symmetrical DDA algorithm, Brenham's algorithm and DDA algorithm on a single screen with different colors.
4. Develop a project to demonstrate 2D animation such as clock simulation, vehicle movement etc.
5. Develop a project to demonstrate 2D animation such as rising sun, sunset, blinking stars.
6. Develop a project to implement the bouncing ball inside a defined rectangular window.
7. Develop a project to draw Bezier and B-Spline Curves with interactive user inputs for control polygon defining the shape of the curve.
8. Develop a project to demonstrate shear transformation in different directions on a unit square situated at the origin.
9. Develop a project in which a set of lines and a rectangular area of interest is given by user, the task is to remove lines which are outside the area of interest and clip the lines which are partially inside the area.
10. Develop a small graphics editor with line, circle, parabola, hyperbola generation.

*Please Note: Each project has to be submitted by a group of 2 to 4 students (Depending upon project), and each group will be assigned only one project.*

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*P.K. Sin*





Department of Computer Science and Engineering

**DESIGN AND ANALYSIS OF ALGORITHM**  
**290302(DC)**

**Skill Based Projects**

1. Develop a project to show graphical implementation of any two sorting methods.
2. Develop a GUI project for implementation of Sorting and searching methods.
3. Implement Kruskal and Prim's algorithm for solving minimum spanning tree problem on Different graphs, and on the basis of complexity analysis deduce which among them is the best suited algorithm.
4. Implement Greedy algorithm and Backtracking algorithm to find a solution for the graph coloring problem on various graphs, and on the basis of complexity analysis deduce which among them is the best suited algorithm.
5. Solve Travelling Salesman Problem using Greedy Algorithm and Brute Force Algorithms, and on the basis of complexity analysis deduce which among them is the best suited algorithm.
6. Using complexity analysis, deduce among brute force and greedy algorithm, which is better for solving 0/1 Knapsack problem.
7. Implement Merge sort, Insertion sort and Quick sort for the following cases:
  - a. Unsorted list of numbers (with size of list  $> 100$ )
  - b. Sorted list of numbers (with size of list  $> 100$ )
  - c. Unsorted list of numbers (with size of list  $\leq 20$ )
  - d. Sorted list of numbers (with size of list  $\leq 20$ )

Then on the basis of complexity analysis, deduce which among them is best suited for each case.

8. Compare the Exhaustive Search Algorithm and Greedy Algorithm for solving Job Scheduling Problem.
9. Implement different shortest path algorithms on various graphs and compare the performance with each other in order to conclude the best among them.

*Please Note: Each project has to be submitted by a group of 2 to 4 students (Depending upon project), and each group will be assigned only one project.*

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Department of Computer Science and Engineering

**DIGITAL CIRCUIT DESIGN**  
**290306 (DLC)**

Skill Based Project

- Design a 4 bit comparator
- Design a parity checker
- Design a 4 bit Ripple counter
- Design a Synchronous counter
- Design a Ring Counter
- Design a left shift counter
- Design a right shift counter

*Please Note: Each project has to be submitted by a group of 2 to 4 students (Depending upon project), and each group will be assigned only one project.*

*Aug* *AK* *AK* *B* *A*  
*R.K. Singh*  
*R*

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

Annexure-11(a)

*Scheme of*  
*B.Tech III & IV Semester*  
*For batch admitted 2021-22*  
*(Computer Science & Engineering)*  
*Under Flexible Curriculum*  
*[Item-15]*



# MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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

Scheme of Examination  
B.Tech. III Semester (Computer Science and Engineering)

**For batches 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.	Continuous Evaluation									
				End Term Evaluation	Proficiency in subject/course	Mid Sem. Exam.	Quiz/Assignment		Lab Work & Sessional	Skill based mini project								
1.	100025	BSC	Engineering Mathematics-II	50	10	20	20	-	-	-	100	2	1	-	3	Offline (3/0)	PP	
2.	150311	DC	Computer System Organization	50	10	20	20	-	-	-	100	2	1	-	3	Blended (2/1)	PP	
3.	150312	DC	Operating Systems	50	10	20	20	-	-	-	100	2	1	-	3	Blended (2/1)	PP	
4.	150313	DC	Computer Graphics	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP	
5.	150314	DC	Design & Analysis of Algorithms	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	PP	
6.	150315	DLC	Computer Hardware & Troubleshooting Lab	-	-	-	-	60	20	20	100	-	-	4	2	Offline	SO	
7.	150316	SEMINAR/SELF STUDY	Self-learning/Presentation (SWAYAM/NPTEL/ MOOC)#	-	-	-	-	-	40	-	40	-	-	2	1	Online Mentoring	SO	
8.	200XXX	CLC	Novel engaging courses	-	-	-	-	50	-	-	50	-	-	2	1	Interactive	SO	
9.	150317	DLC	Summer Internship Project-I (Institute Level) (Evaluation)	-	-	-	-	60	-	-	60	-	-	4	2	Offline	SO	
<b>Total</b>				<b>250</b>	<b>50</b>	<b>100</b>	<b>100</b>	<b>290</b>	<b>100</b>	<b>60</b>	<b>950</b>	<b>11</b>	<b>4</b>	<b>16</b>	<b>23</b>			
10.	1000005	MAC	Project Management and Financing	50	10	20	20	-	-	-	100	2	-	-	-	grade	Online	MCQ

<sup>1</sup>Proficiency in course/subject - includes the weightage towards ability/ skill/ competence /knowledge level /expertise attained etc. in that particular course/subject

<sup>SS</sup>MCQ: Multiple Choice Question <sup>SS</sup>AO: Assignment + Oral <sup>SS</sup>OB: Open Book <sup>SS</sup>PP: Pen Paper SO: Submission &

Mode of Teaching				Mode of Examination							Total Credits
Theory		Blended	Lab	Theory			Lab	SIP/ SLP/ NEC	SIP/ SLP/ NEC		
Offline	Online			Offline	Interactive	PP				A+O	
3	-	8	4	7	1	17	-	-	2	4	23
13.04	-	34.78	17.39	30.43	4.34	73.91	-	-	8.69	17.39	Credits %

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

List of Courses offered for Self-Study/Seminar in III Semester (2021 admitted batch)

Course ID: noc22-es68	C Programming and Assembly Language
Course ID: noc22-es79	Introduction to Quantum Computing: Quantum Algorithms and Qiskit
Course ID: noc22-hs74	Patent Drafting for Beginners
Course ID: noc22-mg62	Decision-Making Under Uncertainty

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**MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR**  
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Annexure-12(a)

*Scheme of*  
*B.Tech I Semester*  
*For batch admitted 2022-23*  
*(Computer Science and Engineering)*  
*ITEM No-18*



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

Scheme of Examination  
B.Tech. I Semester (Computer Science and Engineering)

*For batches admitted in Academic Session 2022-23 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 Sem.	Mid Sem.	Quiz/ Assignment	End Sem.	Lab work/ Sessional	Skill Base mini Project								
										End Term Evaluation		Proficiency in subject /course					
1.	230102	ESC	Introduction to Computer Programming	50	10	20	20	60	20	20	200	2	1	2	4	Offline (3/0)	A+O
2.	100022	ESC	Basic Electrical & Electronics Engineering	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	MCQ
3.	100020	ESC	Basic Civil Engineering & Mechanics	50	10	20	20	-	-	-	100	3	-	-	3	Blended (2/1)	PP
4.	100021	ESC	Basic Mechanical Engineering	50	10	20	20	-	-	-	100	3	-	-	3	Blended (2/1)	MCQ
5.	100015	HSMC	Energy, Environment, Ecology & Society	50	10	20	20	-	-	-	100	3	-	-	3	Online (0/3)	MCQ
6.	150111	DLC	IT workshop	-	-	-	-	60	20	20	100	-	-	4	2	Offline	SO
<b>Total</b>				<b>250</b>	<b>50</b>	<b>100</b>	<b>100</b>	<b>180</b>	<b>60</b>	<b>60</b>	<b>800</b>	<b>13</b>	<b>02</b>	<b>08</b>	<b>19</b>		
7.	1000004	MAC	Engineering chemistry	50	10	20	20	-	-	-	100	2	-	-	Grade	Online	MCQ

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

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

<sup>01</sup>Theory Period=1 Credit; <sup>02</sup> Practical Periods=1 Credit  
<sup>SS</sup>MCQ: Multiple Choice Question    <sup>SS</sup>AO: Assignment + Oral    <sup>SS</sup>PP: Pen Paper    <sup>SS</sup>SO: Submission + Oral

Mode of Teaching				Mode of Examination				Total Credits
Theory		Blended		Lab		Theory		
Offline	Online	Offline	Online	Offline	PP	A+O	MCQ	
3	3	6	3	4	3	4	10	
15.78	15.78	31.5	15.78	21.0	15.8	21.0	52.6	
Credits %								19

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR  
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*B. Tech in Computer Science and Design*

Annexure-12(b)

*Scheme of  
B.Tech I Semester  
For batch admitted 2022-23  
(Computer Science and Design)  
ITEM No-18*

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

*B. Tech in Computer Science and Design*

Annexure-12(b)

*Scheme of  
B.Tech I Semester  
For batch admitted 2022-23  
(Computer Science and Design)  
ITEM No-18*



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

**B. Tech in Computer Science and Design**

**I Semester**

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 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.	290101	DC	Introduction to Computer Science and Design	50	10	20	20	-	-	-	100	4	-	-	4	Blended (3/1)	MCQ
2.	230102	ESC	Introduction to computer programming	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	A+O
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
<b>Total</b>				<b>250</b>	<b>50</b>	<b>100</b>	<b>100</b>	<b>120</b>	<b>40</b>	<b>40</b>	<b>700</b>	<b>14</b>	<b>3</b>	<b>4</b>	<b>19</b>		
7.	1000004	MAC	Engineering Chemistry	50	10	20	20	-	-	-	100	2	-	-	Grade	Online	MCQ

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, \$ 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	NEC	Theory			Lab	SIP/SLP/NEC	
Offline	Online	Offline	Online	Offline	Interactive	PP	A+O	MCQ	SO	SO	
4	3	7	3	2	-	4	4	11	-	-	19
21.05	15.78	36.84	15.78	10.52	-	21.05	21.05	57.89	-	-	Credits %

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**MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR**

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

Annexure-13

**Review the CO attainments, identify gaps and corrective measures  
for the improvement in the  
CO attainment levels**

**for (i) I year November 2021 – February 2022 Semester**

**(ii) July-December 2021 Session for II to IV year students**

*ITEM No-19*





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

CO attainment with Gap Analysis and action taken for B to IV Year July-Dec, 2021 & 1st Year Nov. to Feb. 2022

Sem	Faculty Name	Section	Course code & name	Course Outcome Statements	CO attainment from Quiz (% age)	CO attainment from Assignment (% age)	CO attainment from Mid Sem (%age) Avg. of mid sem I & II	CO attainment from End Sem (%age)	CO direct attainment (%age)	CO direct attainment level	CO indirect attainment (%age) (Calculated using CO Em, End Sem Semester, 1 min Paper writing)	CO indirect attainment level	Overall CO attainment	Target (To be set for Overall CO Attainment)	Attainment attained	Action taken for Not Attained
III	Ms. Aishwarya	A&B	150214-Design and Analysis of Algorithms	CO2 Outline major Algorithms and Data Structures	81	89	84	81.23	82.865	3	89	3	3	2.5	Attained	-
				CO3 Apply various algorithmic design paradigms	79	78	76	76.07	76.66	3	80	3	3	2.5	Attained	-
				CO4 Analyze the asymptotic performance of Algorithms	71	81	78	75.29	76.145	3	78	3	3	2.5	Attained	-
				CO5 Compare different design techniques to develop algorithms for computational problems	66	67	74	72.11	71.18	3	77	3	3	2.5	Attained	-
				CO6 Design algorithms using greedy strategy, divide and conquer approach, dynamic programming, backtracking, branch and bound approach	65	69	74	74028	77049.25	3	71	3	3	2.5	Attained	-
				III	Ms. Aishwarya	A&B	150214-Design and Analysis of Algorithm LAB	CO1 Relate the principles of algorithms design in solving problems	-	-	88	81	84.5	3	88	3
CO2 Demonstrate basic algorithms and different problem solving strategies	-	-	78					73	76.5	3	84	3	3	2.3	Attained	-
CO3 Build creativeness and confidence to solve non-conventional problems	-	-	69					66	67.5	2.8	96	3	2.8	2.3	Attained	-
CO4 Analyze running times of algorithms using asymptotic analysis	-	-	65					71	68	2.8	78	3	2.8	2.3	Attained	-
CO5 Compare various algorithm design approaches for solving real world problems	-	-	69					74	71.5	3	77	3	3	2.3	Attained	-
CO6 Design and implement optimization algorithms in specific applications	-	-	64					62	63	2.3	68	2.8	2.4	2.3	Attained	-
V	Ms. Aishwarya	A&B	150501-Discrete Structures	CO1 Understand logical notation to define and reason mathematically about the fundamental data types and structures used in computer algorithms and systems	84	89	77	71.66	76.705	3	84	3	3	2.3	Attained	-
				CO2 Outline various mathematical concepts along with their applications	81	88	81.25	85.31	84.1025	3	82	3	3	2.5	Attained	-
				CO3 Implement the applications of various types of graphs to solve real life problem.	78	78	74	68.5	72.25	3	76	3	3	2.5	Attained	-
				CO4 Apply the mathematical concepts to solve engineering problems	75	75	84	65.4	72.45	3	74	3	3	2.3	Attained	-
				CO5 Analyze the set theory, propositional logic, graph theory, discrete numeric function and algebraic structure to examine the real world problem.	76	79	81	66	72.825	3	77	3	3	2.5	Attained	-
				CO6 Design analytical skill and interpret applications of engineering in real-time troubleshooting.	65	68	75	68	69.375	2.9	71	3	2.9	2.3	Attained	-
V	Ms. Mir Shahnawaz Ahmad	A&B	150502-Software Engineering	CO1 explain the various fundamental concepts of software engineering	65.6	87	83	82.5	81.075	3	86.11	3	3	2.5	Attained	-
				CO2 develop the concepts related to software design & analysis	63.6	76	74	77.5	74.7	3	83.33	3	3	2.5	Attained	-
				CO3 compare the techniques for software project management & estimation	58	72	68	93.25	79.875	3	83.33	3	3	2.2	Attained	-
				CO4 choose the appropriate model for real life software project.	61	71	72	52	60.5	2.1	75.6	3	2.3	2.2	Attained	-

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

CO attainment with Gap Analysis and action taken for II to IV Year July-Dec. 2021 & 1st Year Nov. to Feb. 2022

Sem	Faculty Name	Section	Course code & name	Course Outcome Statements	CO attainment from Quiz (% age)	CO attainment from Assignment (% age)	CO attainment from Mid Sem (%age) Avg. of mid sem I & II	CO attainment from End Sem (%age)	CO direct attainment (%age)	CO direct attainment level	CO indirect attainment (%age) (Calculated using CO thr. End Sem Seminar, 1 min Paper writing)	CO indirect attainment level	Overall CO attainment	Target (To be set for Overall CO Attainment)	Attained/not attained	Action taken for Not Attained
				CO5 design the software using modern tools and technologies	65	68	64	58	61.625	2.2	71	3	2.4	2.1	Attained	-
				CO6 test the software through different approaches	66	76	81	80	78	3	91.67	3	3	2.5	Attained	-
V	Mr. Mahesh Parmar	A&B	150503-Theory of Computation	CO1 explain the basic concepts of switching and finite automata theory & languages.	60.23	82	88	88	83.77875	3	90	3	3	2.5	Attained	-
				CO2 relate practical problems to languages, automata, computability and complexity.	65	84.33	96	84	84.66625	3	88.33	3	3	2.5	Attained	-
				CO3 construct abstract models of computing and check their power to recognize the languages.	70.2	73	90	72	76.4	3	90	3	3	2.2	Attained	-
				CO4 analyse the grammar, its types, simplification and normal form.	65	73	92	60	70.25	3	73.6	3	3	2.2	Attained	-
				CO5 interpret rigorously formal mathematical methods to prove properties of languages, grammars and automata.	62.15	66	94	80	79.51875	3	85	3	3	2.5	Attained	-
				CO6 develop an overview of how automata theory, languages and computation are applicable in engineering application	60.23	84.33	87	60	69.82	3	88.33	3	3	2.5	Attained	-
V	Mr. Aishwarya	A&B	150504-Microprocessor & Interfacing	CO1 compare the architecture and feature of different 16-bit microprocessor interfacing chips & microcontrollers.	72	84	74	71.09	73.545	3	84	3	3	2.5	Attained	-
				CO2 develop programming skills in assembly language of 8086 microprocessor and 8051 microcontroller.	79	89	71	67.27	72.385	3	85	3	3	2.5	Attained	-
				CO3 demonstrate the concept of interfacing with peripheral devices.	81	76	68	74.1	73.675	3	77	3	3	2.5	Attained	-
				CO4 make use of different interrupts and addressing modes.	83	94	72	73.3	76.775	3	83	3	3	2.5	Attained	-
				CO5 design an interfacing for I/O devices.	75	81	71	69.96	72.23	3	78	3	3	2.3	Attained	-
				CO6 build a system based on 8086 microprocessor and 8051 microcontroller.	68	75	64	73.82	70.785	3	67	2.7	2.9	2.3	Attained	-
V	Mr. Mahesh Parmar	A&B	150503-Theory of Computation LAB	CO1 Judge various model of computation.	-	-	54.43	70.23	62.33	2.2	89.09	3	2.4	2.3	Attained	-
				CO2 Construct abstract models of computing	-	-	57.29	60.43	58.86	1.9	78.03	3	2.1	2.3	Not Attained	Remedial classes are conducted and related assignments are given
				CO3 Infer the power of abstract models in computing to recognize the languages.	-	-	65.63	73.23	69.43	2.9	90.09	3	2.9	2.3	Attained	-
				CO4 Demonstrate analytical thinking and intuition for problem solving situations in related areas of theory of computation	-	-	72.23	58.63	65.43	2.5	87.72	3	2.6	2.3	Attained	-
				CO5 Explain the limitations of computation in solving problems	-	-	57.29	73.23	65.26	2.5	90.09	3	2.6	2.3	Attained	-
				CO6 Define set of rules for syntax verification	-	-	62.23	58.63	60.43	2	78.66	3	2.2	2.3	Not Attained	Remedial classes are conducted and related assignments are given
				CO1 define the concept of computer network and various layered architecture	70	72	75	78	75.5	3	78	3	3	3	Attained	-
				CO2 compare the classless and class full addressing of IPv4	68	64	65	76	70.75	3	76	3	3	2.7	Attained	-

