

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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

Department of CSE/IT

Summary of Board of studies Meeting Held on 23 November, 2019

DETAILS OF PROGRAMMES/COURSES WHERE SYLLABUS REVISION WAS CARRIED OUT

| Course Name | Course Code | Year/Date of Introduction | Year/Date of Revision | Percentage of content added or replaced | Item No. | Page No. |
|---|--|---------------------------|-----------------------|---|--------------|----------|
| DE-2 (Through SWAYAM/NPTEL) and OC-1 implementation of this provision in scheme | DE-2 (16065X/15065X) OC-1 (900XXX) | 2017 | 23/11/2019 | 4.87% | ITEM 2 and 3 | 2 |

(Meeting Dated – 23rd November, 2019)

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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Details of New Course added/Courses with direct bearing on Employability/ Entrepreneurship/ Skill development

| Courses Name | Course Code | Activities/Content which have a bearing on increasing skill and employability | Item No. | Page No. |
|----------------------------------|---------------|--|----------|----------|
| Network & Web Security | 160611/150611 | This course will give an understanding of the principles of systems security from application viewpoint. Student will obtain hands-on experience on security threats and counter-measures. Goal is to study various types of threats, operating systems security, advanced topics on network security, web security and usable security. After the completion of the course, the student will have understanding of practical aspects of security and will be able to analyze and design the secure systems. | ITEM 1 | 01 |
| Image Processing | 160612/150612 | The intent of this course is to familiarize the students to explain the fundamental concepts/issues of Computer Vision and Image Processing, and major approaches that address them. This course provides an introduction to computer vision including image acquisition and image formation models, radiometric models of image formation, image formation in the camera, image processing concepts, concept of feature extraction and selection for pattern classification/recognition, and advanced concepts like motion estimation and tracking, image classification, scene understanding, object classification and tracking, image fusion, and image registration, etc. | ITEM 1 | 01 |
| Agile Methodology | 160613 | Agile approach to software development, Business value of adopting agile approaches, Agile development practices. | ITEM 1 | 01 |
| Data Analytics with Python | 160651/150651 | Mathematical foundations required for Data Science, Model Development and Assessment. | ITEM 2 | 02 |
| Introduction to Machine Learning | 160652/150652 | This course introduces some of the basic concepts of machine learning from a mathematically well motivated perspective. It will cover the different learning paradigms and some of the more popular algorithms and architectures used in each of these paradigms. | ITEM 2 | 02 |
| Data Structures | 900106 | The course will cover approaches for efficient storage mechanisms of data for easy access, design and implementation of various basic and advanced data structures. | ITEM 3 | 02 |

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|----------------------|---------------|---|--------|----|
| Python Programming | 900107 | This course is designed for use by freshmen students taking their first course in programming. It deals with the techniques needed to practice computational thinking, the art of using computers to solve problems and the ways the computers can be used to solve problems. | ITEM 3 | 02 |
| Software Engineering | 900108 | This course targets to expose the students to the challenges of large scale software development and would expose the students as to how to overcome those. Starting with basic life cycle model concepts, it would discuss requirements specification, design, and testing issues. | ITEM 3 | 02 |
| Mobile Computing | 150653 | This course will cover integration of mobile applications with cloud services to create mobile- cloud applications. | ITEM 2 | 02 |
| Cloud Computing | 160563/150653 | Clouds, Virtualization and Virtual Machine, Consensus, Paxos and Recovery in Clouds, Cloud Storage, P2P Systems and their use in Industry Systems. | ITEM 2 | 02 |

(Meeting Dated – 23rd November, 2019)

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**BOARD OF STUDIES (BoS) PROCEEDING
IN
COMPUTER SCIENCE & ENGINEERING
AND
INFORMATION TECHNOLOGY
(Meeting Dated – 23rd November, 2019)**

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| 3. | Flexible Scheme Structure of B.Tech IT (I to VI Semester) for Batch Admitted in Academic Session 2017-18 |
| 4. | Flexible Scheme Structure of B.Tech CSE (I to IV Semester) for Batch Admitted in Academic Session 2018-19 |
| 5. | Flexible Scheme Structure of B.Tech IT (I to IV Semester) for Batch Admitted in Academic Session 2018-19 |
| 6. | Syllabi of all Courses of B.Tech CSE & IT from I to VI Semester |

Madhav Institute of Technology & Science, Gwalior-474 005

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

Department of CSE & IT

Minutes of Meeting of Board of Studies (BoS) in Computer Science & Engineering and Information Technology

Date: 23/11/2019

The Meeting of Board of Studies (BoS) in Computer Science & Engineering and Information Technology was held on 23rd November, 2019 in the department of CSE & IT, 11:30 A.M. onwards. During the meeting following were present.

| | | |
|-----|--|--|
| 1. | Dr. Akhilesh Tiwari, Professor & Head | Chairman |
| 2. | Dr. A. K. Solanki, Professor (Computer Science & Engineering), B.I.E.T. Jhansi (U.P.) | External Member (Academics) <i>(Nominee of Hon'ble Vice Chancellor RGPV Bhopal)</i> |
| 3. | Dr. Nanhay Singh, Professor & Head, Department of Computer Science & Engineering, Ambedkar Institute of Advanced Communication Technologies & Research (AIACTR), Delhi | External Member (Academics) <i>(Nominee of Academic Council (AC), MITS Gwalior)</i> |
| 4. | Dr. Virendra Prasad Vishwakarma, Professor, University School of Information and Communication Technology (USICT), Guru Gobind Singh Indraprastha University (GGSIPU), Delhi | External Member (Academics) <i>(Nominee of Academic Council (AC), MITS Gwalior)</i> |
| 5. | Dr. Kapil Sharma, Professor & Head, Department of Information Technology, Delhi Technological University (DTU), Delhi | External Member (Academics) <i>(Nominated by DTU Delhi under twinning arrangement of TEQIP-III)</i> |
| 6. | Dr. Dinesh Kumar Vishwakarma, Associate Professor, Department of Information Technology, Delhi Technological University (DTU), Delhi | External Member (Academics) <i>(Nominated by DTU Delhi under twinning arrangement of TEQIP-III)</i> |
| 7. | Dr. R. K. Gupta, Professor | Member |
| 8. | Dr. Manish Dixit, Professor | Member |
| 9. | Ms. Khushboo Agarwal, Assistant Professor | Member |
| 10. | Dr. Sanjiv Sharma, Assistant Professor | Member |
| 11. | Mr. Abhilash Sonkar, Assistant Professor | Member |
| 12. | Mr. Jamvant Singh Kumare, Assistant Professor | Member |
| 13. | Ms. Neha Bhardwaj, Assistant Professor | Member |
| 14. | Mr. Mahesh Parmar, Assistant Professor | Member |
| 15. | Mr. R. R. Singh Makwana, Assistant Professor | Member |
| 16. | Mr. Amit Kumar Manjhvar, Assistant Professor | Member |

In addition to above, faculty members engaged under TEQIP-III Project and contractual faculty were also present.

Minutes of Meeting of Board of Studies (BoS) in CSE & IT held on 23 Nov. 2019

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23/11/2019

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The following external and internal members (regular faculty) could not attend the meeting. However, some of the external members have given their suggestions in electronic mode.

| | | |
|----|---|----------------------------|
| 1. | Mr. Amitabh Shrivastava, Senior Consultant, TCS Noida | External Member (Industry) |
| 2. | Dr. Nisha Chaurasia, Assistant Professor (Senior Grade), Department of CSE & IT, Jaypee Institute of Information Technology (JIIT), Noida | External Member (Alumnus) |
| 3. | Mr. Punit Kumar Johari, Assistant Professor | Member |
| 4. | Mr. Vikas Sejwar, Assistant Professor | Member |
| 5. | Ms. Jaimala Jha, Assistant Professor | Member |
| 6. | Mr. Rajeev Kumar Singh, Assistant Professor | Member |
| 7. | Dr. R. S. Jadon, Professor (Computer Application) | Member |
| 8. | Dr. Anshu Chaturvedi, Professor (Computer Application) | Member |
| 9. | Mrs. Parul Saxena, Assistant Professor (Computer Application) | Member |

The following students were present during the meeting:

| S. No. | Name of Student | Class |
|--------|---------------------|----------------------|
| 1 | Ms. Ayushi Agrawal | B. Tech CSE III year |
| 2 | Ms. Sakshi Patel | B. Tech CSE III year |
| 3 | Ms. Bhoomika Jain | B. Tech CSE III year |
| 4 | Ms. Somya Prajapati | B. Tech CSE III year |
| 5 | Mr. Rohit Kushwah | B. Tech CSE III year |
| 6 | Mr. Trishal Arora | B. Tech CSE III year |
| 7 | Ms. Rachna Patil | B. Tech IT III year |
| 8 | Ms. Shikha Mourya | B. Tech IT III year |

The following deliberations took place in the meeting:

The minutes of previous BoS meeting held on 9th April, 2019 were confirmed, followed by item-wise discussion (as per the agenda of present BoS meeting), as follows

| | | | |
|---|---|---|---|
| <p>ITEM CSEIT-1:</p> | <p>To review and finalize the list and syllabi for all Departmental Elective (DE) Courses of VI Semester under the flexible curriculum along with their COs</p> <p>The courses to be offered under Departmental Elective (DE) category (in offline mode) for B.Tech VI Semester CSE & IT discipline (under flexible curriculum) were discussed and finalized, as per the following detail</p> <table border="1" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <p><u>DE-1 (B.Tech CSE):</u></p> <ul style="list-style-type: none"> • Network & Web Security • Cloud Computing • Mobile Computing </td> <td style="width: 50%; vertical-align: top;"> <p><u>DE-1 (B.Tech IT):</u></p> <ul style="list-style-type: none"> • Network & Web Security • Cloud Computing • Agile Methodology </td> </tr> </table> <p><i>It is further discussed that the above mentioned list of courses may be expanded (if required) to accommodate the industrial demand and latest technological</i></p> | <p><u>DE-1 (B.Tech CSE):</u></p> <ul style="list-style-type: none"> • Network & Web Security • Cloud Computing • Mobile Computing | <p><u>DE-1 (B.Tech IT):</u></p> <ul style="list-style-type: none"> • Network & Web Security • Cloud Computing • Agile Methodology |
| <p><u>DE-1 (B.Tech CSE):</u></p> <ul style="list-style-type: none"> • Network & Web Security • Cloud Computing • Mobile Computing | <p><u>DE-1 (B.Tech IT):</u></p> <ul style="list-style-type: none"> • Network & Web Security • Cloud Computing • Agile Methodology | | |