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

CO attainment with Gap Analysis and action taken for II to IV Year July-Dec. 2021 & 1st Year Nov. to Feb. 2022

Sem	Faculty Name	Section	Course code & name	Course Outcome Statements	CO attainment from Quiz (% age)	CO attainment from Assignment (% age)	CO attainment from Mid Sem (%age): Avg. of mid sem I & II	CO attainment from End Sem (%age)	CO direct attainment (%age)	CO direct attainment level	CO indirect attainment (%age) (Calculated using CO Th. End Sem Semest. 1 min Paper writing)	CO indirect attainment level	Overall CO attainment	Target (To be set for Overall CO Attainment)	Attained/not attained	Action taken for Not Attained
VII	Ms. Khushboo Agrawal		150711- Networking with TCP/IP	CO3 identify the different types of networking devices and their functions within a network.	60	60	60	80	70	3	80	3	3	2.5	Attained	-
				CO4 analyze various protocols of computer networks for assisting network design and implementation.	50	55	77	75	71	3	75	3	3	2.5	Attained	-
				CO5 design client server applications and communication model and protocols for communication.	55	55	80	73	70.25	3	73	3	3	2.5	Attained	-
				CO6 elaborate various TCP/IP protocol for achieving multimedia and security services.	50	53	60	78	66.875	2.7	78	3	2.8	2.5	Attained	-
VII	Dr. R. K. Gupta		150712-Data Mining & Warehousing	CO1 classify various databases systems and data models of data warehouse.	52	52	74	86.4	74.7	3	75.36	3	3	3	Attained	-
				CO2 compare various methods for storing & retrieving data from different data sources/repository.	53	53	66	92.8	76.15	3	75.36	3	3	3	Attained	-
				CO3 apply pre-processing techniques for construction of data warehouse.	43	43	66	84.8	69.65	3	69.56	3	3	3	Attained	-
				CO4 analyze data mining for knowledge discovery & prediction.	33	33	78.66	84.8	70.315	3	72.46	3	3	3	Attained	-
				CO5 explain data mining methods for identification of association for transactional databases.	48	48	68.28	88.8	73.47	3	75.36	3	3	3	Attained	-
				CO6 develop various classification and clustering algorithms for data using data mining.	34	34	62.85	78.4	63.4125	2.3	69.56	3	2.4	2.4	Attained	-
VII	Dr. Anjula Mehta		150713- Distributed Systems	CO1 Tell the basic elements and concepts related to distributed system technologies.	82.2	80.12	76	81.05	79.815	3	81.48	3	3	3	Attained	-
				CO2 Demonstrate knowledge of the core architectural aspects of distributed systems.	81.1	78.52	72.1	68.93	72.4425	3	81.48	3	3	3	Attained	-
				CO3 Identify how the resources in a distributed system are managed by algorithm.	62.7	65.23	6.68	83.62	57.97125	1.8	66.66	2.7	2	2.5	Not Attained	Extra classes are conducted and related assignments are given
				CO4 Examine the concept of distributed file system and distributed shared memory.	82	86.23	81.4	78.44	80.59875	3	81.48	3	3	3	Attained	-
				CO5 Compare various distributed system algorithms for solving real world problems.	50.2	60.25	62.5	75.75	67.30625	2.7	66.66	2.7	2.7	2.5	Attained	-
				CO6 Develop application for achieving various services of distributed system.	55	61.25	63.2	53.16	56.91125	1.7	77.77	3	2	2.5	Not Attained	Extra classes are conducted and related assignments are given
VII	Ms. Khushboo Agrawal		150701-Internet of Things LAB	CO1 Understand the key component that make up an IOT system.	-	-	60	80	80	3	78	3	3	2.5	Attained	-
				CO2 Explain the definition and usage of the term "Internet of Things" in different context.	-	-	73	74	73.5	3	76	3	3	2.5	Attained	-
				CO3 Differentiate between the levels of the IOT stack and be familiar with the key technologies and protocol employed at each layer of the stack.	-	-	70	70	70	3	80	3	3	2.5	Attained	-
				CO4 Apply the knowledge and skills acquired during the course to build and test a complete, working IOT system involving prototyping, programming and data analysis.	-	-	70	71	70.5	3	75	3	3	2.5	Attained	-



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				CO5	Understand where the IOT concept fit within the broader ICT industry and possible future trends	-	-	68	72	70	3	73	3	3	2.5	Attained	-
				CO6	Appreciate the role of big data, cloud computing and data Analytics in a typical IoT system	-	-	70	70	70	3	70	3	3	3	2.5	Attained
VII	Mr. Mir Shahnawaz Ahmad		Creative Problem Solving	CO1	Define a Structured Problem Solving Process	-	-	72.41	88.75	80.58	3	85	3	3	2.5	Attained	-
				CO2	Understand Cause-Effect-Symptom-Problem Relationships in Problem Definition	-	-	79.48	96.79	88.125	3	91	3	3	2.5	Attained	-
				CO3	Apply Cause-Effect Tools and Techniques and Develop Root-Cause Analysis	-	-	84.48	71.79	61.125	2.3	76	3	2.4	2.1	Attained	-
				CO4	Apply Idea Generation Tools and Techniques in Formulating Creative Solutions	-	-	84.48	69.3	61.88	2.2	84	3	2.4	2.1	Attained	-
				CO5	Apply Evaluative Tools and Techniques for Decision Making Process	-	-	87.98	74.23	66.105	2.6	74	3	2.7	2.1	Attained	-
				CO6	Identify Strategic Considerations in Evaluating Risks and Implementing Solutions	-	-	72.01	88.48	80.245	3	78	3	3	2.1	Attained	-
I	Mr. Mir Shahnawaz Ahmad		230102- Introduction to Computer Programming	CO1	Identify situations where computational methods and computers would be useful.	81.92	82.4	80.35	79.23	80.2425	3	87.88	3	3	2.5	Attained	-
				CO2	Describe the basic principles of imperative and structural programming.	81.92	82.4	84.7	79.23	81.33	3	86.96	3	3	2.5	Attained	-
				CO3	Develop a pseudo-code and flowchart for a given problem.	70.16	70.16	77.58	76.07	74.97	3	89.96	3	3	2.1	Attained	-
				CO4	Analyze the problems and choose suitable programming techniques to develop solutions.	81.28	81.28	78.2	82.49	86.115	3	86.23	3	3	2	Attained	-
				CO5	Design, implement, debug and test programs.	69.07	71.47	74.65	72.11	72.285	3	84.78	3	3	2.2	Attained	-
				CO6	Design computer programs to solve real world problems.	75.16	79	73.86	95.58	85.475	3	86.23	3	3	2	Attained	-
I	Mr. Mir Shahnawaz Ahmad		230102- Introduction to Computer Programming LAB	CO1	Identify situations where computational methods and programming would be useful.	74	82	84	83.33	82.165	3	89	3	3	2.5	Attained	-
				CO2	Implement the basic principles of imperative and structural programming.	75	89	79	79.55	80.025	3	85.5	3	3	2.5	Attained	-
				CO3	Develop a pseudo-code and flowchart for a given problem.	64	74	75	74.2	73.1	3	86.4	3	3	2.5	Attained	-
				CO4	Analyze the problems and choose suitable programming techniques to develop solutions.	61	76	88	67	67.625	2.8	75.6	3	2.8	2.3	Attained	-
				CO5	Design, implement, debug and test programs.	65	68	66	71.58	68.915	2.9	73	3	2.9	2.5	Attained	-
				CO6	Design computer programs to solve real world problems.	82	71	64	60	62.625	2.3	74	3	2.4	2.5	Not Attained	Additional sessions for discussing, implementing and analysing the skill based mini projects were conducted.
				CO1	Understand the basic concept and structure of application software	80.32	82.45	83.36	84.2	83.28625	3	81.81	3	3	3	Attained	-
				CO2	Identify the existing configuration of the computers and peripherals	80.32	87.12	74.93	80.12	79.6475	3	83.33	3	3	3	Attained	-

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I	Mr. Amit Manjwar & Mr. Mahesh Parmar	-	180111-IT Workshop	CO3 Integrate the PCs into local area network and re-install operating system and various application programs.	89.21	87.12	88.75	70	74.24/25	3	81.81	3	3	3	Attained	-
				CO4 Design and develop basic web pages using HTML and CSS	69.07	70.61	75.6	79	75.86	3	89	3	3	3	Attained	-
				CO5 Design & create and implement a static and dynamic webpage	78.15	75.45	66	67	70.23	3	78.78	3	3	3	Attained	-
				CO6 Design and implement a program to solve a real world problem.	77.23	69.88	68.59	69	70.07/625	3	80	3	3	3	Attained	-

Attainment Levels	Excellent (3)	Very Good (2)	Good (1)
	70	60	50

Total CO Attainment = 80% of Direct CO Attainment + 20% of Indirect CO Attainment

Direct CO Attainment = 12.5% of Weekly Quiz Score +  
 12.5% of Weekly Assignment Score +  
 25% of Mid Sem Exam Score +  
 50% of End Sem Exam Score

For Indirect CO attainment: CO feedback from the students, by respective course instructor, was collected (via Institute's MOODLE), along with the course end seminar and one minutes paper writing.

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Annexure-14

**Review of PO attainment  
2017-2021 batch,  
CO-PO Mapping Matrix  
with attainments and gap analysis**

*ITEM No-20*



**Madhav Institute of Technology & Science Gwalior**  
 Department : Computer Science & Engineering

Batch: 2017-2021

S.No.	Course Code & Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
1	150301: Digital Electronics	1.44	1.33	1.17	1.33	0.83	1.67	0.67	3.00	1.33	2.00	1.47	1.87	1.58	0.93
2	150302: Data Structures	2.50	2.17	1.61	1.89	2.00	1.22		1.50	1.94	2.00	1.42	2.33	1.93	2.00
3	150304: OOPs and methodology	1.63	2.00	1.50	2.33	1.00	2.00	1.11	2.33	2.00	0.67	2.67	2.40	2.33	1.00
4	150303: Computer Graphics and Multimedia	2.80	2.40	1.80	2.33		1.40	2.00	1.00	2.00	3.00	1.75	2.80	2.20	3.00
5	150302: Data Structure LAB	2.67	2.50	1.83	2.33	2.00	1.33	2.00	1.50	2.17	1.50	1.75	2.50	2.33	2.63
6	150303: Computer Graphics LAB	2.67	2.50	1.67	1.75	2.00	1.20	2.25	1.50	2.17	2.00	1.75	2.50	2.33	2.50
7	150304: Object Oriented Programming LAB	2.67	2.20	1.83	2.00	1.50	1.50	2.00	1.50	2.00	2.50	1.75	2.67	2.17	2.50
8	150305: Hardware LAB	2.60	1.83	1.83	1.53	1.53	1.39	1.92	1.42	1.78	1.47	1.28	2.33	1.94	2.00
9	150401: Design and Analysis of Algorithm	1.69	1.50	1.44	0.93	0.89	1.05	1.33	0.67	1.39	0.83	1.33	1.78	1.67	1.61
10	150402: Database management system	1.39	1.56	1.33	1.58	1.22	1.00	1.33	0.83	1.39	0.67	1.08	1.56	1.89	1.61
11	150403: Operating system	2.25	2.00	1.75	2.00	2.50	1.00	1.75	1.67	1.75	1.50	1.00	2.00	1.75	1.00
12	150404: Computer System Organization	2.11	1.22	1.22	1.44	1.44		1.53	1.44		1.53	1.33	1.44	1.00	0.93
13	150401: Design and Analysis of Algorithm Lab	2.67	2.33	1.50	2.33	2.00	1.50	1.80	1.50	2.17	2.50	1.75	2.83	2.33	2.83
14	150402: Database management system Lab	2.40	2.60	2.00	2.00		1.75	1.75	2.00	2.25	2.00	2.00	2.60	2.20	2.40
15	150405: Programming Lab	1.78	1.50	1.17	1.11		1.00	1.53	0.83	1.22	2.00	1.00	1.83	1.39	1.83
16	150503: Theory of Computation	1.61	1.50	0.94	1.78	0.44	0.73	1.25	0.83	1.17	1.83	1.25	1.67	1.33	1.44
17	150502: Software Engineering	1.87	1.60	1.60	0.89	1.47	0.83	1.56	1.00	1.80	2.00	1.33	1.73	1.80	1.87
18	150504: Microprocessor & Interfacing	1.73	1.73	1.20	1.33	0.67	0.93	1.42	1.00	1.53	0.67	1.78	1.67	1.53	1.60
19	150501: Discrete Structures	2.43	2.18	1.60	1.67	0.89	1.98	1.42	2.00	1.63	0.67	1.96	2.67	1.71	1.40
20	150503: Theory of Computation LAB	2.50	2.39	1.56	1.75	2.50	1.22	2.00	1.33	2.06	2.50	1.83	2.33	2.17	2.17
21	150502: Software Engineering LAB	2.67	2.50	1.67	1.75	2.00	1.20	2.25	1.50	2.17	2.00	1.75	2.50	2.33	2.50
22	150504: Microprocessor and interfacing LAB	2.67	2.33	1.67	2.00	1.50	1.20	2.25	1.50	2.17	2.50	1.75	2.50	2.33	2.50
23	150602: Computer Networks	3.00	1.60	2.00	1.83	2.00	1.00	1.33	1.50	2.00	2.00	1.50	1.60	2.00	1.25
24	150601: Compiler Design	2.83	2.17	1.83	2.00	2.20	1.00	1.00	1.25	1.60	1.75	1.75	2.50	1.83	2.00
25	160611: Network and Web security	2.67	2.50	1.67	2.25	2.33	1.20	2.00	1.25	1.80	1.50	1.83	2.50	2.17	1.83
26	150613: MOBILE COMPUTING	2.83	2.20	1.67	2.00	1.00	1.17	2.40	1.33	2.00	3.00	1.75	2.67	2.20	2.67
27	900106 (OC): DATA STRUCTURE	2.83	2.50	1.67	2.00	3.00	1.20	2.25	1.25	1.83	1.67	1.75	2.50	2.17	2.67
28	900107 (OC): Python Programming	2.83	2.33	2.33	2.20	1.50	2.00	1.00	1.00	1.33	1.00	2.00	1.83	2.00	2.00
29	150711: Networking with TCP/IP	2.67	2.67	1.67	2.00	2.00	1.20	1.00	1.17	2.17	1.00	1.75	2.50	2.33	1.50
30	150713: Distributed Systems	2.83	2.67	2.17	2.67	2.50	1.67	1.00	1.50	1.83	1.17	2.00	2.67	2.00	2.33
31	150712: Data Mining and Warehousing	3.00	3.00	2.17	2.25	1.75	1.17	1.00	1.33	2.17	1.50	1.80	2.33	2.83	2.33
32	Internet of Things LAB	2.83	2.25	2.17	2.40	2.00	1.00	1.00	1.17	1.50	1.50	1.50	2.83	2.00	2.50
33	100008: Intellectual Property Rights	2.50	2.60	1.67	2.00	2.00	3.00	3.00	1.80	2.17	2.50	1.60	2.50	2.33	2.50
34	Internship/ Project	2.50	2.60	1.83	2.00	2.67	1.00	1.40	2.50	2.17	2.17	2.00	2.67	2.00	2.33