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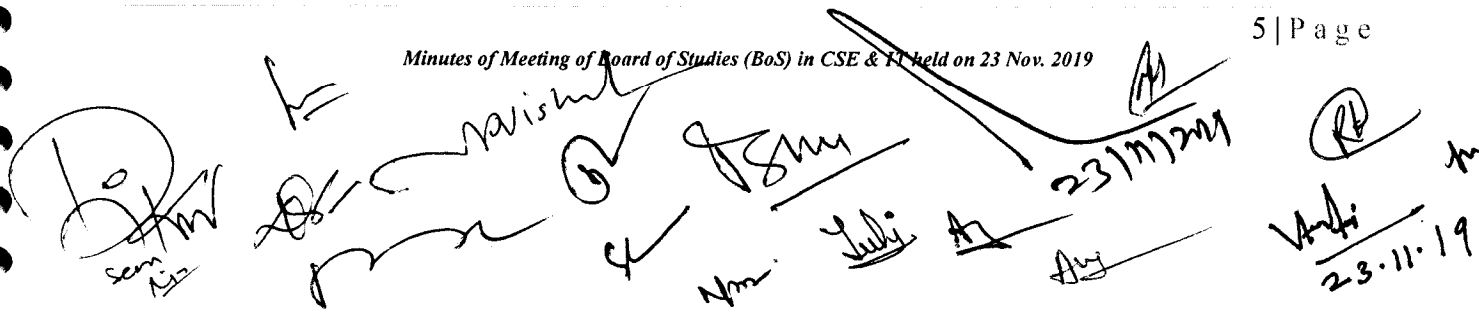
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| | <p><i>advancements.</i></p> <p>The syllabi of Courses along with their Course Outcomes (COs) is Annexed as Annexure-I</p> |
| ITEM CSEIT-2: | <p>To review and finalize the list of Courses from SWAYAM/NPTEL/MOOC Platform to be offered in online mode under DE category for credit transfer in the VI Semester</p> <p>The list of Departmental Elective (DE) courses to be offered from SWAYAM/NPTEL/MOOC based learning platform (in online mode) for B.Tech VI Semester CSE & IT discipline (under flexible curriculum) were discussed and finalized, as per the following detail</p> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <p>DE-2 (B.Tech CSE / IT):</p> <ul style="list-style-type: none"> • Data Analytics with Python • Introduction to Machine Learning • Deep Learning </div> <p><i>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 must be included (as per the need and recent developments).</i></p> |
| ITEM CSEIT-3: | <p>To review and finalize the Courses & Syllabi to be offered under Open Category (OC) Courses for VI semester students of other departments along with their COs</p> <p>The courses to be offered under Open Category (OC) Courses for B.Tech VI Semester (for the students of other departments) were discussed and finalized as per the following detail</p> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> <p>OC-1:</p> <ul style="list-style-type: none"> • Python Programming • Data Structures • Software Engineering </div> <p><i>Further, considering the fact that the Open Category (OC) courses are meant only for the students of other departments, it is discussed and recommended that the above courses may be changed / expanded (as per the need and demand from other departments).</i></p> <p>The detailed syllabi (along with their COs) is Annexed as Annexure-II</p> |
| ITEM CSEIT-4: | <p>To propose the list of "Additional Courses" which can be opted for getting an (i) Honours (ii) Minor Specialization <i>[These will be completed through SWAYAM/NPTEL/MOOC based Platforms during VI semester]</i></p> <p>The courses available on SWAYAM/NPTEL/MOOC based learning platforms for Honours and Minor Specialization were discussed and identified. The same has been listed, as mentioned below</p> |

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| | adopted by the department. |
| ITEM CSEIT-7: | <p>To prepare and recommend the Experiment list/ Lab manual for Laboratory Courses to be offered in VII semester</p> <p>The experiment list and lab manual for the Laboratory Course (Internet of Things) (DLC-6) were discussed and finalized. The same is Annexed as Annexure-IV</p> |
| ITEM CSEIT-8: | <p>To review the 'Question Paper Analysis' (of mid/end semester examination) conducted for Jan-June 2019 Session [On the basis of COs and other parameters separately]</p> <p>The summarized detail of 'Question Paper Analysis' was presented and discussed in the house. This was based on COs and other parameters. The summary of analysis is Annexed as Annexure-V</p> |
| ITEM CSEIT-9: | <p>To identify gaps in CO attainment levels for Jan-June 2019 semester and propose corrective measures for improvement.</p> <p>The attainment level of Course Outcomes (COs) for all the courses pertaining to Jan - June 2019 semester has been discussed. The same is enclosed as Annexure-VI. Further, it is discussed that the courses (if any) where the set target value has not been attained; there should be the critical analysis of difficulty level and other causes. The analysis must be followed by corrective measures, such as arrangement of extra / remedial classes, proper coverage & assignment of COs in Question Paper and interaction of course faculty members with the students for improvement.</p> |
| ITEM CSEIT-10: | <p>To propose and recommend the panel of examiners (UG & PG Level) for conducting practical examinations.</p> <p>The panel of examiner(s) for UG & PG programmes of CSE & IT / Computer Application discipline were discussed and finalized. The same is enclosed as Annexure - VII.</p> |
| ITEM CSEIT-11: | <p>To finalize the 'Collaborative Course' to be offered in VI semester (under DE Category) which is to be run jointly with industry person</p> <p><u>Industry Collaborative Course</u></p> <p>The Board has been informed about the recommendation made in the previous BoS meeting held on 9th April, 2019 and subsequent approval of the same in the meeting of Academic Council (AC) held on 1st June 2019, regarding industry collaborative courses under Departmental Elective (DE) category for B.Tech VI Semester (CSE & IT). The same is detailed below</p> |



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| S.No. | Course Name | Programme |
|-------|------------------------|---|
| 1. | Network & Web Security | B.Tech (Computer Science & Engineering) |
| 2. | Agile Methodology | B.Tech (Information Technology) |

In these courses, content coverage of at least one credit is to be covered by industry person. It was also discussed that other courses from the pool of Departmental Elective (DE) courses may be inducted in the list of collaborative courses (if demanded by the students) and resource person from industry is available.

ITEM CSEIT-12: Curricula feedback from various stakeholders, its analysis and impact

The summarized report of curricula feedback from students and faculty members (for the Jan.-June 2019 semester) was presented and discussed. This was based on various considered parameters. The house appreciated the same and realized that this will be useful for further improvement of curriculum. The same is enclosed as Annexure - VIII.

ITEM CSEIT-13: Other matters:
To apprise and discuss about the implementation mechanism of Departmental Elective (DE) and Open Category (OC) Courses for B.Tech VI Semester (CSE / IT)

As per the flexible curriculum / scheme, there will be

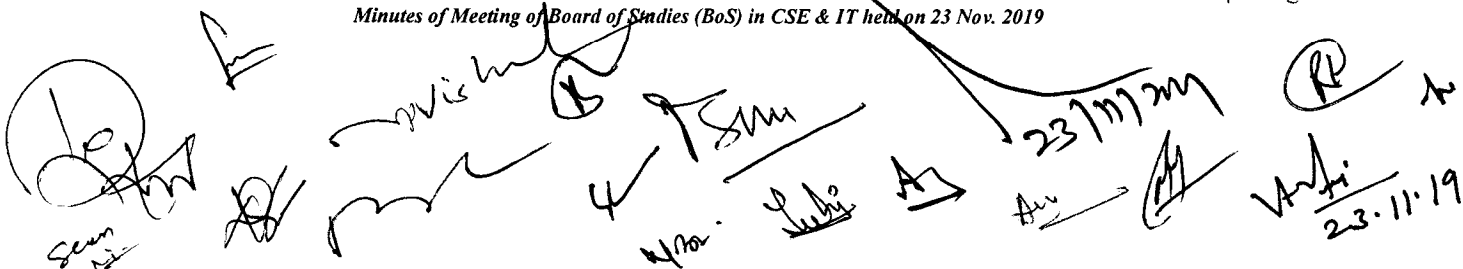
- **Two** Departmental Elective (DE) courses offered by the Parent Department
- **One** Open Category (OC) course (from the pool offered by other Departments)

Guidelines for Departmental Elective (DE) Courses

During the VI Semester, two Departmental Elective (DE) courses will be offered

- DE-1 (Offline Mode)
- DE-2 (Online Mode i.e. through SWAYAM/NPTEL approved by the BoS / department)

- Under DE-1, there will be multiple choices. Out of these, students have to opt any one and the allotment will be based on First Come First Serve (FCFS) basis
- The registration process will be done in Online mode (Registration link will be provided on the website/departmental webpage)
- Any DE course will only be run, if there is a registration of about 30% students of sanctioned intake of class (minimum requirement).The batch size



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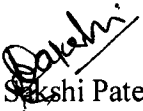

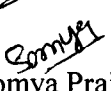



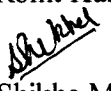
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| | <p>is limited to 60% of the sanctioned class intake</p> <p>The course choices under DE-2 , will be displayed by the department</p> <p><u>Guidelines for Open Category (OC) Courses</u></p> <ul style="list-style-type: none"> ➤ Students of B.Tech VI Semester CSE & IT have to opt one Open Category (OC) course from the pool of courses offered by other departments ➤ The list of OC courses will be made public on the institute website for online registration ➤ Any of the Open Category (OC) course will only be run, when the minimum 5% students of sanctioned batch size (at institute level) will register and the maximum batch size is limited to 10% of the total batch size (at institute level) ➤ The allotment will be based on <u>First Come First Serve (FCFS) basis</u> |
|--|--|

Suggestions by Members:

- There should be some upper and lower limit of students in Minor Specialization.
- It is desired to have one research publication by the final year students (in Internship/Project).
- Multi-Core Computer Architecture-Storage and Interconnects should be replaced by High Performance Computing in the list of Additional Courses for Honours offered in VI semester.
- List of Additional Courses for Honours must be first taken from the students as a choice from permitted MOOC based learning platforms and then be finalized by the department.
- Malware Analysis should be added in the Departmental Elective (DE) course offered in VII semester.
- In Question Paper Analysis, it was suggested to remove low order thinking parameter and add “design based problem/analytical” parameters.
- It was suggested that there should be the flexibility for consideration of $\pm 5\%$ students in the decided limit for Open Category (OC) course. This will be decided by the department.
- Deep Learning should be replaced by Image Processing in the Departmental Elective (DE) course offered in VI semester.

The meeting ended with vote of thanks to the Chair


Student Representatives

- | | | |
|--|--|--|
|  (Ms. Ayush Agrawal) |  (Ms. Sakshi Patel) |  (Ms. Bhoomika Jain) |
|  (Ms. Somya Prajapati) |  (Mr. Rohit Kushwah) |  (Mr. Trishal Arora) |
|  (Ms. Rachna Patil) |  (Ms. Shikha Mourya) | |

Computer Application discipline

- | | | |
|--|--|--------------------------------------|
| <i>on leave</i> (Mrs. Parul Saxena) | <i>on duty leave</i> (Dr. Anshu Chaturvedi) | <i>on leave</i> (Dr. R. S. Jadon) |
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23/11/2019


23-11-19

Nm.