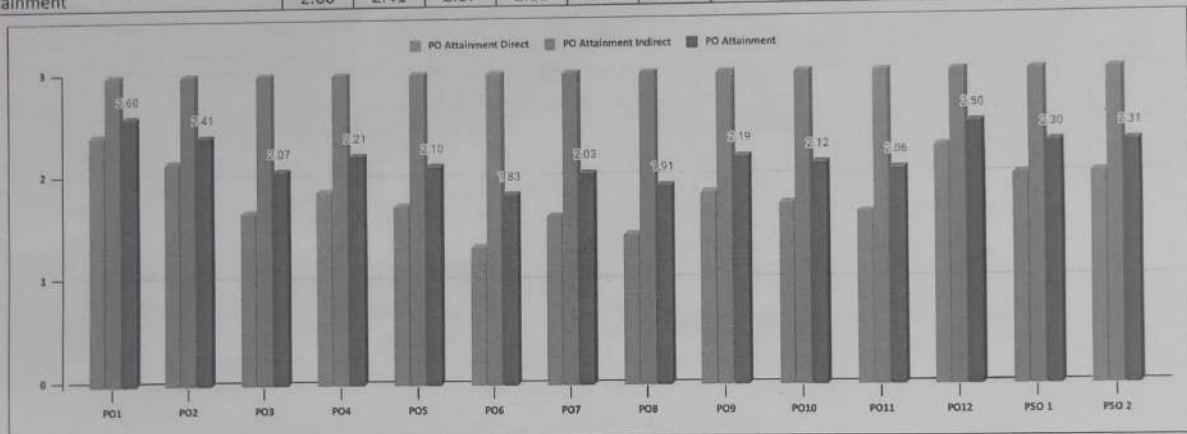
# Madhav Institute of Technology & Science Gwalior

Department : Computer Science & Engineering

Batch: 2017-2021

Excellent  
60.00    V Good  
50.00    Good  
40.00

Column1	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
PO Attainment Direct	2.42	2.15	1.67	1.87	1.72	1.32	1.62	1.44	1.84	1.74	1.65	2.28	2.00	2.01
PO Attainment Indirect	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
PO Attainment	2.60	2.41	2.07	2.21	2.10	1.83	2.03	1.91	2.19	2.12	2.06	2.50	2.30	2.31



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## Madhav Institute of Technology & Science Gwalior

Department : **Computer Science & Engineering**

Batch: 2017-2021		CO Attainment			CO-PO Matrix												PO Attainment													
Sem	Course Code & Name	Course Outcome	Direct % Attainment	Indirect % Attainment	Total % Attainment	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PO16	PO17	PO18	PO19	PO20	PO21	PO22			
III	150301: Digital Electronics	CO1	88	72	84.8	3	3	2	1							2	3	2	2											
III		CO2	84	78	82.4	1	1	2	1	1	2			2		2	3	2	1											
III		CO3	42	59	45.4	3	2	2	2	1	2						2	1	1	1										
III		CO4	68	59	66.2	1	2	1	2	1	3			3	1		2	2	2											
III		CO5	70	61	68.2	2	1	1	1	1	1																			
III		CO6	19	53	25.8	2	1				2			2	3		2	3	1											
III	150302: Data Structures	150301: Digital Electronics																												
III		CO1	85	72	82.4	3	2	2	3	1				2		1	2													
III		CO2	77	74	76.4	3	2	1	2	1			2	2		2	2													
III		CO3	61	56	60	3	3	2			2						2	2												
III		CO4	32	49	35.4	3	3	1	2	1			2		2	2	2	3												
III		CO5	68	78	70	3	2	2			2	1	2		2	2	3	3												
III	CO6	71	62	69.2	2	3	2	2	1				3	2		2	3	2												
III	150304: OOPs and methodology	150302: Data Structures																												
III		CO1	75	70	74	2	2	1	3	1			1	1		2	3	2	3											
III		CO2	56	83	61.4	3	3	3			2	3				3	3													
III		CO3	59	85	60.2			2	3	1			2	3		3	3	2												
III		CO4	35	82	44.4	1	3	2			3	1	3	2	3	3														
III		CO5	58	85	63.4			2					2			3	2													
III	CO6	57	83	62.2	2	2	1	2	1	3					3	3	1													
III	150303: Computer Graphics and Multimedia	150304: OOPs and methodology																												
III		CO1	59	65	60.2	3	2	2	3	1	2			2	3	1	3	2	3											
III		CO2	63	60	62.4	3	2	1	2	1			2		2	3	2	3												
III		CO3	70	62	68.4	3	3	2			2	3	2			2	2	3												
III		CO4	93	80	90.4	2	3	2	2	1	1	2		2	3	2	3	2												
III		CO5	63	55	61.4	3	2	2			2	2	1	2		2	3	3	3											
III	CO6	57	50	55.6	2	3	2			2	1	1	3	2		2	3	2												
III	150303: Computer Graphics and Multimedia																													
III			62.533	56.293	41.546	54.022										31.509	44.9	20.466	45.706	50.2	40.716	64	49.8	58.56						



## Madhav Institute of Technology & Science Gwalior

Department : **Computer Science & Engineering**

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III	150302: Data Structure LAB	CO1	80	75	79	3	2	2	3	1	2	2	2	1	1	2	2	3	79	52.666	52.666	79	26.333	52.666	52.666	26.333	26.333	52.666	52.666	79	65.4	43.6	21.8	43.6	21.8	43.6	43.6	65.4	43.6	65.4				
		CO2	64	71	65.4	3	2	1	2	1	2	2	2	2	2	3	2	3	67.6	67.6	45.066	45.066	67.6	45.066	45.066	45.066	45.066	45.066	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6					
		CO3	68	66	67.6	3	3	2	2	2	3	2	2	2	2	2	2	3	60	90	60	60	30	30	60	60	90	60	90	60	90	60	90	60	90	60	90	60	90					
		CO4	92	82	90	2	3	2	2	1	1	2	2	2	2	3	2	3	74	49.333	49.333	49.333	49.333	49.333	49.333	49.333	49.333	49.333	49.333	74	74	74	74	74	74	74	74	74	74					
		CO5	76	66	74	3	2	2	2	2	2	1	2	2	2	3	3	3	49.6	74.4	49.6	49.6	24.8	74.4	49.6	49.6	74.4	49.6	49.6	74.4	49.6	49.6	74.4	49.6	49.6	74.4	49.6	49.6	74.4	49.6				
		CO6	76	68	74.4	2	3	2	2	2	1	3	2	2	2	3	2	3	65.933	62.933	46.411	60.866	49.6	32.888	49.6	34.133	54.177	37.966	44.816	62.788	58.288	70.933	65.933	62.933	46.411	60.866	49.6	32.888	49.6	34.133	54.177	37.966	44.816	62.788
150302: Data Structure LAB																																												
III	150303: Computer Graphics LAB	CO1	76	64	73.6	3	2	1	2	1	2	1	3	1	3	2	2	73.6	49.066	24.533	49.066	24.533	49.066	24.533	73.6	24.533	73.6	49.066	49.066	73.6	49.066	49.066	73.6	49.066	49.066	73.6	49.066							
		CO2	88	69	84.2	3	2	1	2	1	2	2	2	3	2	3	81.6	81.6	54.4	27.2	54.4	27.2	81.6	81.6	54.4	27.2	54.4	27.2	81.6	81.6	54.4	27.2	54.4	27.2	81.6	81.6								
		CO3	80	88	81.6	3	3	2	1	2	1	3	3	1	1	2	3	50.266	75.4	50.266	50.266	25.133	25.133	50.266	50.266	75.4	50.266	50.266	75.4	50.266	50.266	75.4	50.266	50.266	75.4	50.266								
		CO4	76	73	75.4	2	3	2	2	1	1	2	2	2	2	3	2	2	80.8	53.866	53.866	53.866	80.8	53.866	53.866	53.866	80.8	53.866	53.866	80.8	53.866	53.866	80.8	53.866	53.866	80.8	53.866							
		CO5	80	84	80.8	3	2	2	2	2	3	1	2	2	3	3	3	56.933	85.4	56.933	56.933	85.4	56.933	56.933	85.4	56.933	56.933	85.4	56.933	56.933	85.4	56.933	56.933	85.4	56.933									
		CO6	84	91	85.4	2	3	2	2	2	3	2	2	2	3	2	2	71.233	66.911	44.677	45.666	55.666	31.76	59.35	41.533	58.633	52.577	46.2	66.355	62.677	67.144	71.233	66.911	44.677	45.666	55.666	31.76	59.35	41.533	58.633	52.577	46.2	66.355	62.677
150303: Computer Graphics LAB																																												
III	150304: Object Oriented Programming LAB	CO1	72	65	70.6	3	2	2	3	1	2	2	3	1	3	2	3	70.6	47.066	47.066	70.6	23.533	47.066	47.066	70.6	23.533	70.6	47.066	47.066	70.6	47.066	47.066	70.6	47.066	47.066	70.6	47.066							
		CO2	92	84	90.4	3	2	2	2	2	1	2	2	2	2	3	1	2	90.4	60.266	60.266	60.266	30.133	60.266	60.266	60.266	90.4	60.266	60.266	90.4	60.266	60.266	90.4	60.266										
		CO3	64	75	66.2	2	1	2	2	3	1	3	2	3	44.133	22.066	44.133	86.2	86.2	57.466	28.733	28.733	28.733	57.466	57.466	28.733	28.733	57.466	57.466	28.733	28.733	57.466	57.466	28.733	28.733									
		CO4	88	79	86.2	3	3	2	1	1	1	2	2	2	2	2	3	73.8	49.2	73.8	49.2	24.6	49.2	49.2	73.8	73.8	49.2	73.8	73.8	73.8	73.8	73.8	73.8	73.8	73.8	73.8	73.8							
		CO5	72	81	73.8	3	2	3	2	1	2	2	3	3	3	42.266	63.4	21.133	21.133	21.133	21.133	63.4	42.266	42.266	63.4	21.133	21.133	21.133	21.133	63.4	42.266	42.266	63.4	21.133	21.133	21.133	21.133							
		CO6	64	61	63.4	2	3	1	1	1	3	2	2	3	1	57.9	55.8	45.544	45.866	44.5	36.911	47.3	42.433	49.011	56.433	47.616	66.788	52.666	63.033	57.9	55.8	45.544	45.866	44.5	36.911	47.3	42.433	49.011	56.433	47.616	66.788	52.666	63.033	
150304: Object Oriented Programming LAB																																												
III	150305: Hardware LAB	CO1	40	55	43	3	3	3	2	1	2	2	2	1	2	2	3	43	43	43	28.666	28.666	14.333	28.666	28.666	14.333	28.666	28.666	43	43	43	28.666	28.666	14.333	28.666	28.666	14.333	28.666	28.666					
		CO2	72	79	73.4	3	2	2	1	2	3	2	2	2	1	2	3	3	73.4	48.933	48.933	24.466	48.933	48.933	73.4	48.933	48.933	24.466	48.933	48.933	73.4	48.933	48.933	24.466	48.933	48.933	73.4	48.933						
		CO3	60	72	62.4	2	3	2	2	1	1	3	2	1	2	3	1	41.6	62.4	41.6	41.6	20.8	20.8	62.4	41.6	41.6	20.8	41.6	20.8	41.6	20.8	41.6	20.8	41.6	20.8	41.6	20.8							
		CO4	58	69	66.2	3	2	3	1	1	2	2	3	1	3	2	3	60.2	40.133	40.133	60.2	20.066	40.133	40.133	60.2	20.066	40.133	40.133	60.2	20.066	40.133	40.133	60.2	20.066	40.133	40.133	60.2	20.066						
		CO5	84	83	83.8	3	2	2	2	1	1	2	2	2	2	3	1	2	83.8	55.866	55.866	55.866	27.933	55.866	55.866	55.866	83.8	55.866	55.866	83.8	55.866	55.866	83.8	55.866	55.866	83.8	55.866							
		CO6	64	75	66.2	3	1	2	1	2	2	3	1	1	1	2	2	66.2	22.066	44.133	22.066	44.133	44.133	66.2	22.066	22.066	22.066	44.133	44.133	66.2	22.066	22.066	22.066	44.133	44.133	66.2	22.066							
150305: Hardware LAB																																												





## Madhav Institute of Technology & Science Gwalior

Department : **Computer Science & Engineering**

Batch: 2017-2021		CO Attainment			CO-PO Matrix												PO Attainment											
Sem	Course Code & Name	Course Outcome	Direct % Attainment	Indirect % Attainment	Total % Attainment	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PO16	PO17	PO18	PO19	PO20			
IV	150404: Computer System Organization	CO1: Demonstrate the computer architecture for defining basic component and functional unit	68	65	67.4	3	1	1	2	2	2	2	2	2	1	1												
IV		CO2: Recall different number system and solve the basic arithmetic operations of aimed and	58	71	60.6	3	1		1	2	1		2		1	1	1											
IV		CO3: Develop the fundamental concept to understand the working of microprocessor	59	58	58.8	3	1		1				1				2	1										
IV		CO4: Explain the basic concept of input output organization	64	54	62	2	2	1	2	1		1	1	1		2	1											
IV		CO5: Compare various memory and mapping techniques	62	45	56.6	2	2	2		3	2	3		2		2	1	2										
IV		CO6: Develop the skill of writing assembly language programming	58	55	57.4	2	2	2	2	3	2	3		2	2	3	2	1										
IV		<b>150404: Computer System Organization</b>																										
IV	150403: Design and Analysis of Algorithm Lab	CO1: Label basic algorithms and different problem solving strategies	72	64.1	70.42	3	2	2	3	1	2	2	3	1	3	2	3											
IV		CO2: Demonstrate methods to solve non-conventional problems and expertise for analyzing existing	92	62.39	66.678	3	2	1	2	1	1	2	2	2	3	2	3											
IV		CO3: Experiment with the algorithms as a precise mathematical concept	84	60	79.2	3	2	1		2	2	2			3	2	3											
IV		CO4: Examine the design algorithms, establish their correctness, their efficiency and memory	88	66.66	83.732	2	3	2	2	1	2		2		2	3	2	3										
IV		CO5: Solve the problems using different algorithm solving paradigm	72	61.53	69.986	3	2	1		3	2	1	2		2	3	3	3										
IV		CO6: Develop programming skills to practice well-known algorithms and design data structures to	88	58.97	82.194	2	3	2		2	1			3	2	2	3	2										
IV		<b>150403: Design and Analysis of Algorithm Lab</b>																										
IV	150402: Database management system Lab	CO1: Construct database schema for a given problem domain	75	85	77	2	2		3	3				2	3	2												
IV		CO2: Apply integrity constraints on a database schema using a state-of-the-art RDBMS	76	75	75.8	2									2		1											
IV		CO3: Apply SQL queries using DDL and DML to design and access database system	71	75	71.8	2	3	2		1	2		2	2	3	2	3											
IV		CO4: Make use of operators and functions used in query	85	76	83.2	3	2			2	2	1	2		2	3	3	3										
IV		CO5: Distinguish Tables and Views for database system	64	84	68	3	3	2		1	3	3			1	2	3											
IV		CO6: Develop a small project for real world scenario	59	81	63.4	2	3	2	2	1	1		2		2	3	2	2										
IV		<b>150402: Database management system Lab</b>																										
IV	150405: Programming Lab	CO1: Demonstrate the fundamentals of computer programming	52	64	54.4	3	2	2	3	1	2		2	3	1	3	2	3										
IV		CO2: Read, understand and trace the execution of program	32	75	40.6	3	2	1	2	1		2	2		2	3	2	3										
IV		CO3: Develop Conditional and Iterative Statements	72	71	71.8	3	3	2		2	3	2			3	2	3											
IV		CO4: Design the program using functions	32	68	39.2	2	3	2	2	1	1		2		2	3	2	3										
IV		CO5: Implement the programs using Derived and User defined data types	64	64	64	3	2	2		2	2	1	2		2	3	3	3										
IV		CO6: Design program for a given problem using computer programming	44	71	49.4	3	3	2		2	3	2			3	2	3											
IV		<b>150405: Programming Lab</b>																										