CSE & IT discipline

(Ms. Richa Mishra) (Ms. Poonam Sharma) (Ms. Akanchha Tiwari) (Mr. Chayan Agrawal)

(Dr. Bodhi Chakraborty) (Ms. Soumya Bajpai) (Mr. Ram Parvesh Das) (Ms. Juhi Pruthi)

(Mr. Lav Upadhyay) (Ms. Shweta Patel) (Ms. Aishwarya) (Ms. Pooja Agarwal)

(Mr. Arun Kumar) (Mr. Santosh Shau) (Mr. Ratibhan) (Ms. Julie Kumari)

(Ms. Sneha Garg) (Mr. Mir Shahnawaz Ahmad) (Mr. Mohit Jain) (Mr. Sheo Kumar)

(Ms. Namrata Agarwal) (Mr. Dheeraj Gurjar)

(Ms. Hemlata Arya) (Ms. Kirti Gaur) (Mr. Vishwas Srivastava) (Mr. Abhishek Dixit)

(Mr. Amit Manjhar) (Mr. R. R. Singh Makwana) (Mr. Mahesh Parmar)

(Ms. Neha Bhardwaj) (Mr. Rajeev Kumar Singh) (Mr. Jamvant Singh Kumare)


(Ms. Jaimala Jha) (Mr. Abhilash Sonkar) (Mr. Vikas Sejwar)

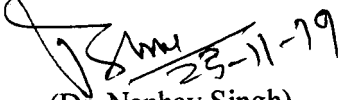
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(Dr. Manish Dixit) (Dr. R. K. Gupta)

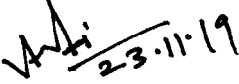
(Dr. Dinesh Kumar Vishwakarma)
Associate Professor, Department of IT
Delhi Technological University (DTU), Delhi
[External Member]

(Dr. Virendra Prasad Vishwakarma)
Professor, USICT,
GGSIU, Delhi
[External Member]

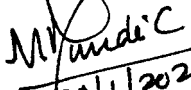

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(Dr. Kapil Sharma)
Professor & Head,
Department of IT,
DTU, Delhi
[External Member]


23-11-19
(Dr. Nanhay Singh)
Professor & Head,
Department of CSE
AIACTR, Delhi
[External Member]


23/11/2019
(Dr. A. K. Solanki)
Professor (CSE),
B.I.E.T. Jhansi
[External Member]


23.11.19
(Dr. Akhilesh Tiwari)
Professor & Head
[Chairman, BoS]

*Suggestions have been
noted.*


20/11/2020.
DEAN (ACADEMICS)
M.I.T.S
GWALIOR

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

Computer Science and Engineering

/For batch admitted in Academic Session 2017-18

Semester-Wise Scheme & Guidelines for Flexible Curriculum

Abbreviations used

| | |
|-------------|--|
| L | Lecture |
| T | Tutorial |
| P | Practical |
| HSMC | Humanities and Social Sciences including Management Courses |
| BSC | Basic Science Courses |
| ESC | Engineering Science Courses |
| DC | Departmental Core |
| DE | Departmental Elective |
| OC | Open Category |
| DLC | Departmental Laboratory Courses |
| MC | Mandatory Course |
| MOOC | Massive Open Online Courses |

Definition of Credit:

| | |
|------------------------------------|-----------------|
| 1 Hr. Lecture (L) per week | 1 credit |
| 1 Hr. Tutorial (T) per week | 1 credit |
| 2 Hours Practical(Lab)/week | 1 credit |

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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

Scheme of Examination

B.Tech. GROUP A: I Semester & GROUP B: II Semester *for batch admitted in Academic Session 2017-18*

| S. No. | Subject Code | Category | Subject Name | Maximum Marks Allotted | | | | | Total Marks | Contact Hours per week | | | Total Credits |
|---|--------------|----------|---|------------------------|---------------|------------------|----------------|----------------------|-------------|------------------------|----------|-----------|---------------|
| | | | | Theory Slot | | | Practical Slot | | | L | T | P | |
| | | | | End Sem. | Mid Sem Exam. | Quiz/ Assignment | End Sem. | Lab work & Sessional | | | | | |
| 1. | 100201 | BSC | Engineering Physics (BSC-1) | 70 | 20 | 10 | 30 | 20 | 150 | 4 | 1 | 2 | 6 |
| 2. | 100202 | HSMC | Energy, Environment, Ecology & Society (HSMC-1) | 70 | 20 | 10 | - | - | 100 | 4 | 1 | - | 5 |
| 3. | 100203 | ESC | Basic Computer Engineering (ESC-1) | 70 | 20 | 10 | 30 | 20 | 150 | 4 | 1 | 2 | 6 |
| 4. | 100204 | ESC | Basic Mechanical Engineering (ESC-2) | 70 | 20 | 10 | 30 | 20 | 150 | 4 | 1 | 2 | 6 |
| 5. | 100205 | ESC | Basic Civil Engineering & Mechanics (ESC-3) | 70 | 20 | 10 | 30 | 20 | 150 | 4 | 1 | 2 | 6 |
| 6. | 100206 | HSMC | Language Lab. & Seminars (HSMC-2) | - | - | - | 30 | 20 | 50 | - | | 2 | 1 |
| Total | | | | 350 | 100 | 50 | 150 | 100 | 750 | 20 | 5 | 10 | 30 |
| Induction Programme of first three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations | | | | | | | | | | | | | |

GROUP A: (Electrical, Electronics, **Computer Science & Engineering**, Information Technology, Electronics & Telecommunication)

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

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

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

Scheme of Examination

B.Tech. GROUP A: II Semester & GROUP B: I Semester *for batch admitted in Academic Session 2017-18*

| S. No. | Subject Code | Category | Subject Name | Maximum Marks Allotted | | | | | Total Marks | Contact Hours per week | | | Total Credits |
|--|--------------|----------|--|------------------------|------------|------------------|----------------|----------------------|-------------|------------------------|----------|-----------|---------------|
| | | | | Theory Slot | | | Practical Slot | | | L | T | P | |
| | | | | End Sem. | Mid Sem. | Quiz/ Assignment | End Sem. | Lab work & Sessional | | | | | |
| 1. | 100101 | BSC | Engineering Chemistry (BSC-2) | 70 | 20 | 10 | 30 | 20 | 150 | 4 | 1 | 2 | 6 |
| 2. | 100102 | BSC | Engineering Mathematics-I (BSC-3) | 70 | 20 | 10 | - | - | 100 | 4 | 1 | - | 5 |
| 3. | 100103 | HSMC | Technical English (HSMC-3) | 70 | 20 | 10 | 30 | 20 | 150 | 4 | 1 | 2 | 6 |
| 4. | 100104 | ESC | Basic Electrical & Electronics Engineering (ESC-4) | 70 | 20 | 10 | 30 | 20 | 150 | 4 | 1 | 2 | 6 |
| 5. | 100105 | ESC | Engineering Graphics (ESC-5) | 70 | 20 | 10 | 30 | 20 | 150 | 4 | 1 | 2 | 6 |
| 6. | 100106 | ESC | Manufacturing Practices (ESC-6) | - | - | - | 30 | 20 | 50 | - | - | 2 | 1 |
| Total | | | | 350 | 100 | 50 | 150 | 100 | 750 | 20 | 5 | 10 | 30 |
| Summer Internship Project –I (Institute Level) (Qualifier): Minimum two-week duration | | | | | | | | | | | | | |

GROUP A: (Electrical, Electronics, **Computer Science & Engineering**, Information Technology, Electronics & Telecommunication)

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

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

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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Scheme of Examination

B.Tech. III Semester (Computer Science & Engineering) *for batch admitted in Academic Session 2017-18*

| S. No. | Subject Code | Category | Subject Name | Maximum Marks Allotted | | | | | Total Marks | Contact Hours per week | | | Total Credits |
|--------------|---------------------|------------------------|---|------------------------|----------------|------------------|----------------|-----------------------------------|-------------|------------------------|----------|-----------|---------------|
| | | | | Theory Slot | | | Practical Slot | | | L | T | P | |
| | | | | End Sem. | Mid Sem. Exam. | Quiz/ Assignment | End Sem | Term work Lab Work & Sessional | | | | | |
| 1. | 100001 | BSC | Mathematics-II (BSC-4) | 70 | 20 | 10 | - | - | 100 | 3 | 1 | - | 4 |
| 2. | 150301 | DC | Digital Electronics (DC-1) | 70 | 20 | 10 | - | - | 100 | 3 | 1 | - | 4 |
| 3. | 150302 | DC | Data Structures (DC-2) | 70 | 20 | 10 | 30 | 20 | 150 | 3 | - | 2 | 4 |
| 4. | 150303 | DC | Computer Graphics (DC-3) | 70 | 20 | 10 | 30 | 20 | 150 | 3 | - | 2 | 4 |
| 5. | 150304 | DC | Object Oriented Programming & Methodology (DC-4) | 70 | 20 | 10 | 30 | 20 | 150 | 3 | - | 2 | 4 |
| 6. | 150305 | DLC | Hardware Lab* (DLC-1) | - | - | - | 30 | 20 | 50 | - | - | 2 | 1 |
| 7. | 150306 | SEMINAR/ SELF STUDY | Self-learning/Presentation (SWAYAM/NPTEL/ MOOC)# | - | - | - | - | 25 | 25 | - | - | 2 | 1 |
| 8. | 150307 | DLC | Summer Internship Project –I (Institute Level) (Evaluation) | - | - | - | 25 | - | 25 | - | - | 4 | 2 |
| Total | | | | 350 | 100 | 50 | 145 | 105 | 750 | 15 | 2 | 14 | 24 |
| 9. | 100002 ^s | MC | Biology for Engineers (Audit Course) (MC) | 70 | 20 | 10 | - | - | 100 | 3 | - | - | - |
| NSS/NCC | | | | Qualifier | | | | | | | | | |

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

^s Course will run for Group A/B in III/IV semester respectively (Passing is optional, however a separate mark sheet will be issued to those who qualify)

*Virtual Lab to be conducted along with the traditional lab

GROUP A: (Electrical, Electronics, **Computer Science & Engineering**, Information Technology, Electronics & Telecommunication)

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

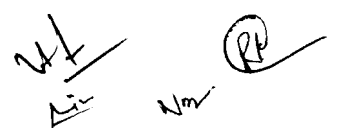


Scheme of Examination

B.Tech. IV Semester (Computer Science & Engineering) for batch admitted in Academic Session 2017-18

| S. No. | Subject Code | Category | Subject Name | Maximum Marks Allotted | | | | | Total Marks | Contact Hours per week | | | Total Credits |
|---|--------------|----------|--|------------------------|----------------|------------------|----------------|----------------------|-------------|------------------------|----------|----------|---------------|
| | | | | Theory Slot | | | Practical Slot | | | L | T | P | |
| | | | | End Sem. | Mid Sem. Exam. | Quiz/ Assignment | End Sem. | Term work | | | | | |
| | | | | | | | | Lab Work & Sessional | | | | | |
| 1. | 100003 | BSC | Mathematics- III (BSC-5) | 70 | 20 | 10 | - | - | 100 | 2 | 2 | - | 4 |
| 2. | 150401 | DC | Design & Analysis of Algorithms (DC-5) | 70 | 20 | 10 | 30 | 20 | 150 | 2 | 1 | 2 | 4 |
| 3. | 150402 | DC | Database Management System (DC-6) | 70 | 20 | 10 | 30 | 20 | 150 | 2 | 1 | 2 | 4 |
| 4. | 150403 | DC | Operating System (DC-7) | 70 | 20 | 10 | - | - | 100 | 3 | 1 | - | 4 |
| 5. | 150404 | DC | Computer System Organization (DC-8) | 70 | 20 | 10 | - | - | 100 | 3 | 1 | - | 4 |
| 6. | 100004 | MC | Cyber Security (MC) | 70 | 20 | 10 | - | - | 100 | 2 | 1 | - | 3 |
| 7. | 150405 | DLC | Programming Lab* (DLC-2) | - | - | - | 30 | 20 | 50 | - | - | 4 | 2 |
| Total | | | | 420 | 120 | 60 | 90 | 60 | 750 | 14 | 7 | 8 | 25 |
| NSS/NCC | | | | Qualifier | | | | | | | | | |
| Summer Internship Project-II (SoftSkills Based) for two weeks duration: Evaluation in V Semester | | | | | | | | | | | | | |

*Virtual Lab to be conducted along with the traditional lab



MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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Scheme of Examination