## Madhav Institute of Technology & Science Gwalior

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V	150503: Theory of Computation LAB	CO1	84	84	84	3	2	1	2	3	1	2	1	3	1	3	2	2	84	56	28	56	84	28	56		28	84	28	84	56	56																																																																									
V		CO2	84	85	84.2	3	2	1	2	2	2	2	2	3	3	2	3	84.2	56.133	28.066	56.133	56.133	56.133	56.133		84.2	84.2	56.133	84.2																																																																												
V		CO3	56	88	62.4	3	3	2	1	1	3	3	1	2	2	62.4	62.4	41.6	20.8	20.8	62.4	62.4					20.8	41.6	41.6																																																																												
V		CO4	80	75	79	2	3	2	2	1	1	2	2	3	3	2	2	52.666	79	52.666	52.666	26.333	26.333	52.666		52.666	79	52.666	52.666																																																																												
V		CO5	56	74	59.6	3	2	2		2	3	1	2	2	3	3	3	59.6	39.733	39.733		39.733	59.6	19.866	39.733	39.733	59.6	59.6	59.6																																																																												
V		CO6	92	73	88.2	2	3	2		2	1	2	3	2	2	3	2	58.8	88.2	58.8		58.8	29.4	58.8		88.2	58.8	58.8	88.2	58.8																																																																											
V	150501: Theory of Computation LAB					66.944	63.577	41.477	46.4	71.4	33.4	52.826	38	54.522	71.4	51.15	64.4	59.033	58.811																																																																																						
V	150502: Software Engineering LAB	CO1	88	85	87.4	3	2	1	2	1	2	1	3	1	3	2	2	87.4	58.266	29.133	58.266	29.133	58.266		29.133	87.4	29.133	87.4	58.266	58.266																																																																											
V		CO2	88	74	85.2	3	2	1	2	1	2	2	2	2	3	2	3	85.2	56.8	28.4	56.8	28.4	56.8	56.8	56.8	85.2	85.2	56.8	85.2																																																																												
V		CO3	96	75	91.8	3	3	2	1	2	1	3	3	1	1	2	3	91.8	91.8	61.2	30.6	61.2	30.6	91.8	91.8	30.6	61.2	91.8																																																																													
V		CO4	92	85	90.6	2	3	2	2	1	1	2	2	3	2	2	2	60.4	90.6	60.4	60.4	30.2	30.2	60.4		60.4	90.6	60.4	60.4																																																																												
V		CO5	96	80	94	3	2	2		2	3	1	2	2	3	3	3	94	62.666	62.666		62.666	94	31.333	62.666	62.666	94	94	94																																																																												
V		CO6	92	82	90	2	3	2	2				3	2	2	3	2	60	90	60	60			90	60	60	90	60	60																																																																												
V	150503: Software Engineering LAB					79.8	75.022	50.3	51.516	60.6	36.2	68.566	44.066	65.133	59.333	52.25	74.833	70.111	74.944																																																																																						
V	150504: Microprocessor and Interfacing LAB	CO1	64	88	68.8	3	1	1	2	1	2	1	3	1	3	2	2	68.8	22.933	22.933	45.866	22.933	45.866		22.933	68.8	22.933	68.8	45.866	45.866																																																																											
V		CO2	100	65	97	3	2	1	2	1	2	2	2	2	3	2	3	97	64.666	32.333	64.666	32.333	64.666	64.666	64.666	97	64.666	97																																																																													
V		CO3	68	74	69.2	3	3	2	1	1	3	3	1	2	3	69.2	69.2	46.133	23.066	23.066	69.2	69.2		23.066	46.133	69.2																																																																															
V		CO4	88	85	87.4	2	3	2	2	1	1	2	2	3	2	2	58.266	87.4	58.266	58.266	29.133	29.133	58.266		58.266	87.4	58.266	58.266																																																																													
V		CO5	64	72	65.6	3	2	2		2	3	1	2	2	3	3	3	65.6	43.733	43.733		43.733	65.6	21.866	43.733	43.733	65.6	65.6																																																																													
V		CO6	80	71	78.2	2	3	2	2				3	2	2	3	2	52.133	78.2	52.133	52.133			78.2	52.133	52.133	78.2	52.133																																																																													
V	150504: Microprocessor and Interfacing LAB					68.5	61.022	42.588	56.266	37.6	30.24	52.45	43.266	56.166	60.466	47.4	65.666	59.788	64.677																																																																																						
VI	150602: Computer Networks	CO1	74.33	66.33	73.13	3	2	2	2	2	1				2	1	2	1	73.13	48.753	48.753	48.753	48.753	24.376				48.753	24.376	48.753	24.376																																																																										
VI		CO2	75.67	69.67	74.47	3	2	2	2		1				2	1	1		74.47	49.646	49.646		24.823			49.646	24.823	24.823																																																																													
VI		CO3	75.67	69.67	74.47	3	1	1	1	2	1				2	1	1		74.47	24.823	24.823	24.823	49.646	24.823		49.646	24.823	24.823																																																																													
VI		CO4	77	71	75.8	3	2	2	1	2	1	1			2	2			75.8	50.533	50.533	25.266	50.533	25.266	25.266		50.533	50.533																																																																													
VI		CO5	70.33	64.33	69.13	3	1	2	2						2	2	3	1	69.13	23.043	46.086	46.086				46.086	46.086	69.13	23.043																																																																												
VI		CO6	81	75	79.8	3	3	3	2	1	2	2	2		2	2			79.8	79.8	79.8	53.2	26.6	53.2	53.2	53.2	53.2	53.2																																																																													
VI	150602: Computer Networks					74.466	39.36	49.999	43.723	49.644	25.266	34.43	39.233	53.2	48.46	36.788	39.804	48.31	31.382																																																																																						



Madhav Institute of Technology & Science Gwalior

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Batch:	2017-2021	Sem	Course Code & Name	Course Outcome	CO Attainment			CO-PO Matrix												PO Attainment																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
					Direct % Attainment	Indirect % Attainment	Total % Attainment	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PO16	PO17	PO18	PO19	PO20	PO21	PO22	PO23	PO24	PO25	PO26	PO27	PO28	PO29	PO30	PO31	PO32	PO33	PO34	PO35	PO36	PO37	PO38	PO39	PO40	PO41	PO42	PO43	PO44	PO45	PO46	PO47	PO48	PO49	PO50	PO51	PO52	PO53	PO54	PO55	PO56	PO57	PO58	PO59	PO60	PO61	PO62	PO63	PO64	PO65	PO66	PO67	PO68	PO69	PO70	PO71	PO72	PO73	PO74	PO75	PO76	PO77	PO78	PO79	PO80	PO81	PO82	PO83	PO84	PO85	PO86	PO87	PO88	PO89	PO90	PO91	PO92	PO93	PO94	PO95	PO96	PO97	PO98	PO99	PO100	PO101	PO102	PO103	PO104	PO105	PO106	PO107	PO108	PO109	PO110	PO111	PO112	PO113	PO114	PO115	PO116	PO117	PO118	PO119	PO120	PO121	PO122	PO123	PO124	PO125	PO126	PO127	PO128	PO129	PO130	PO131	PO132	PO133	PO134	PO135	PO136	PO137	PO138	PO139	PO140	PO141	PO142	PO143	PO144	PO145	PO146	PO147	PO148	PO149	PO150	PO151	PO152	PO153	PO154	PO155	PO156	PO157	PO158	PO159	PO160	PO161	PO162	PO163	PO164	PO165	PO166	PO167	PO168	PO169	PO170	PO171	PO172	PO173	PO174	PO175	PO176	PO177	PO178	PO179	PO180	PO181	PO182	PO183	PO184	PO185	PO186	PO187	PO188	PO189	PO190	PO191	PO192	PO193	PO194	PO195	PO196	PO197	PO198	PO199	PO200	PO201	PO202	PO203	PO204	PO205	PO206	PO207	PO208	PO209	PO210	PO211	PO212	PO213	PO214	PO215	PO216	PO217	PO218	PO219	PO220	PO221	PO222	PO223	PO224	PO225	PO226	PO227	PO228	PO229	PO230	PO231	PO232	PO233	PO234	PO235	PO236	PO237	PO238	PO239	PO240	PO241	PO242	PO243	PO244	PO245	PO246	PO247	PO248	PO249	PO250	PO251	PO252	PO253	PO254	PO255	PO256	PO257	PO258	PO259	PO260	PO261	PO262	PO263	PO264	PO265	PO266	PO267	PO268	PO269	PO270	PO271	PO272	PO273	PO274	PO275	PO276	PO277	PO278	PO279	PO280	PO281	PO282	PO283	PO284	PO285	PO286	PO287	PO288	PO289	PO290	PO291	PO292	PO293	PO294	PO295	PO296	PO297	PO298	PO299	PO300	PO301	PO302	PO303	PO304	PO305	PO306	PO307	PO308	PO309	PO310	PO311	PO312	PO313	PO314	PO315	PO316	PO317	PO318	PO319	PO320	PO321	PO322	PO323	PO324	PO325	PO326	PO327	PO328	PO329	PO330	PO331	PO332	PO333	PO334	PO335	PO336	PO337	PO338	PO339	PO340	PO341	PO342	PO343	PO344	PO345	PO346	PO347	PO348	PO349	PO350	PO351	PO352	PO353	PO354	PO355	PO356	PO357	PO358	PO359	PO360	PO361	PO362	PO363	PO364	PO365	PO366	PO367	PO368	PO369	PO370	PO371	PO372	PO373	PO374	PO375	PO376	PO377	PO378	PO379	PO380	PO381	PO382	PO383	PO384	PO385	PO386	PO387	PO388	PO389	PO390	PO391	PO392	PO393	PO394	PO395	PO396	PO397	PO398	PO399	PO400	PO401	PO402	PO403	PO404	PO405	PO406	PO407	PO408	PO409	PO410	PO411	PO412	PO413	PO414	PO415	PO416	PO417	PO418	PO419	PO420	PO421	PO422	PO423	PO424	PO425	PO426	PO427	PO428	PO429	PO430	PO431	PO432	PO433	PO434	PO435	PO436	PO437	PO438	PO439	PO440	PO441	PO442	PO443	PO444	PO445	PO446	PO447	PO448	PO449	PO450	PO451	PO452	PO453	PO454	PO455	PO456	PO457	PO458	PO459	PO460	PO461	PO462	PO463	PO464	PO465	PO466	PO467	PO468	PO469	PO470	PO471	PO472	PO473	PO474	PO475	PO476	PO477	PO478	PO479	PO480	PO481	PO482	PO483	PO484	PO485	PO486	PO487	PO488	PO489	PO490	PO491	PO492	PO493	PO494	PO495	PO496	PO497	PO498	PO499	PO500	PO501	PO502	PO503	PO504	PO505	PO506	PO507	PO508	PO509	PO510	PO511	PO512	PO513	PO514	PO515	PO516	PO517	PO518	PO519	PO520	PO521	PO522	PO523	PO524	PO525	PO526	PO527	PO528	PO529	PO530	PO531	PO532	PO533	PO534	PO535	PO536	PO537	PO538	PO539	PO540	PO541	PO542	PO543	PO544	PO545	PO546	PO547	PO548	PO549	PO550	PO551	PO552	PO553	PO554	PO555	PO556	PO557	PO558	PO559	PO560	PO561	PO562	PO563	PO564	PO565	PO566	PO567	PO568	PO569	PO570	PO571	PO572	PO573	PO574	PO575	PO576	PO577	PO578	PO579	PO580	PO581	PO582	PO583	PO584	PO585	PO586	PO587	PO588	PO589	PO590	PO591	PO592	PO593	PO594	PO595	PO596	PO597	PO598	PO599	PO600	PO601	PO602	PO603	PO604	PO605	PO606	PO607	PO608	PO609	PO610	PO611	PO612	PO613	PO614	PO615	PO616	PO617	PO618	PO619	PO620	PO621	PO622	PO623	PO624	PO625	PO626	PO627	PO628	PO629	PO630	PO631	PO632	PO633	PO634	PO635	PO636	PO637	PO638	PO639	PO640	PO641	PO642	PO643	PO644	PO645	PO646	PO647	PO648	PO649	PO650	PO651	PO652	PO653	PO654	PO655	PO656	PO657	PO658	PO659	PO660	PO661	PO662	PO663	PO664	PO665	PO666	PO667	PO668	PO669	PO670	PO671	PO672	PO673	PO674	PO675	PO676	PO677	PO678	PO679	PO680	PO681	PO682	PO683	PO684	PO685	PO686	PO687	PO688	PO689	PO690	PO691	PO692	PO693	PO694	PO695	PO696	PO697	PO698	PO699	PO700	PO701	PO702	PO703	PO704	PO705	PO706	PO707	PO708	PO709	PO710	PO711	PO712	PO713	PO714	PO715	PO716	PO717	PO718	PO719	PO720	PO721	PO722	PO723	PO724	PO725	PO726	PO727	PO728	PO729	PO730	PO731	PO732	PO733	PO734	PO735	PO736	PO737	PO738	PO739	PO740	PO741	PO742	PO743	PO744	PO745	PO746	PO747	PO748	PO749	PO750	PO751	PO752	PO753	PO754	PO755	PO756	PO757	PO758	PO759	PO760	PO761	PO762	PO763	PO764	PO765	PO766	PO767	PO768	PO769	PO770	PO771	PO772	PO773	PO774	PO775	PO776	PO777	PO778	PO779	PO780	PO781	PO782	PO783	PO784	PO785	PO786	PO787	PO788	PO789	PO790	PO791	PO792	PO793	PO794	PO795	PO796	PO797	PO798	PO799	PO800	PO801	PO802	PO803	PO804	PO805	PO806	PO807	PO808	PO809	PO810	PO811	PO812	PO813	PO814	PO815	PO816	PO817	PO818	PO819	PO820	PO821	PO822	PO823	PO824	PO825	PO826	PO827	PO828	PO829	PO830	PO831	PO832	PO833	PO834	PO835	PO836	PO837	PO838	PO839	PO840	PO841	PO842	PO843	PO844	PO845	PO846	PO847	PO848	PO849	PO850	PO851	PO852	PO853	PO854	PO855	PO856	PO857	PO858	PO859	PO860	PO861	PO862	PO863	PO864	PO865	PO866	PO867	PO868	PO869	PO870	PO871	PO872	PO873	PO874	PO875	PO876	PO877	PO878	PO879	PO880	PO881	PO882	PO883	PO884	PO885	PO886	PO887	PO888	PO889	PO890	PO891	PO892	PO893	PO894	PO895	PO896	PO897	PO898	PO899	PO900	PO901	PO902	PO903	PO904	PO905	PO906	PO907	PO908	PO909	PO910	PO911	PO912	PO913	PO914	PO915	PO916	PO917	PO918	PO919	PO920	PO921	PO922	PO923	PO924	PO925	PO926	PO927	PO928	PO929	PO930	PO931	PO932	PO933	PO934	PO935	PO936	PO937	PO938	PO939	PO940	PO941	PO942	PO943	PO944	PO945	PO946	PO947	PO948	PO949	PO950	PO951	PO952	PO953	PO954	PO955	PO956	PO957	PO958	PO959	PO960	PO961	PO962	PO963	PO964	PO965	PO966	PO967	PO968	PO969	PO970	PO971	PO972	PO973	PO974	PO975	PO976	PO977	PO978	PO979	PO980	PO981	PO982	PO983	PO984	PO985	PO986	PO987	PO988	PO989	PO990	PO991	PO992	PO993	PO994	PO995	PO996	PO997	PO998	PO999	PO1000	PO1001	PO1002	PO1003	PO1004	PO1005	PO1006	PO1007	PO1008	PO1009	PO1010	PO1011	PO1012	PO1013	PO1014	PO1015	PO1016	PO1017	PO1018	PO1019	PO1020	PO1021	PO1022	PO1023	PO1024	PO1025	PO1026	PO1027	PO1028	PO1029	PO1030	PO1031	PO1032	PO1033	PO1034	PO1035	PO1036	PO1037	PO1038	PO1039	PO1040	PO1041	PO1042	PO1043	PO1044	PO1045	PO1046	PO1047	PO1048	PO1049	PO1050	PO1051	PO1052	PO1053	PO1054	PO1055	PO1056	PO1057	PO1058	PO1059	PO1060	PO1061	PO1062	PO1063	PO1064	PO1065	PO1066	PO1067	PO1068	PO1069	PO1070	PO1071	PO1072	PO1073	PO1074	PO1075	PO1076	PO1077	PO1078	PO1079	PO1080	PO1081	PO1082	PO1083	PO1084	PO1085	PO1086	PO1087	PO1088	PO1089	PO1090	PO1091	PO1092	PO1093	PO1094	PO1095	PO1096	PO1097	PO1098	PO1099	PO1100	PO1101	PO1102	PO1103	PO1104	PO1105	PO1106	PO1107	PO1108	PO1109	PO1110	PO1111	PO1112	PO1113	PO1114	PO1115	PO1116	PO1117	PO1118	PO1119	PO1120	PO1121	PO1122	PO1123	PO1124	PO1125	PO1126	PO1127	PO1128	PO1129	PO1130	PO1131	PO1132	PO1133	PO1134	PO1135	PO1136	PO1137	PO1138	PO1139	PO1140	PO1141	PO1142	PO1143	PO1144	PO1145	PO1146	PO1147	PO1148	PO1149	PO1150	PO1151	PO1152	PO1153	PO1154	PO1155	PO1156	PO1157	PO1158	PO1159	PO1160	PO1161	PO1162	PO1163	PO1164	PO1165	PO1166	PO1167	PO1168	PO1169	PO1170	PO1171	PO1172	PO1173	PO1174	PO1175	PO1176	PO1177	PO1178	PO1179	PO1180	PO1181	PO1182	PO1183	PO1184	PO1185	PO1186	PO1187	PO1188	PO1189	PO1190	PO1191	PO1192	PO1193	PO1194	PO1195	PO1196	PO1197	PO1198	PO1199	PO1200	PO1201	PO1202	PO1203	PO1204	PO1205	PO1206	PO1207	PO1208	PO1209	PO1210	PO1211	PO1212	PO1213	PO1214	PO1215	PO1216	PO1217	PO1218	PO1219	PO1220	PO1221	PO1222	PO1223	PO1224	PO1225	PO1226	PO1227	PO1228	PO1229	PO1230	PO1231	PO1232	PO1233	PO1234	PO1235	PO1236	PO1237	PO1238	PO1239	PO1240	PO1241	PO1242	PO1243	PO1244	PO1245	PO1246	PO1247	PO1248	PO1249	PO1250	PO1251	PO1252	PO1253	PO1254	PO1255	PO1256	PO1257	PO1258	PO1259	PO1260	PO1261	PO1262	PO1263	PO1264	PO1265	PO1266	PO1267	PO1268	PO1269	PO1270	PO1271	PO1272	PO1273	PO1274	PO1275	PO1276	PO1277	PO1278	PO1279	PO1280	PO1281	PO1282	PO1283	PO1284	PO1285	PO1286	PO1287	PO1288	PO1289	PO1290	PO1291	PO1292	PO1293	PO1294	PO1295	PO1296	PO1297	PO1298	PO1299	PO1300	PO1301	PO1302	PO1303	PO1304	PO1305	PO1306	PO1307	PO1308	PO1309	PO1310	PO1311	PO1312	PO1313	PO1314	PO1315	PO1316	PO1317