B.Tech. V Semester (Computer Science & Engineering) for batch admitted in Academic Session 2017-18

| S. No. | Subject Code | Category | Subject Name | Maximum Marks Allotted | | | | | Total Marks | Contact Hours per week | | | Total Credits |
|---|---------------------|------------------------|--|------------------------|---------------|------------------|----------------|----------------------|-------------|------------------------|----------|-----------|---------------|
| | | | | Theory Slot | | | Practical Slot | | | L | T | P | |
| | | | | End Sem. | Mid Sem Exam. | Quiz/ Assignment | End Sem. | Lab work & Sessional | | | | | |
| 1. | 100005* | HSMC | Ethics, Economics, Entrepreneurship & Management (HSMC- 4) | 70 | 20 | 10 | - | - | 100 | 2 | - | - | 2 |
| 2. | 150501 | BSC | Discrete Structures (BSC – 6) | 70 | 20 | 10 | - | - | 100 | 2 | 1 | - | 3 |
| 3. | 150502 | DC | Software Engineering (DC-09) | 70 | 20 | 10 | 30 | 20 | 150 | 2 | - | 2 | 3 |
| 4. | 150503 | DC | Theory of Computation (DC-10) | 70 | 20 | 10 | 30 | 20 | 150 | 2 | - | 2 | 3 |
| 5. | 150504 | DC | Microprocessor & Interfacing (DC-11) | 70 | 20 | 10 | 30 | 20 | 150 | 2 | - | 2 | 3 |
| 6. | 150505 | DLC | Minor Project-I** (DLC-3) | - | - | - | 30 | 20 | 50 | - | - | 2 | 1 |
| 7. | 150506 | DLC | Summer Internship Project-II (Evaluation) (DLC-4) | - | - | - | 25 | - | 25 | - | - | 4 | 2 |
| 8. | 150507 | SEMINAR/ SELF STUDY | Self-learning/Presentation (SWAYAM/NPTEL/ MOOC)* | - | - | - | - | 25 | 25 | - | - | 2 | 1 |
| Total | | | | 350 | 100 | 50 | 145 | 105 | 750 | 10 | 1 | 14 | 18 |
| 9. | 100006 ^s | MC | Indian Constitution & Traditional Knowledge (Audit Course) (MC) | 70 | 20 | 10 | - | - | 100 | 3 | - | - | - |
| Department level activity/workshop/awareness Programme to be conducted; certificate of compliance to be submitted by HoD to the Exam Controller through Dean Academics | | | | | | | | | | | | | |
| Additional Courses for obtaining Honours or minor Specialization by desirous students | | | Permitted to opt for <u>maximum two additional courses</u> for the award of Honours or Minor specialization | | | | | | | | | | |

* Group A/B programmes will offer this course in V/VI Semester respectively.

^s Group A/B programmes will offer this course in V/VI Semester respectively. (Passing is optional, however a separate mark sheet will be issued to those who qualify)

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

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

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

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

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)



MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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Scheme of Examination

B.Tech. VI Semester (Computer Science & Engineering) *for batch admitted in Academic Session 2017-18*

| S. No. | Subject Code | Category | Subject Name | Maximum Marks Allotted | | | | | Total Marks | Contact Hours per week | | | Total Credits |
|--------------|--------------|----------|-------------------------------|------------------------|---------------|------------------|----------------|----------------------|-------------|------------------------|----------|----------|---------------|
| | | | | Theory Slot | | | Practical Slot | | | L | T | P | |
| | | | | End Sem. | Mid Sem Exam. | Quiz/ Assignment | End Sem. | Lab work & Sessional | | | | | |
| 1. | 150601 | DC | Compiler Design (DC-12) | 70 | 20 | 10 | 30 | 20 | 150 | 2 | - | 2 | 3 |
| 2. | 150602 | DC | Computer Networks (DC-13) | 70 | 20 | 10 | - | - | 100 | 2 | 1 | - | 3 |
| 3. | DE | DE | Departmental Elective (DE-1) | 70 | 20 | 10 | - | - | 100 | 2 | - | - | 2 |
| 4. | DE | DE | Departmental Elective* (DE-2) | 70 | 20 | 10 | - | - | 100 | 2 | - | - | 2 |
| 5. | OC | OC | Open Category (OC-1) | 70 | 20 | 10 | - | - | 100 | 2 | - | - | 2 |
| 6. | 100007 | MC | Disaster Management (MC) | 70 | 20 | 10 | - | - | 100 | 2 | - | - | 2 |
| 7. (X) | 150606 | DLC | Minor Project-II (DLC-5) | - | - | - | 50 | 50 | 100 | - | - | 4 | 2 |
| Total | | | | 420 | 120 | 60 | 80 | 70 | 750 | 12 | 1 | 6 | 16 |

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

Additional Courses for obtaining Honours or minor Specialization by desirous students

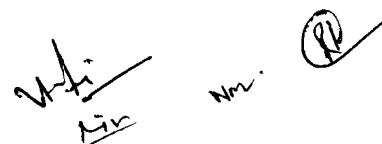
Permitted to opt for maximum two additional courses for the award of Honours or Minor specialization


| DE -1 (Through Traditional Mode) | | |
|----------------------------------|--------------|------------------------|
| S. No. | Subject Code | Subject Name |
| 1. | 150611 | Network & Web Security |
| 2. | 150612 | Image Processing |
| 3. | 150613 | Mobile Computing |

| DE -2* | | |
|--------|--------------|----------------------------------|
| S. No. | Subject Code | Subject Name |
| 1. | 150651 | Data Analytics with Python |
| 2. | 150652 | Introduction to Machine Learning |
| 3. | 150653 | Cloud Computing |

| OC-1 | | |
|--------|--------------|----------------------|
| S. No. | Subject Code | Subject Name |
| 1. | 900106 | Data Structures |
| 2. | 900107 | Python Programming |
| 3. | 900108 | Software Engineering |

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




 15/1/2020
 DEAN (ACADEMICS)
 MITS
 GWALIOR

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Information Technology

[For batch admitted in Academic Session 2017-18]

Semester-Wise Scheme & Guidelines for Flexible Curriculum

Abbreviations used

| | |
|------|---|
| L | Lecture |
| T | Tutorial |
| P | Practical |
| HSMC | Humanities and Social Sciences including Management Courses |
| BSC | Basic Science Courses |
| ESC | Engineering Science Courses |
| DC | Departmental Core |
| DE | Departmental Elective |
| OC | Open Category |
| DLC | Departmental Laboratory Courses |
| MC | Mandatory Course |
| MOOC | Massive Open Online Courses |

Definition of Credit:

| | |
|-----------------------------|----------|
| 1 Hr. Lecture (L) per week | 1 credit |
| 1 Hr. Tutorial (T) per week | 1 credit |
| 2 Hours Practical(Lab)/week | 1 credit |

Handwritten signatures and initials:
A. S. / A. S. / M. M. / (P) / S. S.

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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Scheme of Examination

B.Tech. GROUP A: I Semester & GROUP B: II Semester *for batch admitted in Academic Session 2017-18*

| S. No. | Subject Code | Category | Subject Name | Maximum Marks Allotted | | | | | Total Marks | Contact Hours per week | | | Total Credits |
|---|--------------|----------|---|------------------------|---------------|------------------|----------------|----------------------|-------------|------------------------|----------|-----------|---------------|
| | | | | Theory Slot | | | Practical Slot | | | L | T | P | |
| | | | | End Sem. | Mid Sem Exam. | Quiz/ Assignment | End Sem. | Lab work & Sessional | | | | | |
| 1. | 100201 | BSC | Engineering Physics (BSC-1) | 70 | 20 | 10 | 30 | 20 | 150 | 4 | 1 | 2 | 6 |
| 2. | 100202 | HSMC | Energy, Environment, Ecology & Society (HSMC-1) | 70 | 20 | 10 | - | - | 100 | 4 | 1 | - | 5 |
| 3. | 100203 | ESC | Basic Computer Engineering (ESC-1) | 70 | 20 | 10 | 30 | 20 | 150 | 4 | 1 | 2 | 6 |
| 4. | 100204 | ESC | Basic Mechanical Engineering (ESC-2) | 70 | 20 | 10 | 30 | 20 | 150 | 4 | 1 | 2 | 6 |
| 5. | 100205 | ESC | Basic Civil Engineering & Mechanics (ESC-3) | 70 | 20 | 10 | 30 | 20 | 150 | 4 | 1 | 2 | 6 |
| 6. | 100206 | HSMC | Language Lab. & Seminars (HSMC-2) | - | - | - | 30 | 20 | 50 | - | - | 2 | 1 |
| Total | | | | 350 | 100 | 50 | 150 | 100 | 750 | 20 | 5 | 10 | 30 |
| Induction Programme of first three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations | | | | | | | | | | | | | |

GROUP A: (Electrical, Electronics, Computer Science & Engineering, **Information Technology**, Electronics & Telecommunication)

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

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



MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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Scheme of Examination

B.Tech. GROUP A: II Semester & GROUP B: I Semester *for batch admitted in Academic Session 2017-18*

| S. No. | Subject Code | Category | Subject Name | Maximum Marks Allotted | | | | | Total Marks | Contact Hours per week | | | Total Credits |
|--|--------------|----------|--|------------------------|------------|------------------|----------------|----------------------|-------------|------------------------|----------|-----------|---------------|
| | | | | Theory Slot | | | Practical Slot | | | L | T | P | |
| | | | | End Sem. | Mid Sem. | Quiz/ Assignment | End Sem. | Lab work & Sessional | | | | | |
| 1. | 100101 | BSC | Engineering Chemistry (BSC-2) | 70 | 20 | 10 | 30 | 20 | 150 | 4 | 1 | 2 | 6 |
| 2. | 100102 | BSC | Engineering Mathematics-I (BSC-3) | 70 | 20 | 10 | - | - | 100 | 4 | 1 | - | 5 |
| 3. | 100103 | HSMC | Technical English (HSMC-3) | 70 | 20 | 10 | 30 | 20 | 150 | 4 | 1 | 2 | 6 |
| 4. | 100104 | ESC | Basic Electrical & Electronics Engineering (ESC-4) | 70 | 20 | 10 | 30 | 20 | 150 | 4 | 1 | 2 | 6 |
| 5. | 100105 | ESC | Engineering Graphics (ESC-5) | 70 | 20 | 10 | 30 | 20 | 150 | 4 | 1 | 2 | 6 |
| 6. | 100106 | ESC | Manufacturing Practices (ESC-6) | - | - | - | 30 | 20 | 50 | - | - | 2 | 1 |
| Total | | | | 350 | 100 | 50 | 150 | 100 | 750 | 20 | 5 | 10 | 30 |
| Summer Internship Project –I (Institute Level) (Qualifier): Minimum two-week duration | | | | | | | | | | | | | |

GROUP A: (Electrical, Electronics, Computer Science & Engineering, **Information Technology**, Electronics & Telecommunication)

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

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

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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Scheme of Examination

B.Tech. III Semester (Information Technology) *for batch admitted in Academic Session 2017-18*

| S. No. | Subject Code | Category | Subject Name | Maximum Marks Allotted | | | | | Total Marks | Contact Hours per week | | | Total Credits |
|----------------|---------------------|------------------------|---|------------------------|----------------|------------------|----------------|-----------------------------------|-------------|------------------------|----------|-----------|---------------|
| | | | | Theory Slot | | | Practical Slot | | | L | T | P | |
| | | | | End Sem. | Mid Sem. Exam. | Quiz/ Assignment | End Sem | Term work Lab Work & Sessional | | | | | |
| 1. | 100001 | BSC | Mathematics-II (BSC-4) | 70 | 20 | 10 | - | - | 100 | 3 | 1 | - | 4 |
| 2. | 160301 | DC | Digital Electronics (DC-1) | 70 | 20 | 10 | - | - | 100 | 3 | 1 | - | 4 |
| 3. | 160302 | DC | Data Structures (DC-2) | 70 | 20 | 10 | 30 | 20 | 150 | 3 | - | 2 | 4 |
| 4. | 160303 | DC | Computer Graphics & Multimedia (DC-3) | 70 | 20 | 10 | 30 | 20 | 150 | 3 | - | 2 | 4 |
| 5. | 160304 | DC | Object Oriented Programming & Methodology (DC-4) | 70 | 20 | 10 | 30 | 20 | 150 | 3 | - | 2 | 4 |
| 6. | 160305 | DLC | Hardware Lab* (DLC-1) | - | - | - | 30 | 20 | 50 | - | - | 2 | 1 |
| 7. | 160306 | SEMINAR/ SELF STUDY | Self-learning/Presentation (SWAYAM/NPTEL/ MOOC)# | - | - | - | - | 25 | 25 | - | - | 2 | 1 |
| 8. | 160307 | DLC | Summer Internship Project -I (Institute Level) (Evaluation) | - | - | - | 25 | - | 25 | | | 4 | 2 |
| Total | | | | 350 | 100 | 50 | 145 | 105 | 750 | 15 | 2 | 14 | 24 |
| 9. | 100002 ^s | MC | Biology for Engineers (Audit Course) (MC) | 70 | 20 | 10 | - | - | 100 | 3 | | - | - |
| NSS/NCC | | | | Qualifier | | | | | | | | | |

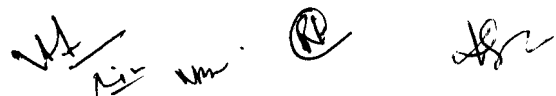
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^s Course will run for Group A/B in III/IV semester respectively (Passing is optional, however a separate mark sheet will be issued to those who qualify)

*Virtual Lab to be conducted along with the traditional lab

GROUP A: (Electrical, Electronics, Computer Science & Engineering, **Information Technology**, Electronics & Telecommunication)

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)



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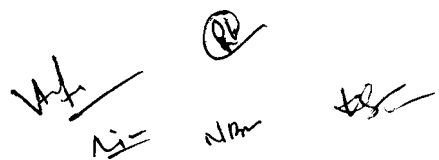
Scheme of Examination

B.Tech. IV Semester (Information Technology)

for batch admitted in Academic Session 2017-18

| S. No. | Subject Code | Category | Subject Name | Maximum Marks Allotted | | | | | Total Marks | Contact Hours per week | | | Total Credits |
|--|--------------|----------|--|------------------------|----------------------|------------------|----------------|-----------|-------------|------------------------|----------|----------|---------------|
| | | | | Theory Slot | | | Practical Slot | | | L | T | P | |
| | | | | End Sem. | Mid Sem. Exam. | Quiz/ Assignment | End Sem. | Term work | | | | | |
| | | | | | Lab Work & Sessional | | | | | | | | |
| 1. | 100003 | BSC | Mathematics- III (BSC-5) | 70 | 20 | 10 | - | - | 100 | 2 | 2 | - | 4 |
| 2. | 160401 | DC | Design & Analysis of Algorithms (DC-5) | 70 | 20 | 10 | 30 | 20 | 150 | 2 | 1 | 2 | 4 |
| 3. | 160402 | DC | Database Management System (DC-6) | 70 | 20 | 10 | 30 | 20 | 150 | 2 | 1 | 2 | 4 |
| 4. | 160403 | DC | Operating System (DC-7) | 70 | 20 | 10 | - | - | 100 | 3 | 1 | - | 4 |
| 5. | 160404 | DC | Computer System Organization (DC-8) | 70 | 20 | 10 | - | - | 100 | 3 | 1 | - | 4 |
| 6. | 100004 | MC | Cyber Security (MC) | 70 | 20 | 10 | - | - | 100 | 2 | 1 | - | 3 |
| 7. | 160405 | DLC | Programming Lab* (DLC-2) | - | - | - | 30 | 20 | 50 | - | - | 4 | 2 |
| Total | | | | 420 | 120 | 60 | 90 | 60 | 750 | 14 | 7 | 8 | 25 |
| NSS/NCC | | | | Qualifier | | | | | | | | | |
| Summer Internship Project-II (SoftSkills Based) for two weeks duration: Evaluation in V Semester | | | | | | | | | | | | | |

*Virtual Lab to be conducted along with the traditional lab



MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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Scheme of Examination

B.Tech. V Semester (Information Technology) for batch admitted in Academic Session 2017-18

| S. No. | Subject Code | Category | Subject Name | Maximum Marks Allotted | | | | | Total Marks | Contact Hours per week | | | Total Credits |
|--|---------------------|------------------------|---|------------------------|---------------|------------------|----------------|----------------------|-------------|------------------------|----------|-----------|---------------|
| | | | | Theory Slot | | | Practical Slot | | | L | T | P | |
| | | | | End Sem. | Mid Sem Exam. | Quiz/ Assignment | End Sem. | Lab work & Sessional | | | | | |
| 1. | 100005* | HSMC | Ethics, Economics, Entrepreneurship & Management (HSMC- 4) | 70 | 20 | 10 | - | - | 100 | 2 | - | - | 2 |
| 2. | 160501 | BSC | Discrete Structures (BSC – 6) | 70 | 20 | 10 | - | - | 100 | 2 | 1 | - | 3 |
| 3. | 160502 | DC | Software Engineering (DC-09) | 70 | 20 | 10 | 30 | 20 | 150 | 2 | - | 2 | 3 |
| 4. | 160503 | DC | Theory of Computation (DC-10) | 70 | 20 | 10 | 30 | 20 | 150 | 2 | - | 2 | 3 |
| 5. | 160504 | DC | Microprocessor & Interfacing (DC-11) | 70 | 20 | 10 | 30 | 20 | 150 | 2 | - | 2 | 3 |
| 6. | 160505 | DLC | Minor Project-I** (DLC-3) | - | - | - | 30 | 20 | 50 | - | - | 2 | 1 |
| 7. | 160506 | DLC | Summer Internship Project-II (Evaluation) (DLC-4) | - | - | - | 25 | - | 25 | - | - | 4 | 2 |
| 8. | 160507 | SEMINAR/ SELF STUDY | Self-learning/Presentation (SWAYAM/NPTEL/ MOOC)# | - | - | - | - | 25 | 25 | - | - | 2 | 1 |
| Total | | | | 350 | 100 | 50 | 145 | 105 | 750 | 10 | 1 | 14 | 18 |
| 9. | 100006 ^s | MC | Indian Constitution & Traditional Knowledge (Audit Course) (MC) | 70 | 20 | 10 | - | - | 100 | 3 | - | - | - |
| Department level activity/workshop/awareness Programme to be conducted; certificate of compliance to be submitted by HoD to the Exam Controller through Dean Academics | | | | | | | | | | | | | |
| Additional Courses for obtaining Honours or minor Specialization by desirous students | | | Permitted to opt for <u>maximum two additional courses</u> for the award of Honours or Minor specialization | | | | | | | | | | |

* Group A/B programmes will offer this course in V/VI Semester respectively.

^s Group A/B programmes will offer this course in V/VI Semester respectively. (Passing is optional, however a separate mark sheet will be issued to those who qualify)

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

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

GROUP A: (Electrical, Electronics, Computer Science & Engineering, **Information Technology**, Electronics & Telecommunication)

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)



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Scheme of Examination

B.Tech. VI Semester (Information Technology) for batch admitted in Academic Session 2017-18

| S. No. | Subject Code | Category | Subject Name | Maximum Marks Allotted | | | | | Total Marks | Contact Hours per week | | | Total Credits |
|--------------|--------------|----------|--------------------------------|------------------------|---------------|------------------|----------------|----------------------|-------------|------------------------|----------|----------|---------------|
| | | | | Theory Slot | | | Practical Slot | | | L | T | P | |
| | | | | End Sem. | Mid Sem Exam. | Quiz/ Assignment | End Sem. | Lab work & Sessional | | | | | |
| 1. | 160601 | DC | Compiler Design (DC-12) | 70 | 20 | 10 | 30 | 20 | 150 | 2 | - | 2 | 3 |
| 2. | 160602 | DC | Computer Networks (DC-13) | 70 | 20 | 10 | - | - | 100 | 2 | 1 | - | 3 |
| 3. | DE | DE | Departmental Elective (DE-1) | 70 | 20 | 10 | - | - | 100 | 2 | - | - | 2 |
| 4. | DE | DE | Departmental Elective * (DE-2) | 70 | 20 | 10 | - | - | 100 | 2 | - | - | 2 |
| 5. | OC | OC | Open Category (OC-1) | 70 | 20 | 10 | - | - | 100 | 2 | - | - | 2 |
| 6. | 100007 | MC | Disaster Management (MC) | 70 | 20 | 10 | - | - | 100 | 2 | - | - | 2 |
| 7. | 160606 | DLC | Minor Project-II (DLC-5) | - | - | - | 50 | 50 | 100 | - | - | 4 | 2 |
| Total | | | | 420 | 120 | 60 | 80 | 70 | 750 | 12 | 1 | 6 | 16 |

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

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 -1 (Through Traditional Mode) | | |
|----------------------------------|--------------|------------------------|
| S. No. | Subject Code | Subject Name |
| 1. | 160611 | Network & Web Security |
| 2. | 160612 | Image Processing |
| 3. | 160613 | Agile Methodology |

| DE -2* | | |
|--------|--------------|----------------------------------|
| S. No. | Subject Code | Subject Name |
| 1. | 160651 | Data Analytics with Python |
| 2. | 160652 | Introduction to Machine Learning |
| 3. | 160653 | Cloud Computing |

| OC-1 | | |
|--------|--------------|----------------------|
| S. No. | Subject Code | Subject Name |
| 1. | 900106 | Data Structures |
| 2. | 900107 | Python Programming |
| 3. | 900108 | Software Engineering |

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

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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

Computer Science & Engineering

/For batch admitted in Academic Session 2018-19

Semester-Wise Scheme & Guidelines for Flexible Curriculum

Abbreviations used

| | |
|------|---|
| L | Lecture |
| T | Tutorial |
| P | Practical |
| HSMC | Humanities and Social Sciences including Management Courses |
| BSC | Basic Science Courses |
| ESC | Engineering Science Courses |
| DC | Departmental Core |
| DE | Departmental Elective |
| OC | Open Category |
| DLC | Departmental Laboratory Courses |
| MC | Mandatory Course |
| MOOC | Massive Open Online Courses |

Definition of Credit:

| | |
|-----------------------------|----------|
| 1 Hr. Lecture (L) per week | 1 credit |
| 1 Hr. Tutorial (T) per week | 1 credit |
| 2 Hours Practical(Lab)/week | 1 credit |