## Madhav Institute of Technology & Science Gwalior

Department : Computer Science & Engineering

Batch: 2017-2021		CO Attainment			CO-PO Matrix												PO Attainment															
Sem	Course Code & Name	Course Outcome	Direct % Attainment	Indirect % Attainment	Total % Attainment	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15	PO16	PO17	PO18	PO19	PO20							
VII	Internet of Things LAB	explain the definition and usage of the term "Internet of Things" in different contexts	72	71	71.8	3	2	2	1	2	1	1	1	1	3	2	2	71.8	47.866	47.866	23.933	47.866	23.933	23.933	23.933	71.8	47.866	47.866				
VII		differentiate between the levels of the IoT stack and be familiar with the key technologies and apply the knowledge and skills acquired during the course to build and test a complete, working understand where the IoT concept fits within the broader ICT industry and possible future trends	80	84	80.8	2	2	2	2	2	1	1	2	1	1	2	2	3	53.866	53.866	51.866	53.866	53.866	26.933	26.933	26.933	53.866	53.866	80.8			
VII		appreciate the role of big data, cloud computing and data analytics in a typical IoT system	80	68	77.6	3	3	3	2	1	3	1	2	2	2	3	2	2	77.6	77.6	77.6	77.6	51.733	25.866	25.866	25.866	51.733	51.733	77.6	51.733	51.733	
VII			80	71	78.2	3	3	3	3	3	1	1	1	1	1	2	2	3	78.2	78.2	78.2	78.2	28.066	26.066	26.066	26.066	52.133	52.133	78.2	78.2		
VII			68	65	67.4	3	2	1	1	1	1	1	1	2	2	2	3	3	67.4	44.933	22.466	22.466	22.466	44.933	44.933	44.933	67.4	44.933	67.4			
VII																			69.711	58.2	54.266	60.76	50.506	24.733	24.8	28.722	37.277	37.133	37.133	68.711	50.96	52.044
VII	10008: Intellectual Property Rights	Introduce the knowledge of Intellectual Property and its protection through various laws	66.67	75	69.336	2	1	2	3	3	1	3	1	3	2	2	2	45.557	22.778	45.557	48.338	48.338	21.778	48.338	48.338	41.778	62.664	41.778	62.664			
VII		Identify the appropriate data structures to solve specific problems	64	62	63.6	3	3	2	3	3	2	3	2	3	2	3	2	3	63.6	63.6	42.4	63.6	63.6	42.4	63.6	63.6	21.2	42.4	63.6			
VII		develop a platform for protection and compliance of Intellectual Property Rights & create awareness amongst academia and industry of IPR and Copyright compliance	64	71	65.4	2	3	2	3	3	2	2	2	2	2	2	2	2	43.8	65.4	43.8	43.8	65.4	43.8	43.8	43.8	43.8	43.8	43.8	43.8		
VII		deliver the purpose and function of IPR and patenting	60	65	61	3	2	2	3	3	1	2	2	2	3	3	3	3	58.733	37.264	48.144	47.922	56.486	51.2	51.211	35.792	42.322	50.134	38.044	59.118	44.858	57.477
VII			60	62	60.4	2	3	2	2	3	2	3	2	2	1	2	3	2	40.266	60.4	40.266	40.266	60.4	40.266	60.4	40.266	20.133	40.266	60.4	40.266		
VII																			52.407	57.684	34.678	44.714	38.376	62.24	61.935	40.767	45.74	52.912	33.266	53.836	46.452	52.194
VIII	Internship/ Project	Design solutions to real world problems	85	80	85.8	3	3	2	2	3	1	1	3	2	1	2	3	2	85.8	85.8	57.2	57.2	85.8	28.6	28.6	85.8	57.2	28.6	57.2	85.8	57.2	
VIII		Express the technical ideas, strategies and methodologies	86	85	87.4	2	3	2	2	3	1	1	2	2	2	3	2	2	58.266	87.4	58.266	58.266	87.4	29.133	29.133	58.266	58.266	58.266	87.4	58.266	58.266	
VIII		Utilize new tools, algorithms, techniques to obtain solution of the project	78	91	86.6	3	3	2	3	1	3	3	3	2	1	2	3	3	80.6	80.6	53.733	80.6	26.866	80.6	80.6	53.733	26.866	53.733	80.6			
VIII		Evaluate the performance of the prototype/ results	81	87	82.2	2	3	2	3	1	1	2	2	2	3	2	2	2	54.8	82.2	54.8	54.8	82.2	27.4	27.4	54.8	54.8	54.8	82.2	54.8	54.8	
VIII		Able to locate and use technical information from multiple sources	83	88	84	2	2	2	2	1	1	2	3	2	3	2	2	2	56	56	56	56	28	28	56	56	56	84	56	56		
VIII		Demonstrate the ability to communicate effectively in speech and writing	86	78	84.4	3	2	1	2	2	1	2	2	3	2	3	2	3	84.4	56.266	28.133	56.266	28.133	56.266	28.133	56.266	28.133	56.266	84.4	56.266	84.4	
VIII																		69.977	78.454	53.354	58.504	74.711	28.022	38.746	51.011	40.522	60.633	54.504	75.111	38.044	85.211	

Target: 2.2

POs	PO Attainment Level	Attained/ Not Attained	Action taken for not attained
PO1	2.595898693	Attained	-
PO2	2.406372549	Attained	-
PO3	2.067924837	Not Attained	More interactive sessions are planned with professionals from industry in order to expose the industrial / societal problems. Skill Based Projects are introduced.
PO4	2.211013072	Attained	-
PO5	2.104426523	Not Attained	Assignments and seminars are given and they are expected to study the real world problems and give presentation about their ideas to solve them. In-house internships in the form of Finishing schools and summer internships were conducted to help students to solve complex computer science and engineering problems.
PO6	1.827441077	Not Attained	Encouraged to participate in the extra-curricular activities through NSS etc. To identify the problems in the society and the scope for solving through engineering.
PO7	2.034848485	Not Attained	Additional interactive session were arranged for students in courses like IPR and Disaster management.
PO8	1.906993464	Not Attained	EEES course was introduced to further strengthen the PO
PO9	2.186397306	Not Attained	Skill Based mini Projects are introduced for LAB courses.
PO10	2.116421569	Not Attained	In-house Summer internship program to enhance the softskills of students was arranged
PO11	2.057287582	Not Attained	Students were allowed/encouraged to take industry internships for completing 8th semester projects
PO12	2.497875817	Attained	-
PSO1	2.302653595	Attained	-
PSO2	2.307892157	Attained	-

Handwritten signatures and initials are present below the table, including a large signature on the right and several initials on the left.

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

Annexure-15

**Review of curriculam feedback  
from various stakeholders,  
its analysis and impact**

*ITEM No-21*



**Madhav Institute of Technology & Science, Gwalior**  
 (A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)  
**Department of Computer Science and Engineering**  
 Feedback Analysis (Jan. - June 2022)

**Student Curriculum Feedback - CSE 4th Semester**

Course Name & Code: Computer Networks (150411)  
 No. of Responses: 27

Parameters	Strongly Disagree (%age Response)	Disagree (%age Response)	Neutral (%age Response)	Agree (%age Response)	Strongly Agree (%age Response)	Overall Score (%)
The course is well designed	0	11.11	14.81	37.04	37.04	80
The syllabus units are balanced	0	7.41	14.81	40.74	37.04	81
The learning material was available to you	3.7	7.41	18.52	37.04	33.33	78
The content was clear and easy to understand	0	3.7	25.93	22.22	48.15	83
The course was relevant and updated for present needs	0	3.7	25.93	37.04	33.33	80
The course meets your career expectations	0	11.11	18.52	29.63	40.74	80
The course will be useful to meet your higher studies/future aspirations.	0	11.11	18.52	29.63	40.74	80

Course Name & Code: Database Management System (150412)  
 No. of Responses: 14

Parameters	Strongly Disagree (%age Response)	Disagree (%age Response)	Neutral (%age Response)	Agree (%age Response)	Strongly Agree (%age Response)	Overall Score (%)
The course is well designed	0	0	42.86	28.57	28.57	77
The syllabus units are balanced	7.14	7.14	35.71	35.71	14.29	69
The learning material was available to you	0	0	35.71	35.71	28.57	79
The content was clear and easy to understand	0	7.14	50	28.57	14.29	70
The course was relevant and updated for present needs	0	0	50	28.57	21.43	74
The course meets your career expectations	0	0	35.71	35.71	28.57	79
The course will be useful to meet your higher studies/future aspirations.	0	0	42.86	28.57	28.57	77



**Madhav Institute of Technology & Science, Gwalior**  
 (A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)  
**Department of Computer Science and Engineering**  
 Feedback Analysis (Jan. - June 2022)

Course Name & Code: Software Engineering (150413)  
 No. of Responses: 21

Parameters	Strongly Disagree (%age Response)	Disagree (%age Response)	Neutral (%age Response)	Agree (%age Response)	Strongly Agree (%age Response)	Overall Score (%)
The course is well designed	4.76	0	14.29	38.1	42.86	83
The syllabus units are balanced	4.76	0	14.29	38.1	42.86	83
The learning material was available to you	0	0	0	42.86	57.14	91
The content was clear and easy to understand	4.76	4.76	9.52	52.38	28.57	79
The course was relevant and updated for present needs	0	4.76	19.05	28.57	47.62	84
The course meets your career expectations	0	4.76	9.52	38.1	47.62	86
The course will be useful to meet your higher studies/future aspirations.	4.76	0	19.05	38.1	38.1	81

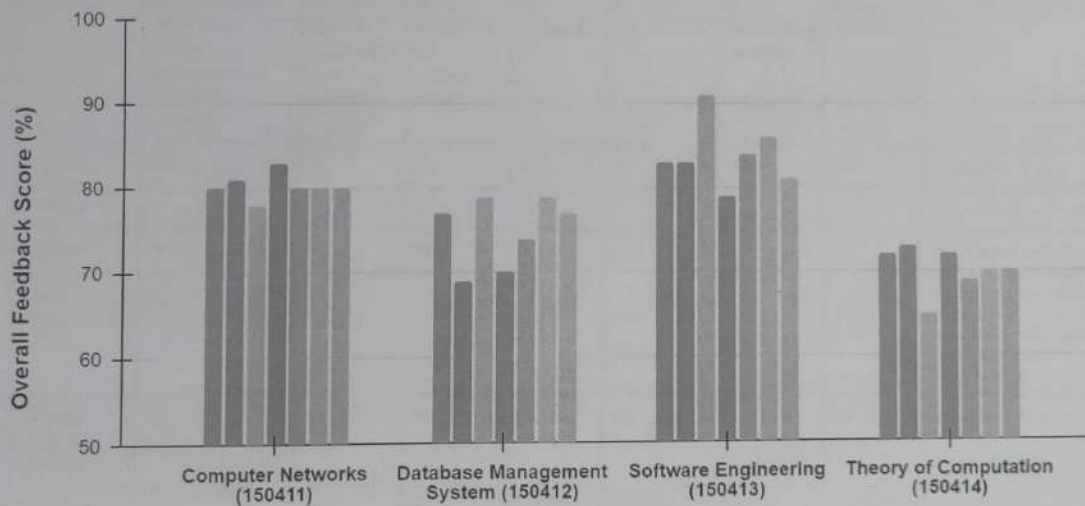
Course Name & Code: Theory of Computation (150414)  
 No. of Responses: 29

Parameters	Strongly Disagree (%age Response)	Disagree (%age Response)	Neutral (%age Response)	Agree (%age Response)	Strongly Agree (%age Response)	Overall Score (%)
The course is well designed	0	0	24.14	24.14	37.93	72
The syllabus units are balanced	0	0	27.59	27.59	34.48	73
The learning material was available to you	0	0	27.59	17.24	34.48	65
The content was clear and easy to understand	0	0	27.59	17.24	41.38	72
The course was relevant and updated for present needs	0	0	20.69	27.59	34.48	69
The course meets your career expectations	0	0	31.03	17.24	37.93	70
The course will be useful to meet your higher studies/future aspirations.	0	0	31.03	20.69	34.48	70

**Madhav Institute of Technology & Science, Gwalior**  
 (A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)  
**Department of Computer Science and Engineering**  
 Feedback Analysis (Jan. - June 2022)

**Overall Student Curriculum Feedback Analysis - CSE 4th Semester**

- The course is well designed    ■ The syllabus units are balanced    ■ The learning material was available to you
- The content was clear and easy to understand    ■ The course was relevant and updated for present needs
- The course meets your career expectations    ■ The course will be useful to meet your higher studies/future aspirations.



Courses

*Handwritten signatures and initials:*  
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**Madhav Institute of Technology & Science, Gwalior**  
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**Department of Computer Science and Engineering**

Feedback Analysis (Jan. - June 2022)

**Overall Student Curriculum Feedback Analysis - CSE 4th Semester**  
**Additional Suggestion by students and Action Taken Report**

S. No.	Course name and code	Additional Comments by students							Action Taken
		Details of the course / contents which in the student's opinion are outdated & needs to be removed.	Name course / contents which needs to be updated.	Is any new course required to meet current needs?	Suggestion for Honours:	Suggestion for Minor specialization:	Suggestion for Departmental electives:	Suggestion for Open electives:	
1	Computer Networks (150411)	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Respective course instructor was requested to provide additional study material to the students.
2	Database Management System (150412)	Nil	Nil	Nil	Nil	Nil	Nil	Nil	The syllabus will be discussed in the upcoming BoS meeting for creating a balanced course content. Respective course instructor was requested to take additional classes to clarify the course content and shared study material.
3	Software Engineering (150413)	Nil	Nil	Nil	Nil	Nil	Nil	Nil	All the responses are Satisfactory.
4	Theory of Computation (150414)	Nil	Nil	Nil	Cloud computing; Big Data Computing	Artificial Intelligence; Search Methods for Problem solving	Data Science for Engineers	Computational Number Theory and Algebra	Respective course instructor was requested to share the study material prior to scheduled class. The course is referred for upcoming BoS meeting for updates.