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

Scheme of Examination

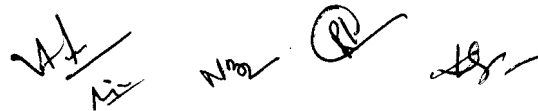
B.Tech. GROUP A: I Semester & GROUP B: II Semester *For batches admitted in Academic Session 2018-19*

| S. No. | Subject Code | Category Code | Subject Name | Maximum Marks Allotted | | | | | Total Marks | Contact Hours per week | | | Total Credits |
|--|--------------|---------------|---|------------------------|---------------|-----------------|----------------|----------------------|-------------|------------------------|----------|-----------|---------------|
| | | | | Theory Slot | | | Practical Slot | | | L | T | P | |
| | | | | End Sem. | Mid Sem Exam. | Quiz/Assignment | End Sem. | Lab work & Sessional | | | | | |
| 1. | 100201 | BSC | Engineering Physics (BSC-1) | 70 | 20 | 10 | 30 | 20 | 150 | 2 | 1 | 2 | 4 |
| 2. | 100202 | HSMC | Energy, Environment, Ecology & Society (HSMC-1) | 70 | 20 | 10 | - | - | 100 | 3 | - | - | 3 |
| 3. | 100203 | ESC | Basic Computer Engineering (ESC-1) | 70 | 20 | 10 | 30 | 20 | 150 | 3 | - | 2 | 4 |
| 4. | 100204 | ESC | Basic Mechanical Engineering (ESC-2) | 70 | 20 | 10 | 30 | 20 | 150 | 3 | - | 2 | 4 |
| 5. | 100205 | ESC | Basic Civil Engineering & Mechanics (ESC-3) | 70 | 20 | 10 | 30 | 20 | 150 | 3 | - | 2 | 4 |
| 6. | 100206 | HSMC | Language Lab. & Seminars (HSMC-2) | - | - | - | 30 | 20 | 50 | - | - | 4 | 2 |
| Total | | | | 350 | 100 | 50 | 150 | 100 | 750 | 14 | 1 | 12 | 21 |
| NSS/NCC | | | | Qualifier | | | | | | | | | |
| Induction programme of first three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations | | | | | | | | | | | | | |

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

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

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



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

Scheme of Examination

B.Tech. GROUP A: II Semester & GROUP B: I Semester *for batches admitted in Academic Session 2018-19*

| S. No. | Subject Code | Category Code | Subject Name | Maximum Marks Allotted | | | | | Total Marks | Contact Hours per week | | | Total Credits |
|---|--------------|---------------|--|------------------------|------------|------------------|----------------|----------------------|-------------|------------------------|----------|-----------|---------------|
| | | | | Theory Slot | | | Practical Slot | | | L | T | P | |
| | | | | End Sem. | Mid Sem. | Quiz/ Assignment | End Sem. | Lab work & Sessional | | | | | |
| 1. | 100101 | BSC | Engineering Chemistry (BSC-2) | 70 | 20 | 10 | 30 | 20 | 150 | 3 | - | 2 | 4 |
| 2. | 100102 | BSC | Engineering Mathematics-I (BSC-3) | 70 | 20 | 10 | - | - | 100 | 3 | 1 | - | 4 |
| 3. | 100103 | HSMC | Technical English (HSMC-3) | 70 | 20 | 10 | 30 | 20 | 150 | 3 | - | 2 | 4 |
| 4. | 100104 | ESC | Basic Electrical & Electronics Engineering (ESC-4) | 70 | 20 | 10 | 30 | 20 | 150 | 3 | - | 2 | 4 |
| 5. | 100105 | ESC | Engineering Graphics (ESC-5) | 70 | 20 | 10 | 30 | 20 | 150 | 2 | - | 2 | 3 |
| 6. | 100106 | ESC | Manufacturing Practices (ESC-6) | - | - | - | 30 | 20 | 50 | - | - | 2 | 1 |
| Total | | | | 350 | 100 | 50 | 150 | 100 | 750 | 14 | 1 | 10 | 20 |
| NSS/NCC | | | | Qualifier | | | | | | | | | |
| Summer Internship Project –I (Institute Level) (Qualifier): Minimum two-week duration | | | | | | | | | | | | | |

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

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)



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 & Engineering) for batches admitted in Academic Session 2018-19

| S. No. | Subject Code | Category Code | Subject Name | Maximum Marks Allotted | | | | | Total Marks | Contact Hours per week | | | Total Credits |
|--------------|---------------------|---------------------------|---|------------------------|----------------|------------------|----------------|-----------------------------------|-------------|------------------------|----------|-----------|---------------|
| | | | | Theory Slot | | | Practical Slot | | | L | T | P | |
| | | | | End Sem. | Mid Sem. Exam. | Quiz/ Assignment | End Sem | Term work Lab Work & Sessional | | | | | |
| 1. | 100001 | BSC | Mathematics-II (BSC-4) | 70 | 20 | 10 | - | - | 100 | 3 | 1 | - | 4 |
| 2. | 150301 | DC | Digital Electronics (DC-1) | 70 | 20 | 10 | - | - | 100 | 3 | 1 | - | 4 |
| 3. | 150302 | DC | Data Structures (DC-2) | 70 | 20 | 10 | 30 | 20 | 150 | 3 | - | 2 | 4 |
| 4. | 150303 | DC | Computer Graphics (DC-3) | 70 | 20 | 10 | 30 | 20 | 150 | 3 | - | 2 | 4 |
| 5. | 150304 | DC | Object Oriented Programming & Methodology (DC-4) | 70 | 20 | 10 | 30 | 20 | 150 | 3 | - | 2 | 4 |
| 6. | 150305 | DLC | Hardware Lab* (DLC-1) | - | - | - | 30 | 20 | 50 | - | - | 2 | 1 |
| 7. | 150306 | SEMINAR/ SELF STUDY | Self-learning/Presentation (SWAYAM/NPTEL/ MOOC)# | - | - | - | - | 25 | 25 | - | - | 2 | 1 |
| 8. | 150307 | DLC | Summer Internship Project -I (Institute Level) (Evaluation) | - | - | - | 25 | - | 25 | - | - | 4 | 2 |
| Total | | | | 350 | 100 | 50 | 145 | 105 | 750 | 15 | 2 | 14 | 24 |
| 9. | 100002 ^S | MC | Biology for Engineers(Audit Course) (MC) | 70 | 20 | 10 | - | - | 100 | 3 | - | - | - |
| NSS/NCC | | | | Qualifier | | | | | | | | | |

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

^S Course will run for Group A/B in III/IV semester respectively (This is a non-credit course and it is optional to appear & pass in the end semester examination. However, a separate mark sheet will be issued to those who will qualify)

*Virtual Lab to be conducted along with the traditional lab

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

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

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

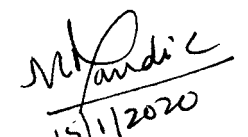
Scheme of Examination

B.Tech. IV Semester (Computer Science & Engineering) for batches admitted in Academic Session 2018-19

| S. No. | Subject Code | Category Code | Subject Name | Maximum Marks Allotted | | | | | Total Marks | Contact Hours per week | | | Total Credits |
|--|--------------|---------------|--|------------------------|----------------|------------------|----------------|-----------------------------------|-------------|------------------------|----------|-----------|---------------|
| | | | | Theory Slot | | | Practical Slot | | | L | T | P | |
| | | | | End Sem. | Mid Sem. Exam. | Quiz/ Assignment | End Sem. | Term work Lab Work & Sessional | | | | | |
| 1. | 100003 | BSC | Mathematics- III (BSC-5) | 70 | 20 | 10 | - | - | 100 | 2 | 2 | - | 4 |
| 2. | 150401 | DC | Design & Analysis of Algorithms (DC-5) | 70 | 20 | 10 | 30 | 20 | 150 | 2 | 1 | 2 | 4 |
| 3. | 150402 | DC | Database Management System (DC-6) | 70 | 20 | 10 | 30 | 20 | 150 | 2 | 1 | 2 | 4 |
| 4. | 150403 | DC | Operating System (DC-7) | 70 | 20 | 10 | - | - | 100 | 3 | 1 | - | 4 |
| 5. | 150404 | DC | Computer System Organization (DC-8) | 70 | 20 | 10 | - | - | 100 | 3 | 1 | - | 4 |
| 6. | 100004 | MC | Cyber Security (MC) | 70 | 20 | 10 | - | - | 100 | 2 | 1 | - | 3 |
| 7. | 150405 | DLC | Programming Lab* (DLC-2) | - | - | - | 30 | 20 | 50 | - | - | 6 | 3 |
| Total | | | | 420 | 120 | 60 | 90 | 60 | 750 | 14 | 7 | 10 | 26 |
| NSS/NCC | | | | Qualifier | | | | | | | | | |
| Summer Internship Project-II (Softskills Based) for two weeks duration: Evaluation in V Semester | | | | | | | | | | | | | |

*Virtual Lab to be conducted along with the traditional lab




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 GWALIOR

Page 5 of 5

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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

Information Technology

[For batch admitted in Academic Session 2018-19]

Semester-Wise Scheme & Guidelines for Flexible Curriculum

Abbreviations used

| | |
|------|---|
| L | Lecture |
| T | Tutorial |
| P | Practical |
| HSMC | Humanities and Social Sciences including Management Courses |
| BSC | Basic Science Courses |
| ESC | Engineering Science Courses |
| DC | Departmental Core |
| DE | Departmental Elective |
| OC | Open Category |
| DLC | Departmental Laboratory Courses |
| MC | Mandatory Course |
| MOOC | Massive Open Online Courses |

Definition of Credit:

| | |
|-----------------------------|----------|
| 1 Hr. Lecture (L) per week | 1 credit |
| 1 Hr. Tutorial (T) per week | 1 credit |
| 2 Hours Practical(Lab)/week | 1 credit |

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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

Scheme of Examination

B.Tech. GROUP A: I Semester & GROUP B: II Semester *for batches admitted in Academic Session 2018-19*

| S. No. | Subject Code | Category Code | Subject Name | Maximum Marks Allotted | | | | | Total Marks | Contact Hours per week | | | Total Credits |
|--|--------------|---------------|---|------------------------|---------------|------------------|----------------|----------------------|-------------|------------------------|----------|-----------|---------------|
| | | | | Theory Slot | | | Practical Slot | | | L | T | P | |
| | | | | End Sem. | Mid Sem Exam. | Quiz/ Assignment | End Sem. | Lab work & Sessional | | | | | |
| 1. | 100201 | BSC | Engineering Physics (BSC-1) | 70 | 20 | 10 | 30 | 20 | 150 | 2 | 1 | 2 | 4 |
| 2. | 100202 | HSMC | Energy, Environment, Ecology & Society (HSMC-1) | 70 | 20 | 10 | - | - | 100 | 3 | - | - | 3 |
| 3. | 100203 | ESC | Basic Computer Engineering (ESC-1) | 70 | 20 | 10 | 30 | 20 | 150 | 3 | - | 2 | 4 |
| 4. | 100204 | ESC | Basic Mechanical Engineering (ESC-2) | 70 | 20 | 10 | 30 | 20 | 150 | 3 | - | 2 | 4 |
| 5. | 100205 | ESC | Basic Civil Engineering & Mechanics (ESC-3) | 70 | 20 | 10 | 30 | 20 | 150 | 3 | - | 2 | 4 |
| 6. | 100206 | HSMC | Language Lab. & Seminars (HSMC-2) | - | - | - | 30 | 20 | 50 | - | - | 4 | 2 |
| Total | | | | 350 | 100 | 50 | 150 | 100 | 750 | 14 | 1 | 12 | 21 |
| NSS/NCC | | | | Qualifier | | | | | | | | | |
| Induction programme of first three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations | | | | | | | | | | | | | |

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

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

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

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

Scheme of Examination

B.Tech. GROUP A: II Semester & GROUP B: I Semester *for batches admitted in Academic Session 2018-19*

| S. No. | Subject Code | Category Code | Subject Name | Maximum Marks Allotted | | | | | Total Marks | Contact Hours per week | | | Total Credits |
|--|--------------|---------------|--|------------------------|------------|-----------------|----------------|----------------------|-------------|------------------------|----------|-----------|---------------|
| | | | | Theory Slot | | | Practical Slot | | | L | T | P | |
| | | | | End Sem. | Mid Sem. | Quiz/Assignment | End Sem. | Lab work & Sessional | | | | | |
| 1. | 100101 | BSC | Engineering Chemistry (BSC-2) | 70 | 20 | 10 | 30 | 20 | 150 | 3 | - | 2 | 4 |
| 2. | 100102 | BSC | Engineering Mathematics-I (BSC-3) | 70 | 20 | 10 | - | - | 100 | 3 | 1 | - | 4 |
| 3. | 100103 | HSMC | Technical English (HSMC-3) | 70 | 20 | 10 | 30 | 20 | 150 | 3 | - | 2 | 4 |
| 4. | 100104 | ESC | Basic Electrical & Electronics Engineering (ESC-4) | 70 | 20 | 10 | 30 | 20 | 150 | 3 | - | 2 | 4 |
| 5. | 100105 | ESC | Engineering Graphics (ESC-5) | 70 | 20 | 10 | 30 | 20 | 150 | 2 | - | 2 | 3 |
| 6. | 100106 | ESC | Manufacturing Practices (ESC-6) | - | - | - | 30 | 20 | 50 | - | - | 2 | 1 |
| Total | | | | 350 | 100 | 50 | 150 | 100 | 750 | 14 | 1 | 10 | 20 |
| NSS/NCC | | | | Qualifier | | | | | | | | | |
| Summer Internship Project –I (Institute Level) (Qualifier): Minimum two-week duration | | | | | | | | | | | | | |

GROUP A: (Electrical, Electronics, Computer Science & Engineering, Information Technology, Electronics & Telecommunication)
GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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

Scheme of Examination

B.Tech. III Semester (Information Technology) *for batches admitted in Academic Session 2018-19*

| S. No. | Subject Code | Category Code | Subject Name | Maximum Marks Allotted | | | | | Total Marks | Contact Hours per week | | | Total Credits |
|----------------|---------------------|------------------------|---|------------------------|----------------|------------------|----------------|----------------------|-------------|------------------------|----------|-----------|---------------|
| | | | | Theory Slot | | | Practical Slot | | | L | T | P | |
| | | | | End Sem. | Mid Sem. Exam. | Quiz/ Assignment | End Sem | Term work | | | | | |
| | | | | | | | | Lab Work & Sessional | | | | | |
| 1. | 100001 | BSC | Mathematics-II (BSC-4) | 70 | 20 | 10 | - | - | 100 | 3 | 1 | - | 4 |
| 2. | 160301 | DC | Digital Electronics (DC-1) | 70 | 20 | 10 | - | - | 100 | 3 | 1 | - | 4 |
| 3. | 160302 | DC | Data Structures (DC-2) | 70 | 20 | 10 | 30 | 20 | 150 | 3 | - | 2 | 4 |
| 4. | 160303 | DC | Computer Graphics & Multimedia (DC-3) | 70 | 20 | 10 | 30 | 20 | 150 | 3 | - | 2 | 4 |
| 5. | 160304 | DC | Object Oriented Programming & Methodology (DC-4) | 70 | 20 | 10 | 30 | 20 | 150 | 3 | - | 2 | 4 |
| 6. | 160305 | DLC | Hardware Lab* (DLC-1) | - | - | - | 30 | 20 | 50 | - | - | 2 | 1 |
| 7. | 160306 | SEMINAR/ SELF STUDY | Self-learning/Presentation (SWAYAM/NPTEL/ MOOC)# | - | - | - | - | 25 | 25 | - | - | 2 | 1 |
| 8. | 160307 | DLC | Summer Internship Project –I (Institute Level) (Evaluation) | - | - | - | 25 | - | 25 | | | 4 | 2 |
| Total | | | | 350 | 100 | 50 | 145 | 105 | 750 | 15 | 2 | 14 | 24 |
| 9. | 100002 ⁵ | MC | Biology for Engineers(Audit Course)(MC) | 70 | 20 | 10 | - | - | 100 | 3 | | - | - |
| NSS/NCC | | | | Qualifier | | | | | | | | | |

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

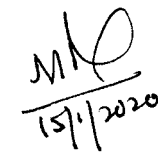
⁵ Course will run for Group A/B in III/IV semester respectively (This is a non-credit course and it is optional to appear & pass in the end semester examination. However, a separate mark sheet will be issued to those who will qualify)

*Virtual Lab to be conducted along with the traditional lab

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

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)





MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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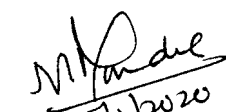
Scheme of Examination

B.Tech. IV Semester (Information Technology) *for batches admitted in Academic Session 2018-19*

| S. No. | Subject Code | Category Code | Subject Name | Maximum Marks Allotted | | | | | Total Marks | Contact Hours per week | | | Total Credits |
|--|--------------|---------------|--|------------------------|----------------|------------------|----------------|----------------------|-------------|------------------------|----------|-----------|---------------|
| | | | | Theory Slot | | | Practical Slot | | | L | T | P | |
| | | | | End Sem. | Mid Sem. Exam. | Quiz/ Assignment | End Sem. | Term work | | | | | |
| | | | | | | | | Lab Work & Sessional | | | | | |
| 1. | 100003 | BSC | Mathematics- III (BSC-5) | 70 | 20 | 10 | - | - | 100 | 2 | 2 | - | 4 |
| 2. | 160401 | DC | Design & Analysis of Algorithms (DC-5) | 70 | 20 | 10 | 30 | 20 | 150 | 2 | 1 | 2 | 4 |
| 3. | 160402 | DC | Database Management System (DC-6) | 70 | 20 | 10 | 30 | 20 | 150 | 2 | 1 | 2 | 4 |
| 4. | 160403 | DC | Operating System (DC-7) | 70 | 20 | 10 | - | - | 100 | 3 | 1 | - | 4 |
| 5. | 160404 | DC | Computer System Organization (DC-8) | 70 | 20 | 10 | - | - | 100 | 3 | 1 | - | 4 |
| 6. | 100004 | MC | Cyber Security (MC) | 70 | 20 | 10 | - | - | 100 | 2 | 1 | - | 3 |
| 7. | 160405 | DLC | Programming Lab* (DLC-2) | - | - | - | 30 | 20 | 50 | - | - | 6 | 3 |
| Total | | | | 420 | 120 | 60 | 90 | 60 | 750 | 14 | 7 | 10 | 26 |
| NSS/NCC | | | | Qualifier | | | | | | | | | |
| Summer Internship Project-II (Softskills Based) for two weeks duration: Evaluation in V Semester | | | | | | | | | | | | | |

*Virtual Lab to be conducted along with the traditional lab




 15/1/2020
 DEAN (ACADEMICS)
 M.I.T.S
 GWALIOR
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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR.
(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)

Department of Computer Science & Engineering and Information Technology

BASIC COMPUTER ENGINEERING
100203

COURSE OBJECTIVES

- To develop comprehensive knowledge about the fundamental principles and concepts of basic computer engineering.
 - To develop competencies for the design, coding and debugging of computer programs.
 - To understand fundamentals of operating system concept.
 - To acquire the basic knowledge of computer networks and its application & internet technology.
-

Unit-I

Basics of Computer: Introduction, Generation of Computers, Classification of Computers, Hardware, Software: Types of Software, Memory Representation, RAM, ROM and Hard Disk.

Number System & Conversion: Decimal, Binary, Octal and Hexadecimal.

Unit-II

Basics of Programming: Introduction, History, Generations of Programming Languages, Types of Programming Languages, Flow Charts.

Fundamentals of C++ programming: Data Types, Operators, Writing and Executing C++ Programs, Standard I/O Functions, Goto Statement, Break and Continue Statement, Conditional Statements and Loops.

Unit-III

Functions: Introduction, Function Prototypes, Passing Values to Functions, Recursive Functions.

Arrays: Declaration and Initialization, Manipulating Array Elements, Multidimensional Arrays, String.

Pointer and Structure: Introduction, Declarations, Double Pointer, Pointer to Function, Function Returning Pointer, Pointer to Array, Array of Pointers, Dynamic Memory Allocation using Malloc and Calloc functions, Structures, Arrays of Structures, Pointers to Structures, Union.

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR.
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Department of Computer Science & Engineering and Information Technology

Unit-IV

Operating System: Introduction, Functions of Operating System, Types of Operating System, Popular Operating Systems.

Database Management System: Introduction to DBMS, Data Models, Applications of DBMS, Architecture of Database Management System, DBA, Keys, Data Definition Language, Data Manipulation Language.

Unit-V

Computer Networks & Internet Technology: Introduction, Types of Network, Internetworking Devices, Network Topologies, E-commerce, WWW and Web Browser.

HTML: Introduction, Working with Text, Lists, Table, Frames, Hyperlinks, Images, Multimedia, Forms and Controls.

RECOMMENDED BOOKS

- Fundamentals of Computer Engineering, E. Balagurusamy, Tata McGraw Hill Education.
- Let Us C++, Yashavant P. Kanetkar, BPB Publications.
- Operating System Concepts, Galvin, Wiley.
- Computer Fundamentals and C Programming, Sumitabha Das, McGraw Hill Education

COURSE OUTCOMES

After completion of the course students would be able to:

CO1. tell the fundamental concepts and techniques used in computer engineering.

CO2. explain the working and features of the basic components of computer system.

CO3. apply the concept and attributes to design programs for problem solving.

CO4. compare various operating systems and also analyze the different approaches of maintaining data.

CO5. determine the importance of various components of computer networking and web designing.

CO6. develop a skill of programming using the constructs of C++.

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR.
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Department of Computer Science & Engineering and Information Technology

Syllabi of Subjects
B.Tech. III Semester
(Computer Science & Engineering and
Information Technology)
Under Flexible Scheme Structure

III SEMESTER



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

Department of Computer Science & Engineering and Information Technology

DIGITAL ELECTRONICS
150301/160301 (DC-1)

COURSE OBJECTIVES

- To perform the analysis and design of various digital electronic circuits.
- To learn various number systems, boolean algebra and logic gates.
- To understand the concept of counters, latches and flip-flops.

Unit-I

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

Unit-II

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

Unit-III

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

Unit-IV

Sequential Circuits, Latches, Flip-Flops: RS Latches, Level Clocking, D Latches, Edge-Triggered D Flip-Flop, Edge-Triggered JK Flip-Flop, JK Master-Slave Flip-Flop; Registers, Shift Registers, Counters, Ripple Counters, Synchronous Counters.

Unit-V

Introduction to Memory, Memory Decoding, Error Detection and Correction, Programmable Logic Array, Programmable Array Logic, Sequential Programmable Devices, RTL and DTL Circuits, TTL, ECL, MOS, CMOS, Application Specific Integrated Circuits.