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**Department of Computer Science and Engineering**  
 Feedback Analysis (Jan. - June 2022)

**Student Curriculum Feedback - CSE 6th Semester**

Course Name & Code: Compiler Design (150601)  
 No. of Responses: 7

Parameters	Strongly Disagree (%age Response)	Disagree (%age Response)	Neutral (%age Response)	Agree (%age Response)	Strongly Agree (%age Response)	Overall Score (%)
The course is well designed	0	0	14.29	57.14	14.29	69
The syllabus units are balanced	0	0	28.57	28.57	28.57	69
The learning material was available to you	0	0	14.29	42.86	28.57	71
The content was clear and easy to understand	0	14.29	28.57	14.29	28.57	63
The course was relevant and updated for present needs	0	0	42.86	14.29	28.57	66
The course meets your career expectations	0	14.29	28.57	14.29	28.57	63
The course will be useful to meet your higher studies/future aspirations.	0	14.29	28.57	14.29	28.57	63

Course Name & Code: Computer Networks (150602)  
 No. of Responses: 22

Parameters	Strongly Disagree (%age Response)	Disagree (%age Response)	Neutral (%age Response)	Agree (%age Response)	Strongly Agree (%age Response)	Overall Score (%)
The course is well designed	0	9.09	36.36	13.64	40.91	77
The syllabus units are balanced	0	4.55	27.27	27.27	40.91	81
The learning material was available to you	0	4.55	31.82	18.18	45.45	81
The content was clear and easy to understand	0	9.09	31.82	13.64	45.45	79
The course was relevant and updated for present needs	0	4.55	40.91	13.64	40.91	78
The course meets your career expectations	4.55	13.64	27.27	13.64	40.91	75
The course will be useful to meet your higher studies/future aspirations.	0	13.64	27.27	18.18	40.91	77

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**Department of Computer Science and Engineering**  
 Feedback Analysis (Jan. - June 2022)

Course Name & Code: Network & Web Security (150611)  
 No. of Responses: 69

Parameters	Strongly Disagree (%age Response)	Disagree (%age Response)	Neutral (%age Response)	Agree (%age Response)	Strongly Agree (%age Response)	Overall Score (%)
The course is well designed	1.45	2.9	33.33	31.88	30.43	77
The syllabus units are balanced	0	5.8	26.09	39.13	28.99	78
The learning material was available to you	1.45	8.7	31.88	33.33	24.64	74
The content was clear and easy to understand	1.45	4.35	34.78	31.88	27.54	76
The course was relevant and updated for present needs	1.45	8.7	27.54	34.78	27.54	76
The course meets your career expectations	1.45	8.7	30.43	27.54	31.88	76
The course will be useful to meet your higher studies/future aspirations.	1.45	4.35	28.99	36.23	28.99	77

Course Name & Code: Mobile Computing (150613)  
 No. of Responses: 19

Parameters	Strongly Disagree (%age Response)	Disagree (%age Response)	Neutral (%age Response)	Agree (%age Response)	Strongly Agree (%age Response)	Overall Score (%)
The course is well designed	5.26	0	36.84	36.84	21.05	74
The syllabus units are balanced	15.79	0	31.58	26.32	26.32	69
The learning material was available to you	5.26	10.53	26.32	42.11	15.79	71
The content was clear and easy to understand	10.53	5.26	31.58	10.53	42.11	74
The course was relevant and updated for present needs	5.26	5.26	36.84	31.58	21.05	72
The course meets your career expectations	5.26	10.53	36.84	31.58	15.79	68
The course will be useful to meet your higher studies/future aspirations.	5.26	10.53	31.58	42.11	10.53	68

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**Department of Computer Science and Engineering**  
 Feedback Analysis (Jan. - June 2022)

Course Name & Code: Disaster Management (100007)  
 No. of Responses: 32

Parameters	Strongly Disagree (%age Response)	Disagree (%age Response)	Neutral (%age Response)	Agree (%age Response)	Strongly Agree (%age Response)	Overall Score (%)
The course is well designed	0	9.38	37.5	31.25	21.88	73
The syllabus units are balanced	0	6.25	34.38	40.63	18.75	74
The learning material was available to you	0	3.13	37.5	34.38	25	76
The content was clear and easy to understand	0	3.13	31.25	40.63	25	78
The course was relevant and updated for present needs	0	9.38	28.13	37.5	25	76
The course meets your career expectations	0	6.25	40.63	28.13	25	74
The course will be useful to meet your higher studies/future aspirations.	0	6.25	34.38	34.38	25	76

Course Name & Code: Data Structure (900106)  
 No. of Responses: 44

Parameters	Strongly Disagree (%age Response)	Disagree (%age Response)	Neutral (%age Response)	Agree (%age Response)	Strongly Agree (%age Response)	Overall Score (%)
The course is well designed	0	4.55	34.09	25	36.36	79
The syllabus units are balanced	0	6.82	29.55	29.55	34.09	78
The learning material was available to you	2.27	15.91	25	25	31.82	74
The content was clear and easy to understand	0	13.64	27.27	27.27	31.82	75
The course was relevant and updated for present needs	0	9.09	29.55	22.73	38.64	78
The course meets your career expectations	2.27	6.82	25	31.82	34.09	78
The course will be useful to meet your higher studies/future aspirations.	0	6.82	25	31.82	36.36	80



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**Feedback Analysis (Jan. - June 2022)**

Course Name & Code: Python Programming (900107)

No. of Responses: 25

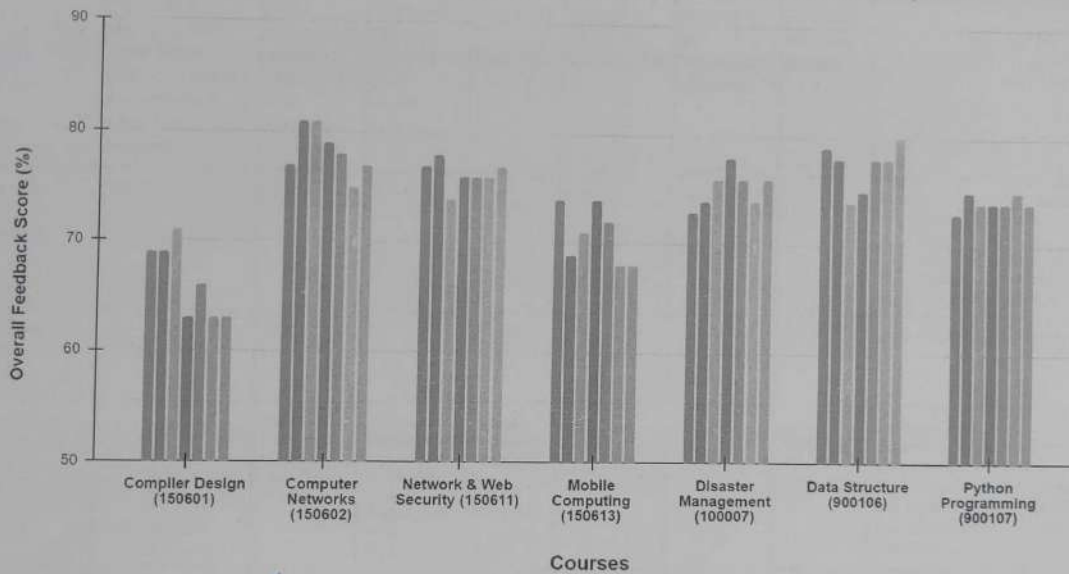
Parameters	Strongly Disagree (%age Response)	Disagree (%age Response)	Neutral (%age Response)	Agree (%age Response)	Strongly Agree (%age Response)	Overall Score (%)
The course is well designed	4	12	32	20	32	73
The syllabus units are balanced	4	8	32	20	36	75
The learning material was available to you	4	8	32	28	28	74
The content was clear and easy to understand	4	12	28	24	32	74
The course was relevant and updated for present needs	4	12	28	24	32	74
The course meets your career expectations	4	8	32	20	36	75
The course will be useful to meet your higher studies/future aspirations.	4	12	28	20	36	74

**Madhav Institute of Technology & Science, Gwalior**  
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**Department of Computer Science and Engineering**

Feedback Analysis (Jan. - June 2022)

**Overall Student Curriculum Feedback Analysis - CSE 6th Semester**

- The course is well designed
- The syllabus units are balanced
- The learning material was available to you
- The content was clear and easy to understand
- The course was relevant and updated for present needs
- The course meets your career expectations
- The course will be useful to meet your higher studies/future aspirations.



Courses

**Madhav Institute of Technology & Science, Gwalior**  
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**Department of Computer Science and Engineering**  
 Feedback Analysis (Jan. - June 2022)

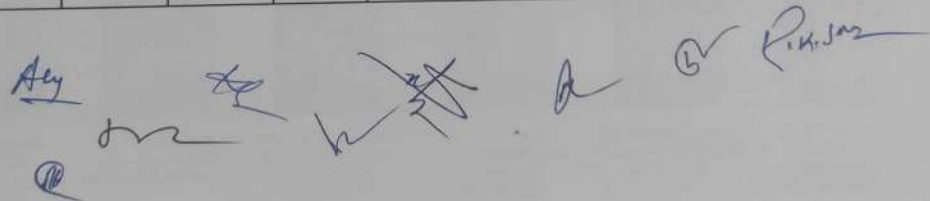
**Overall Student Curriculum Feedback Analysis - CSE 6th Semester**  
**Additional Suggestion by students and Action Taken Report**

S. No.	Course name and code	Additional Comments by students							Action Taken
		Details of the course / contents which in the student's opinion are outdated & needs to be removed.	Name course / contents which needs to be updated.	Is any new course required to meet current needs?	Suggestion for Honours:	Suggestion for Minor specialization:	Suggestion for Departmental electives:	Suggestion for Open electives:	
1	Compiler Design (150601)	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Respective course instructor was requested to share the study material prior to scheduled class. The course is referred for upcoming BoS meeting for updates, as per the suggestions of students.
2	Computer Networks (150602)	Nil	WAP	Nil	IoT	Nil	Nil	Nil	All the responses are Satisfactory.
3	Network & Web Security (150611)	Nil	End to End Encryption	Yes, modern cryptographic algorithms in optional mode. Hacking and cyber security	Arts and humanities subjects like history; Blockchain; IoT	Finance; Electrical	Web 3.0	Data Analytics and SQL	Syllabus will be discussed in the upcoming BoS meeting for the updates suggested by the students. The suggestive list of Honour, Minor and elective courses will be forwarded and presented in upcoming BoS for necessary actions.
4	Mobile Computing (150613)	Nil	Routing	Nil	Python related courses; Computer network and ip	Dbms courses	Nil	Nil	Syllabus will be discussed in the upcoming BoS meeting for the updates suggested by the students, and new routing techniques will be suggested to be incorporated in the updated syllabus.



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**Department of Computer Science and Engineering**  
**Feedback Analysis (Jan. - June 2022)**

					addressing				
5	Disaster Management (100007)	Nil	Nil	Nil	Nil	Nil	Nil	Nil	All the responses are Satisfactory.
6	Data Structure (900106)	Nil	Nil	Nil	Nil	Software Testing, Theory of Computation, Cryptography And Network Security, Artificial Intelligence : Search Methods For Problem solving	Nil	Nil	All the responses are Satisfactory. The suggestive list for Minor specialization courses will be forwarded and presented in upcoming BoS for necessary actions.
7	Python Programming (900107)	Nil	Nil	Nil	Nil	Nil	Nil	Nil	All the responses are Satisfactory.


  
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**Feedback Analysis (Jan. - June 2022)**

**Faculty Curriculum Feedback Jan-June 2022 (4th Semester CSE)**

- The availability of books & E-learning material in the institute is good.
- The Courses and content are up to date.
- The course curriculum/syllabi are helpful in meeting the higher studies/placement requirements according to present global trends.
- The course / contents in your domain/area are well designed and frequently updated, hence need no changes at present.
- The curriculum is capable of inculcating life-long learning abilities in students.



**Course Instructor, Course Name & Course Code**

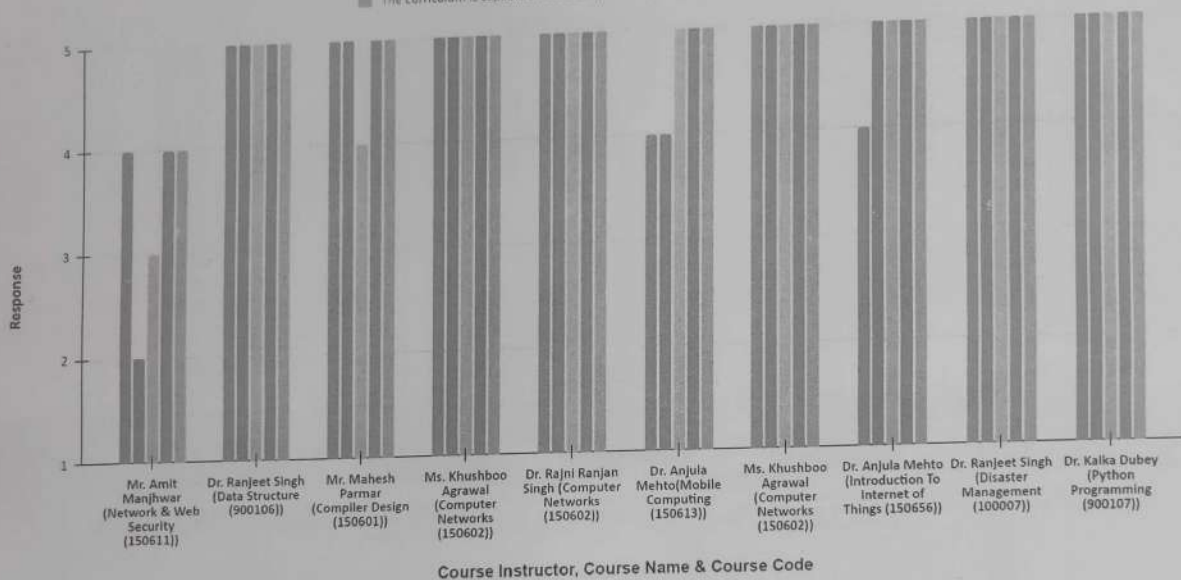
**Response Mapping: 1 - Strongly Disagree; 2 - Disagree; 3 - Neutral; 4 - Agree; 5 - Strongly Agree**

Handwritten signatures of the faculty members corresponding to the courses listed in the chart above.

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**Department of Computer Science and Engineering**  
**Feedback Analysis (Jan. - June 2022)**

**Faculty Curriculum Feedback Jan-June 2022 (6th Semester CSE)**

- The availability of books & E-learning material in the institute is good.
- The Courses and content are up to date.
- The course curriculum/syllabi are helpful in meeting the higher studies/placement requirements according to present global trends.
- The course / contents in your domain/area are well designed and frequently updated, hence need no changes at present.
- The curriculum is capable of inculcating life-long learning abilities in students.

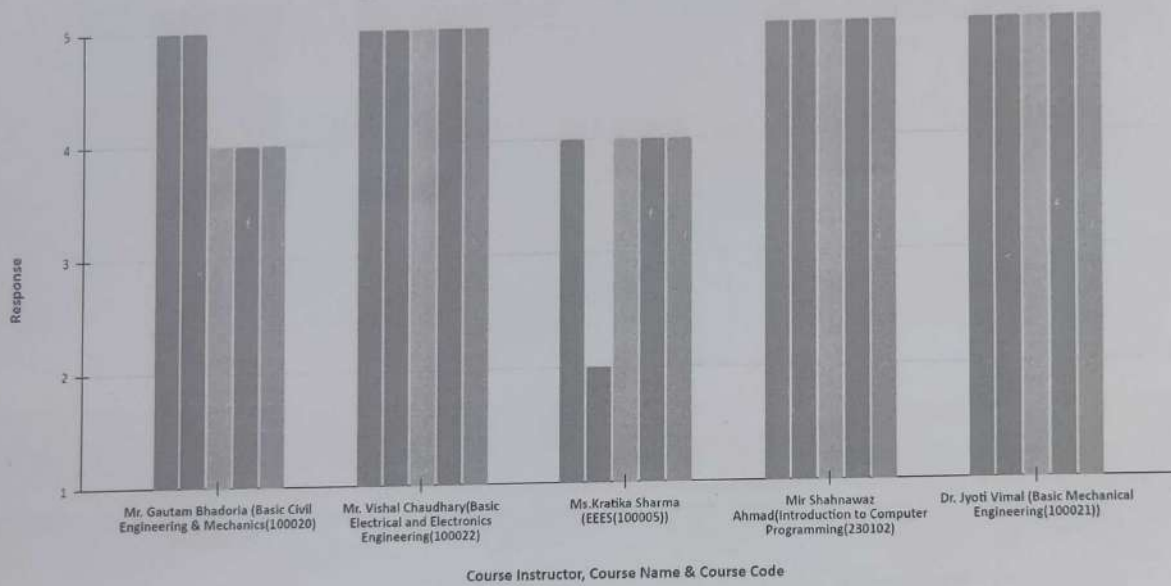


**Response Mapping: 1 - Strongly Disagree; 2 - Disagree; 3 - Neutral; 4 - Agree; 5 - Strongly Agree**

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**Department of Computer Science and Engineering**  
**Feedback Analysis (Jan. - June 2022)**

**Faculty Curriculum Feedback Jan-June 2022 (1st Semester CSE)**

- The availability of books & E-learning material in the institute is good.
- The Courses and content are up to date.
- The course curriculum/syllabi are helpful in meeting the higher studies/placement requirements according to present global trends.
- The course / contents in your domain/area are well designed and frequently updated, hence need no changes at present.
- The curriculum is capable of inculcating life-long learning abilities in students.

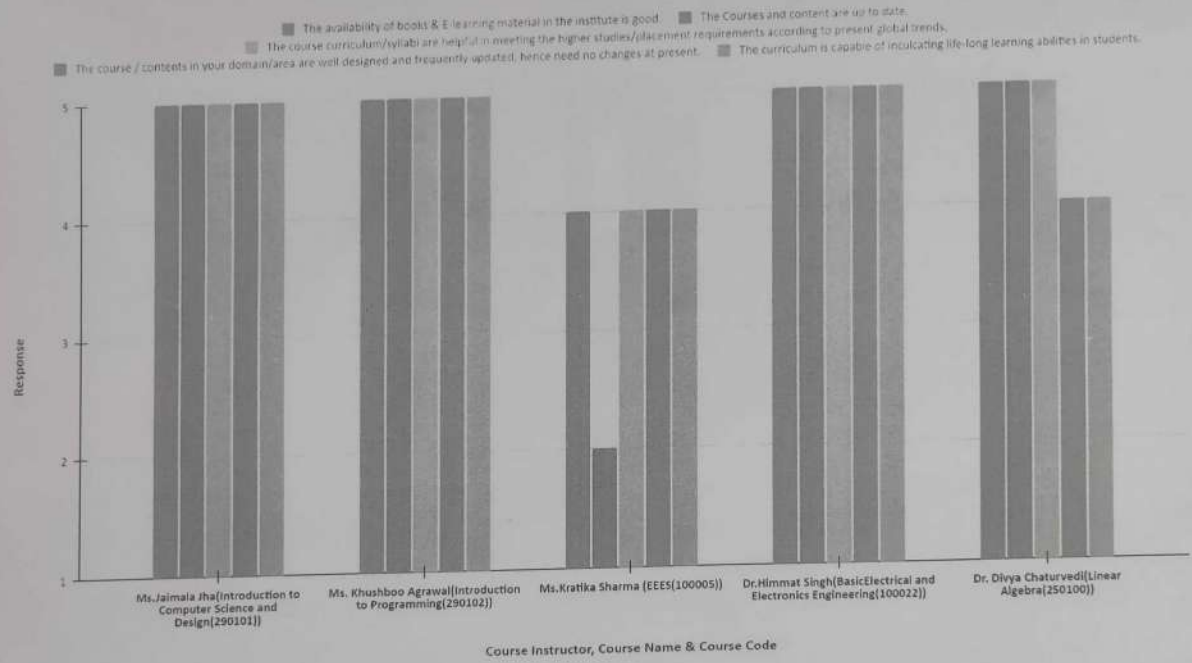


**Response Mapping: 1 - Strongly Disagree; 2 - Disagree; 3 - Neutral; 4 - Agree; 5 - Strongly Agree**

Handwritten signatures and initials are present below the response mapping text, corresponding to the five instructors listed in the chart above.

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**Department of Computer Science and Engineering**  
**Feedback Analysis (Jan. - June 2022)**

**Faculty Curriculum Feedback Jan-June 2022 (1st Semester CSD)**



**Response Mapping: 1 - Strongly Disagree; 2 - Disagree; 3 - Neutral; 4 - Agree; 5 - Strongly Agree**

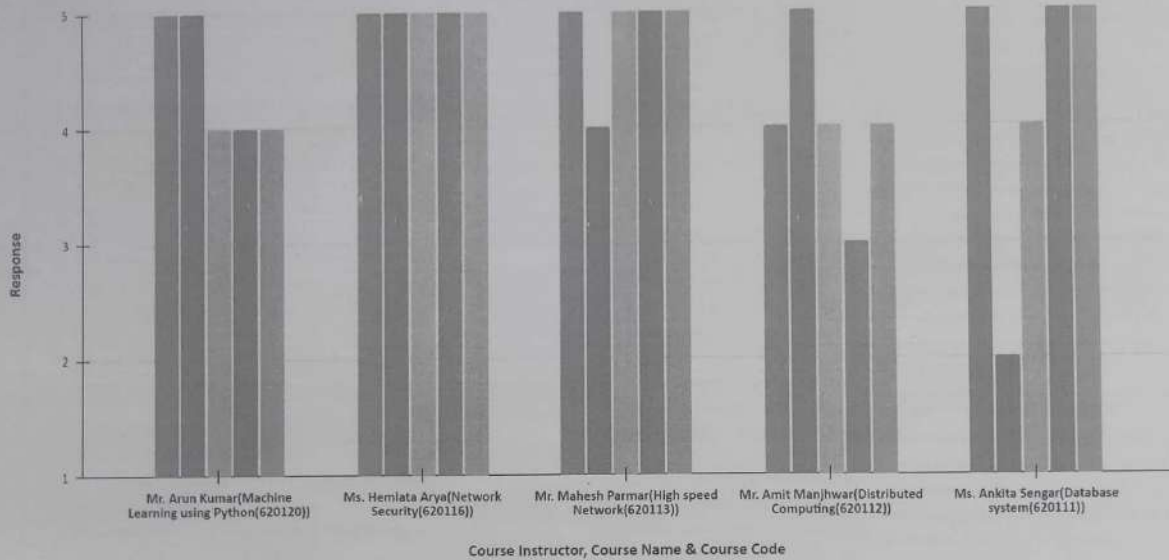
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**Department of Computer Science and Engineering**  
**Feedback Analysis (Jan. - June 2022)**

**Faculty Curriculum Feedback Jan-June 2022 (First Semester M. Tech. CSE)**

- The availability of books & E-learning material in the institute is good.
- The Courses and content are up to date.
- The course curriculum/syllabi are helpful in meeting the higher studies/placement requirements according to present global trends.
- The course / contents in your domain/area are well designed and frequently updated, hence need no changes at present.
- The curriculum is capable of inculcating life-long learning abilities in students.



**Response Mapping: 1 - Strongly Disagree; 2 - Disagree; 3 - Neutral; 4 - Agree; 5 - Strongly Agree**

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**Department of Computer Science and Engineering**  
Feedback Analysis (Jan. - June 2022)

**Action Taken Report for Faculty Curriculum Feedback**

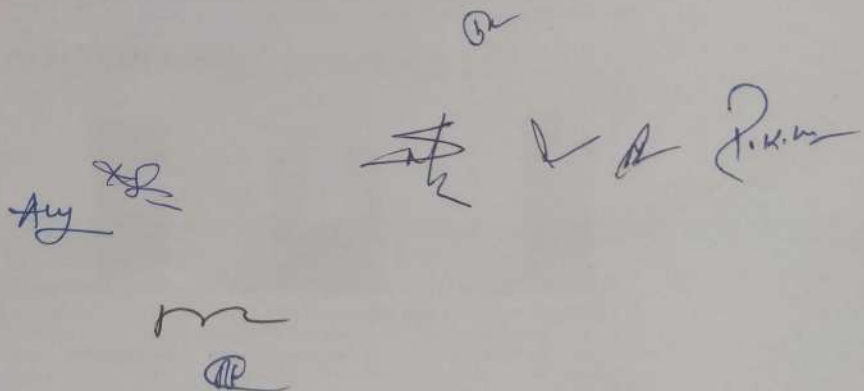
S. No.	Course Instructor with course name and code	Action Taken
1.	Dr. R.K. Gupta (Database Management System (150412))	All the responses are Satisfactory.
2.	Dr. Rajni Ranjan Singh (Computer Networks (150411))	All the responses are Satisfactory.
3.	Mr. Mir Shahnawaz Ahmad (Software Engineering (150413))	All the responses are Satisfactory.
4.	Ms. Jaimala Jha (Software Engineering (150413))	All the responses are Satisfactory.
5.	Dr. Anjula Mehto (Computer Networks (150411))	All the responses are Satisfactory.
6.	Dr. R.K. Gupta (Database Management System (150412))	All the responses are Satisfactory.
7.	Dr. Manish Dixit (Theory of Computation (150414))	All the responses are Satisfactory.
8.	Mr. Amit Manjhar (Network & Web Security (150611))	The course content will be discussed in the upcoming BoS meeting for modifications suggested by the faculty.
9.	Dr. Ranjeet Singh (Data Structure (900106))	All the responses are Satisfactory.
10.	Mr. Mahesh Parmar (Compiler Design (150601))	All the responses are Satisfactory.
11.	Ms. Khushboo Agrawal (Computer Networks (150602))	All the responses are Satisfactory.
12.	Dr. Rajni Ranjan Singh (Computer Networks (150602))	All the responses are Satisfactory.
13.	Dr. Anjula Mehto (Mobile Computing (150613))	All the responses are Satisfactory.
14.	Ms. Khushboo Agrawal (Computer Networks (150602))	All the responses are Satisfactory.
15.	Dr. Anjula Mehto (Introduction To Internet of Things (150656))	All the responses are Satisfactory.
16.	Dr. Ranjeet Singh (Disaster Management (100007))	All the responses are Satisfactory.
17.	Dr. Kalka Dubey (Python Programming (900107))	All the responses are Satisfactory.
18.	Mr. Gautam Bhadoria (Basic Civil Engineering & Mechanics (100020))	All the responses are Satisfactory.
19.	Mr. Vishal Chaudhary (Basic Electrical and Electronics Engineering (100022))	All the responses are Satisfactory.
20.	Ms. Kratika Sharma (EES (100005))	The course content will be discussed in the upcoming BoS meeting for modifications suggested by the faculty.
21.	Mir Shahnawaz Ahmad (Introduction to Computer Programming (230102))	All the responses are Satisfactory.
22.	Dr. Jyoti Vimal (Basic Mechanical Engineering (100021))	All the responses are Satisfactory.
23.	Ms. Jaimala Jha (Introduction to Computer Science and Design (290101))	All the responses are Satisfactory.
24.	Ms. Khushboo Agrawal (Introduction to Programming (290102))	All the responses are Satisfactory.
25.	Dr. Himmat Singh (Basic Electrical and Electronics Engineering (100022))	All the responses are Satisfactory.
26.	Dr. Divya Chaturvedi (Linear Algebra (250100))	All the responses are Satisfactory.
27.	Mr. Arun Kumar (Machine Learning using Python (620120))	All the responses are Satisfactory.
28.	Ms. Hemlata Arya (Network Security (620116))	All the responses are Satisfactory.



**Madhav Institute of Technology & Science, Gwalior**  
 (A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)  
**Department of Computer Science and Engineering**  
**Feedback Analysis (Jan. - June 2022)**

29.	Mr. Mahesh Parmar(High speed Network(620113))	All the responses are Satisfactory.
30.	Mr. Amit Manjhar(Distributed Computing(620112))	The course content will be discussed in the upcoming BoS meeting for modifications suggested by the faculty.
31.	Ms. Ankita Sengar(Database system(620111))	The course content will be discussed in the upcoming BoS meeting for modifications suggested by the faculty.
<b>Additional Comments by faculties:</b> <ul style="list-style-type: none"> <li>• Lot of text books and e books are available.</li> <li>• AI and Machine learning must be emphasized.</li> <li>• In All competitive exams and public sector exams, TOC questions are always asked . For further studies through GATE, it is a very important subject. Students employability skills have been enhanced through flexi curriculum. NEC enhanced the confidence in the area of his interest.</li> <li>• There are a lot of research scholars working in the department. Some research scholars are getting fellowship under NDF scheme.</li> <li>• Regular workshops and training programs are organized</li> <li>• Yes, the institute gives all support for faculty.</li> <li>• Suggestions for (i) Honours, (ii) Minor specialization, (iii) Departmental electives, (iv) Open electives:</li> <li>• Deep Learning Robotics, Machine Learning, Image Processing</li> </ul>		

Dr

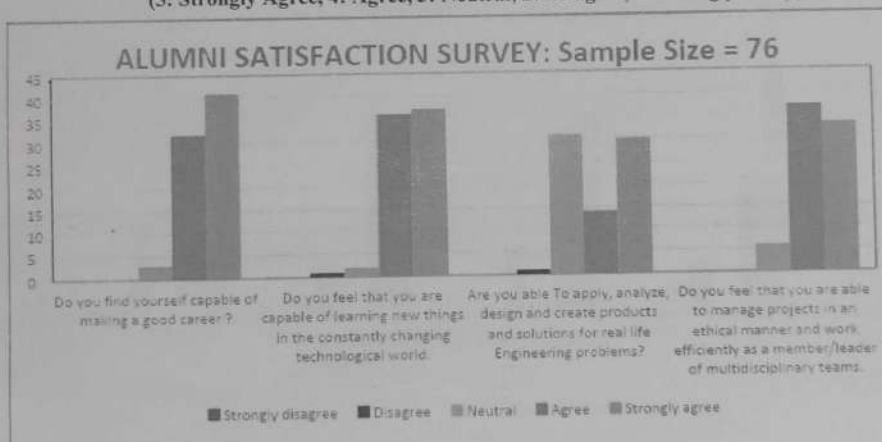


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**Department of Computer Science and Engineering**  
 Feedback Analysis (Jan. - June 2022)

**Summary Sheet (Alumni Satisfaction Survey) Sample Size:76**

Curriculum Evaluation Point	Number of Response				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Do you find yourself capable of making a good career ?	0	0	3	32	41
Do you feel that you are capable of learning new things in the constantly changing technological world.	0	1	2	36	37
Are you able To apply, analyze, design and create products and solutions for real life Engineering problems?	0	1	31	14	30
Do you feel that you are able to manage projects in an ethical manner and work efficiently as a member/leader of multidisciplinary teams.	0	0	6	37	33

Alumni Satisfaction Index has been calculated on 5 Point Scale  
 (5: Strongly Agree, 4: Agree, 3: Neutral, 2: Disagree, 1: Strongly Disagree)



*(Handwritten signatures and initials)*



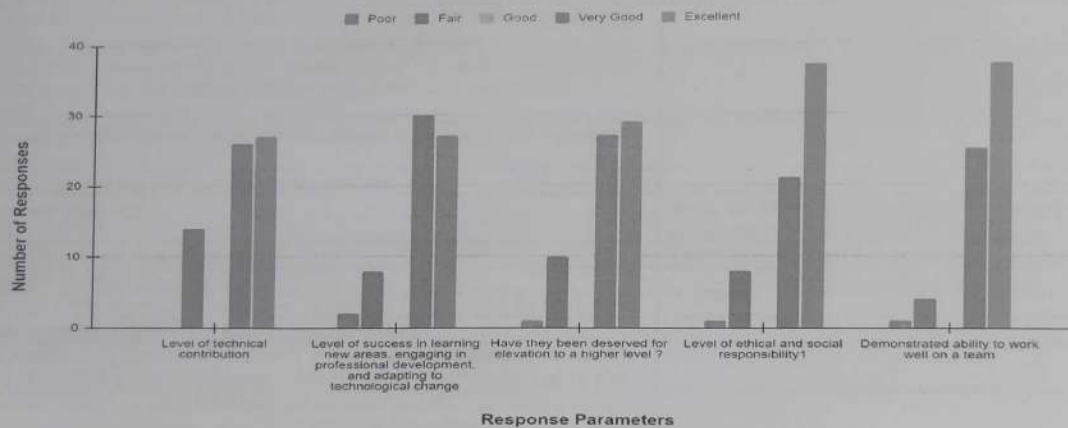
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**Department of Computer Science and Engineering**

Feedback Analysis (Jan. - June 2022)

**Summary Sheet (Employer Satisfaction Survey) Sample Size:67**

Parameter (Average Grading)	Poor	Fair	Good	Very Good	Excellent	Employer Satisfaction Index
Level of technical contribution	0	14	0	26	27	3.98
Level of success in learning new areas, engaging in professional development, and adapting to technological change	2	8	0	30	27	4.07
Have they been deserved for elevation to a higher level ?	1	10	0	27	29	4.08
Level of ethical and social responsibility1	1	8	0	21	37	4.26
Demonstrated ability to work well on a team	1	4	0	25	37	4.38

**Employer Satisfaction Index (ESI) (on a scale of 5) (5: Excellent, 4: Very Good, 3: Good, 2: Fair, 1: Poor)**



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**Department of Computer Science and Engineering**  
**Feedback Analysis (Jan. - June 2022)**

Any Other Comment / Suggestions (Please write)	Action taken
Good technical knowledge	-
GOOD. KEEP IT UP	-
Hardworking & smart students	-
Having good technical knowledge as well as great dedication and attitude towards any given task. He is having great potential to grow in our organization.	-
Nicholas is a great addition to the team. He has shown good acumen to research new technology and solutions and find the best possible usage out of that.	-
Overall Good Candidates	-
Please make your study environment as per private companies standard.	Students doing internship /project for understanding company needs. Curriculum has been designed as per industry requirements.
Positive, dynamic, fast learner, good team performer. MITS rocks!!	-
Require more Co -Operation and Co-Ordination.	Our training placement department coordinating.
Jai is an excellent team player and a fast learner.He is focused to the work and performs his responsibilities very well and on time. Happy to have him in the team.	-
till now the journey is wonderful in terms of learning and earning, despite a lower package, the promotions were way above industrial norms good growth and a positive work environment	-
More companies should be invited to the institute premises to provide greater exposure to the students.	-
I think they did a great job. They just need proper guidance.	-
focused on new technology...	As per the industry demands some provision has been incorporated for industry person guidance in the curriculum
Need some improvement in practical aspect.	Timely workshops and training programs conducted
Please improve quality of education	Curriculum has designed as per industry needs
Excellent team player, eager to learn and strive for success. Truly carrying the MITS value.	-
Very good human being. Honest and hard working professional.	-
This year some freshers have joined L&T, and I am really shocked to see their attitude towards work adaptation. They need to understand that initially they have to learn to work.	-
Joining of 2020 Batch was delayed due to Covid-19 pandemic. GET batch started in Dec 20/ Jan 21. Quarterly performance review would happen in due course.	-
Very talented, adapt easily to new work environment, Never saying "no" attitude, always ready to learn new skills and help others	-

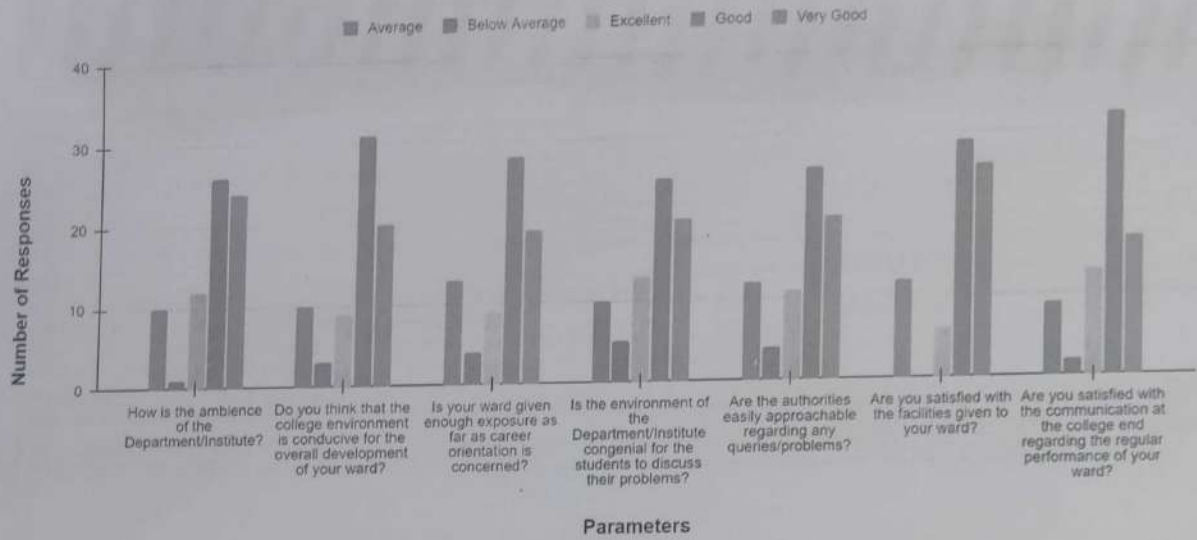
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**Department of Computer Science and Engineering**  
 Feedback Analysis (Jan. - June 2022)

**Summary Sheet (Parent Satisfaction Survey) Sample Size:73**

Evaluation Point	Number of Response				
	Average	Below Average	Excellent	Good	Very Good
How is the ambience of the Department/Institute?	10	1	12	26	24
Do you think that the college environment is conducive for the overall development of your ward?	10	3	9	31	20
Is your ward given enough exposure as far as career orientation is concerned?	13	4	9	28	19
Is the environment of the Department/Institute congenial for the students to discuss their problems?	10	5	13	25	20
Are the authorities easily approachable regarding any queries/problems?	12	4	11	26	20
Are you satisfied with the facilities given to your ward?	12	0	6	29	26
Are you satisfied with the communication at the college end regarding the regular performance of your ward?	9	2	13	32	17

Parent Satisfaction Index has been calculated on 5 Point Scale ((5: Excellent, 4: Very Good, 3: Good, 2: Average, 1: Below Average)

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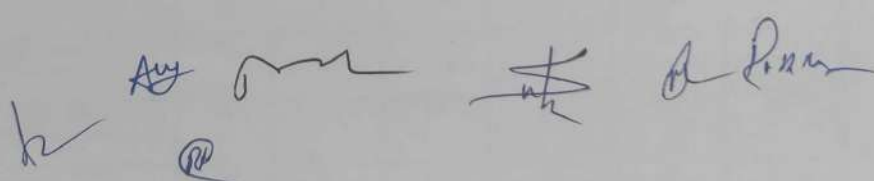


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Feedback Analysis (Jan. - June 2022)

**Suggestions given by parents for improvement**

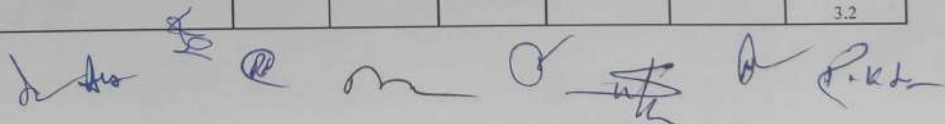
Suggestion for further improvement(if any)	Action Taken
What is the scheme related to oc i think if oc subject converted to oc student performance so much better .oc is already is a subject for other subject student how to manage other branch subject in final year its time to placement preparation or any higher study preparation so i think maximum time consumed in oc course.	It is mandatory for course curriculum scheme.
Placement training part must be focused more	Various training placement activity conducted in semester-wise
Every thing is fine	
Desire of Regular Communication to and from parents with faculty on Specified WhatsApp Group,As elsewhere	Already Whatsapp groups have been created for communication.
Account Section is not cooperative . The way they are talking is just ridiculous	
Classes shall be started in the offline mode as soon as possible.	Already done
Please have colleges opened offline as soon as possible.. Corona is here to stay but the future of my child depends highly on these remaining 2 years and we want them to be as productive to him as they can be.. so sincere request for opening the college offline	
Make more competitive environment and awareness among students regarding their career needs in terms of guidance.	Various activities and workshops have been conducted in every semester.
Improving network connection and completing the syllabus on time.	Syllabus completed before teaching end



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**STUDENTS EXIT SURVEY FEEDBACK REPORT- 2022 BATCH: Sample Size :140**

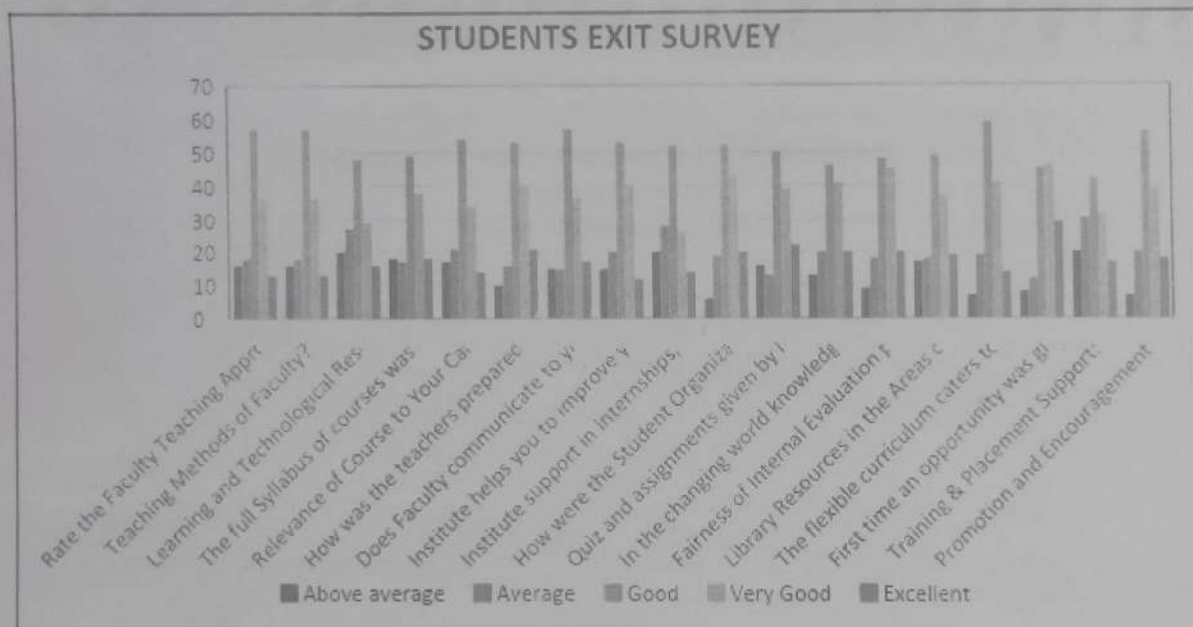
Parameter	Average	Above Average	Good	Very Good	Excellent	Exit Survey Index
Rate the Faculty Teaching Approach in the UG or PG Programs:	18	16	57	36	13	3.14
Teaching Methods of Faculty?	18	16	57	36	13	3.07
Learning and Technological Resources	27	20	48	29	16	2.90
The full Syllabus of courses was completed through regular & additional/remedial classes	17	18	49	38	18	3.15
Relevance of Course to Your Career Goals or Further Study:	21	17	54	34	14	3.02
How was the teachers preparedness and communication in the class?	16	10	53	40	21	3.28
Does Faculty communicate to you about Course Outcomes (CO), Program Outcomes (PO) and expected learning & competencies from the course?	15	15	57	36	17	3.17
Institute helps you to improve your soft skills, life skills and employability skills to make you ready for Industry or Placements -	20	15	53	40	12	3.06
Institute support in Internships, Industrial Visits, Project work, Students exchange and other related activities was	28	20	52	26	14	2.84
How were the Student Organizations, Technical & Social Clubs for your overall growth and learnings ?	19	6	52	43	20	3.27
Quiz and assignments given by Faculty were helpful in learning?	13	16	50	39	22	3.29
In the changing world knowledge of new technology and domains is expected from graduates. The NPTEL-MOOCs will help students in becoming self-learners and future ready	20	13	46	41	20	3.2
Fairness of Internal Evaluation process by faculty	18	9	48	45	20	3.28
Library Resources in the Areas of Engineering, Research, Journals & e-Journals, Technical Magazines etc.	18	17	49	37	19	3.15
The flexible curriculum caters to individual career needs by providing choice of subjects. In your opinion, this curriculum approach is	19	7	59	41	14	3.17
First time an opportunity was given for a full VIII semester internship/project. This provision will help in the career planning and growth for you and the future batches.	12	8	45	46	29	3.51
Training & Placement Support:	30	20	42	31	17	2.89
Promotion and Encouragement by Institute/Department for participation in Curricular and Extra-Curricular activities for development of students.	20	7	56	39	18	3.2



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**Feedback Analysis (Jan. - June 2022)**

Students Exit Survey Index (on a scale of 5) (5: Excellent, 4: Very Good, 3: Good, 2: Above Average, 1: Average Poor)



*[Handwritten signatures and initials]*

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Annexure-16

**Review of Course Outcomes (COs) feedback  
of various courses,  
its analysis, and ATR**

*ITEM No-22*



**Madhav Institute of Technology & Science, Gwalior**  
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**Course Outcomes (COs) Feedback Analysis Jan.-June 2022**

Semester	Course Code	Course Name	Faculty Name	CO Statements	CO Attainment using I Min. Paper writing (%)	CO Attainment using course end sem seminar (%)	CO Attainment using course feedback using MOODLE (%)	Overall Indirect CO Attainment (%)	Overall Indirect CO Attainment Level	Target	Attained/not attained	Action taken for Not Attained	
IV	150411	Computer Networks	Dr. Anjula Mehta	CO1	Outline the Data Communications System and its components	84.84	75.48	82.1	80.94	3	3	Attained	-
				CO2	Identify the different types of network topologies and protocols.	77.27	68.45	90.47	79.9	3	2.5	Attained	-
				CO3	Enumerate the layers of the OSI model and function(s) of each layer.	74.24	60.65	89.28	76.18	3	2.5	Attained	-
				CO4	Identify the different types of network devices and their functions within a network	90.9	66.25	95.23	85.24	3	2.5	Attained	-
				CO5	Analyze the problems associated with various networking protocols and measure the Performance	87.87	64.25	78.57	77.06	3	2.5	Attained	-
				CO6	Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation	66.66	68.25	86.9	75.23	3	2.5	Attained	-
IV	150413	Software Engineering	Mr. Mir Shahsawaz Ahmad	CO1	explain the various fundamental concepts of software engineering.	89	86	80.3	84.62	3	2.5	Attained	-
				CO2	develop the concepts related to software design & analysis.	84	78	78.78	80.11	3	2.5	Attained	-
				CO3	compare the techniques for software project management & estimation	78	68	81.81	76.52	3	2.3	Attained	-
				CO4	choose the appropriate model for real life software project.	71	71	81.81	75.32	3	2.3	Attained	-
				CO5	design the software using modern tools and technologies	68	68	80.3	72.92	3	2.2	Attained	-
				CO6	test the software through different approaches.	92	83	81.81	85.22	3	2.5	Attained	-
IV	150414	Theory of Computation	Dr. Manish Dixit	CO1	Explain the basic concepts of switching and finite automata theory & languages.	92.32	75.36	80.33	82.44	3	2.7	Attained	-
				CO2	Relate practical problems to languages, automata, computability and complexity.	89.43	80.32	80.33	83.06	3	2.5	Attained	-
				CO3	Construct abstract models of computing and check their power to recognize the languages.	78.8	62	83.33	75.57	3	2.5	Attained	-
				CO4	Analyse the grammar, its types, simplification and normal form.	90	71.35	83.33	81.74	3	2.5	Attained	-
				CO5	Interpret rigorously formal mathematical methods to prove properties of languages, grammars and automata.	75.62	64.18	80	73.94	3	2.5	Attained	-
				CO6	Develop an overview of how automata theory, languages and computation are applicable in engineering application	71.39	59.35	80	71.22	3	2.5	Attained	-
				CO1	define the concept of computer network and various layered architecture	90	85	72	81.3	3	2.5	Attained	-
				CO2	compare the classless and class full addressing of IPV4	85	72	75	77.1	3	2.5	Attained	-



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**Course Outcomes (COs) Feedback Analysis Jan.-June 2022**

Semester	Course Code	Course Name	Faculty Name	CO Statements	CO Attainment using 1 Min. Paper writing (%age)	CO Attainment using course end sem seminar (%age)	CO Attainment using course feedback using MOODLE (%age)	Overall Indirect CO Attainment (%age)	Overall Indirect CO Attainment Level	Target	Attained/ not attained	Action taken for Not Attained
VI	150602	Computer Networks	Mr. Khushboo Agrawal	CO3 identify the different types of networking devices and their functions within a network.	93	90	72	83.7	3	2.5	Attained	-
				CO4 analyze various protocols of computer networks for getting network design and implementation.	70	89	73	78.9	3	2.5	Attained	-
				CO5 design client server applications and communication model and protocols for communication.	85	60	71	65.4	2.6	2.5	Attained	-
				CO6 elaborate various TCP/IP protocol for achieving multimedia and security services.	60	65	73	68.7	2.7	2.5	Attained	-
VI	150611 DE-1	Network & Web Security	Mr. Jyoti Manghwar	CO1 explain cryptographic algorithms, hash algorithms and authentication mechanisms.	-	-	72.8	72.8	3	3	Attained	-
				CO2 illustrate fundamentals of number theory, attacks and security principles.	-	-	75.43	75.43	3	2.5	Attained	-
				CO3 apply number theory and various algorithms to achieve principles of security.	-	-	75.43	75.43	3	2.5	Attained	-
				CO4 analyze the cause for various existing network attacks and describe the working of.	-	-	72.8	72.8	3	3	Attained	-
				CO5 examine the vulnerabilities in IT infrastructure.	-	-	71.42	71.42	3	3	Attained	-
				CO6 predict the attacks and controls associated with IP, transport-level, web and e-mail.	-	-	74.38	74.38	3	3	Attained	-
VI	150613 DE-1	Mobile Computing	Dr. Anjali Mishra	CO1 To explain the basic concepts of mobile telecommunications system.	79.12	70.12	74.6	74.61	3	3	Attained	-
				CO2 To demonstrate the infrastructure to develop mobile communications system.	71.52	67.12	69.84	69.13	3	2.5	Attained	-
				CO3 To classify the different generations and technology for mobile communications.	68.24	61.02	77.77	69.99	3	2.5	Attained	-
				CO4 To examine the working of different protocols of wireless mobile communication technology.	85.47	64.12	88.88	80.43	3	2.5	Attained	-
				CO5 To determine the importance of each technology suitable for different situation of mobile and wireless communications.	80.12	63.12	73.03	72.18	3	2.5	Attained	-
				CO6 To develop protocols for ad-hoc and infrastructure based wireless networks.	66.23	60.20	73.01	66.30	2.5	2.5	Attained	-

Attainment Levels	Excellent (A)	Vary Good (B)	Good (C)
	70%	60%	50%

Overall Indirect CO Attainment (%age) = 30% of CO Attainment using 1 Min. Paper writing + 30% of CO attainment using course end sem seminar + 40% of CO attainment using feedback from MOODLE