III SEMESTER

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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. explain the computer architecture for defining basic component and functional unit.
 - CO2. recall different number system and solve the basic arithmetic operations.
 - CO3. develop the understanding of combinational circuits.
 - CO4. analyze the basic concept of sequential circuits.
 - CO5. compare various memories.
 - CO6. solve the Boolean functions using logic gates.
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DATA STRUCTURES
150302/160302 (DC-2)

COURSE OBJECTIVES

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

Unit-I

Introduction to Data Structures: Algorithms & their Characteristics, Asymptotic Notations. Arrays and its Representations, Index to Address Translation. **Link List:** Introduction, Implementation of Linked List, Operations, Circular Link List, Doubly Linked List, Polynomial Manipulation Using Linked List.

Unit-II

Stacks: Concepts and Implementation of Stacks, Operations on Stack, Conversion of Infix to Postfix Notation, Evaluation of Postfix Expression, Recursion.

Queues: Concepts and Implementation, Operations on Queues, Dequeue, Priority Queues, Circular Queues and Application.

Unit-III

Trees: Types, Terminology, Binary Tree -Representations, Traversal, Conversion of General Tree to Binary Tree, Binary Search Tree, Threaded Binary Tree and Height Balanced Tree.

Unit-IV

Searching & Sorting: Linear Search, Binary Search, Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort, Radix Sort and Heap Sort, Comparison between Sorting Techniques, Hashing and Collision Resolution Techniques.

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Unit-V

Graphs: Background, Graph Theory Terminologies, Representation of Graphs- Sequential & Linked Representation, Path Matrix, Graph Traversals- BFS, DFS, Spanning Trees, Applications of Graph.

RECOMMENDED BOOKS

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

COURSE OUTCOMES

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

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

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Department of Computer Science & Engineering and Information Technology

COMPUTER GRAPHICS
150303 (DC-3)

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, 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

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Polygon, Sutherland Hodgeman Polygon Clipping Algorithm etc, Area Filling, Hidden Surface Elimination: Z- Buffer Algorithm and Painter's Algorithm.

Unit-V

Basic Illumination Models: Diffuse Reflection, Specular Reflection, Phong Shading, Gouraud Shading, Color Models like RGB, YIQ, CMY, HSV etc., Introduction to Digital Image Processing (DIP), Fundamental Steps and Components of DIP.

RECOMMENDED BOOKS

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

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, 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.** discuss various color models, shading methods, animation and digital image processing.

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COMPUTER GRAPHICS & MULTIMEDIA
160303 (DC-3)

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, 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. **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-IV

Basic Illumination Models: Diffuse Reflection, Specular Reflection, Phong Shading, Gouraud Shading, Color Models like RGB, YIQ, CMY, HSV etc.

Unit-V

Multimedia System: Introduction, Multimedia Hardware, Multimedia System Architecture. Data & File Format Standards. i.e RTF, TIFF, MIDI, JPEG, DIB, MPEG,

Audio: Digital Audio, MIDI, Processing Sound, Sampling, Compression.

Video: Avi, 3GP, MOV, MPEG, Compression Standards, Compression through Spatial and Temporal Redundancy. Multimedia Authoring.

RECOMMENDED BOOKS

- Donald Hearn and M.P. Becker: Computer Graphics, PHI Publication.
- FoleyVandam, Feiner, Hughes: Computer Graphics Principle and Practice.
- Rogers:Principles of Computers Graphics, TMH.
- Sinha and Udai: Computer Graphics, TMH.
- Digital Image Processing by Gonzalez.

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, shape generation algorithms and storage technique.
- CO3.** apply various 2-dimensional, 3-dimensional transformations and projections on images.
- CO4.** classify methods of image clipping and various algorithms for line and polygon clipping and different multimedia storage extensions.
- CO5.** choose appropriate filling algorithms, hidden surface elimination algorithm and apply on various images.
- CO6.** discuss various color models, shading methods, animation and digital image processing.

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OBJECT ORIENTED PROGRAMMING AND METHODOLOGY
150304/160304 (DC-4)

COURSE OBJECTIVES

- To study about the concept of object oriented programming.
- To create C++ programs that leverage the object oriented features of the C++ Language.
- To apply object oriented or non-object oriented techniques to solve bigger computing problems.

Unit-I

Introduction to C++ and Object Oriented Concepts: Basics of C++, Tokens, I/O Statements, Structure of Program, Operators and Expressions, Flow of Control, Arrays, Structures, Functions and its Type, Function Prototyping, Pointers, Pointer Variables, Pointers and Arrays, Array of Pointers, Pointers and Structures, Dynamic Memory Allocation.

Programming Techniques: Unstructured & Structured Programming, Object Oriented Paradigm, Features of OOPs, Comparison with Procedural Oriented Programming & Object Oriented Programming, Abstract Data Types, Reference Variable, Scope Resolution Operator.

Unit-II

Classes & Objects: Specification of Class, Visibility Modes: Private, Public, Protected, Defining Member Functions, Creating of Objects, Characteristics of Object, Static Data Member, Static Member Function, Array of Objects, Object as Arguments, Inline Function, Default Arguments, Friend Function, Recursion.

Constructors and Destructors: Introduction, Types of Constructors- Default Constructor, User Defined Constructor, Parameterized Constructor, Copy Constructor, Constructor with Default Arguments, Rules of Constructor Definition and Usage, Destructors.

Unit-III

Polymorphism: Introduction, Type of Polymorphism: Compile Time Polymorphism & Run Time Polymorphism, Function Overloading, Operator Overloading: Binary

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Operators, Arithmetic Assignment Operators, Unary Operators, Rules for Operator Overloading, Pitfalls of Operator Overloading, Data Conversion, Type Casting.

Unit-IV

Inheritance: Introduction to Code Reuse, Visibility Modes, Types of Inheritance: Single Level, Multilevel, Multiple, Hybrid, Multipath. Virtual Base Classes, Abstract Classes, Constructors in Derived Classes, Nesting of Classes, Overriding Member Function. Containership: Classes with in Classes, Function Overriding.

Unit-V

Pointer & File Concept: Pointers Overview, Pointers to Objects, This Pointer, Pointers to Derived Classes, Virtual Functions & Pure Virtual Function, Association, Type of Association, Aggregation, File Concepts, Study of Various Files and Streams, Opening and Closing of Files- Functions Get(), Getline(), Put(), Opening The Files Using Function Open(), File Manipulator Function.

RECOMMENDED BOOKS

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

COURSE OUTCOMES

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

- CO1. tell the concepts of classes & objects and their significance in real world.
- CO2. explain the benefits of object oriented design.
- CO3. build C++ classes using appropriate encapsulation and design principles.
- CO4. analyze the utilization of inheritance and polymorphism in the solution of problems.
- CO5. choose appropriate object orient programming concepts for solving real world problems.

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CO6. develop solutions to problems demonstrating usage of control structures, modularity, I/O and other standard language constructs.

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HARDWARE LAB
150305/160305 (DLC-1)

COURSE OBJECTIVES

- To understand various number systems, boolean algebra, logic gates.
- To acquire the knowledge of a computer system, motherboard and its processing unit.
- To be aware of different memories, I/O devices, windows installation and SMPS.

Unit -I

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

Unit-II

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

Unit -III

Sequential Circuits, Latches, Flip-Flops: Edge-Triggered D Flip-Flop, Edge-Triggered JK Flip-Flop, JK Master-Slave Flip-flop, Registers. Integrated Circuits.

Unit-IV

Introduction of Motherboard, Types of Motherboard, Integrated Motherboards, Non-Integrated Motherboards, Desktop Motherboards, Server Motherboards, Laptop Motherboards, Factors of Motherboard, Components of a Motherboard, Manufacturers of Motherboards, Bus Architecture.

Unit -V

Introduction to Memory, Types of Memory, Installation and Partition of Hard Disk, Working of Hard Disk. Basics of I/O Devices, Introduction to Ports, Identify the Different Ports, Ports Troubleshooting, Windows Installation, SMPS (Switch Mode Power Supply).

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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.
- The Indispensable PC Hardware Book, Hans-Peter Messmer, Third Edition.

COURSE OUTCOMES

After completion of the course students would be able to:

- CO1. illustrate the concept of number system and boolean algebra.
 - CO2. demonstrate installation of windows and connections through ports at basic level.
 - CO3. build various circuits and inspect their working.
 - CO4. examine the ICs specifications and their functioning.
 - CO5. explain the concept of memory, motherboard, bus, and SMPS.
 - CO6. choose appropriate logic gates to design combinational & sequential circuits.
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Department of Computer Science & Engineering and Information Technology

Syllabi of Subjects
B.Tech. IV Semester
(Computer Science & Engineering and
Information Technology)
Under Flexible Scheme Structure



DESIGN & ANALYSIS OF ALGORITHMS
150401/160401 (DC-5)

COURSE OBJECTIVES

- To introduce the topic of algorithms as a precise mathematical concept.
- To study the techniques like recursion, divide and conquer, dynamic programming, greedy approach, backtracking and branch and bound.
- To practice their skills on many well-known algorithms and data structures designed to solve real-life problems.

Unit-I

Introduction to Computational Model: RAM, Turing Machine, Circuit model, PRAM, Bulk Synchronous Parallel (BSP) Model, Algorithms and its Importance, Recurrences and Asymptotic Notations, Mathematical Analysis of Non-Recursive and Recursive Algorithm, Review of Sorting & Searching Algorithms, **Basic Tree and Graph Concepts:** Binary Search Trees, Height Balanced Trees, 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, Examples of Greedy Methods such as Single-Source Shortest Paths, **Minimum Cost Spanning Trees** : Prims's and Kruskal's Algorithm, Knapsack Problem, Dijkstra's Single Source Shortest Path Algorithm, Optimal Storage on Tapes.

Unit-IV

Dynamic Programming: Introduction, Principle of Optimality, Examples of Dynamic Programming Methods such as – 0/1 Knapsack, Traveling Salesman Problem, Floyd's All Pairs Shortest Path, Longest Common Subsequence and Reliability Design.



Unit-V

Backtracking: Concept and its examples like 4-Queen's Problem, Knapsack Problem Hamiltonian Circuit Problem, Graph Coloring Problem etc. **Branch & Bound:** Introduction and its examples like - Traveling Salesperson Problem etc. **NP-Completeness:** Introduction, Class P and NP, Polynomial Reduction, NP-Hard and NP-Complete Problems.

RECOMMENDED BOOKS

- Fundamentals of Computer Algorithms, Horowitz & Sahani, Universities Press.
 - Introduction to Algorithms, Cormen Thomas, Leiserson CE, Rivest RL, PHI.
 - Design & Analysis of Computer Algorithms, Ullmann, Pearson.
 - Algorithm Design, Michael T Goodrich, Roberto Tamassia, Wiley India.
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COURSE OUTCOMES

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

- CO1. tell the basic features of an algorithm.
 - CO2. demonstrate a familiarity with major algorithms and data structures.
 - CO3. apply important algorithmic design paradigms and methods of analysis.
 - CO4. analyze the asymptotic performance of algorithms.
 - CO5. compare different design techniques to develop algorithms for computational problems.
 - CO6. design algorithms using greedy strategy, divide and conquer approach, dynamic programming, backtracking and branch n bound approach.
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DATABASE MANAGEMENT SYSTEM
150402/160402 (DC-6)

COURSE OBJECTIVES

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

Unit-I

DBMS: Concepts & Architecture, Introduction of File Organization Techniques, Database Approach v/s Traditional File Approach, Advantages of Database System, Schemas, Instances, Data Independence, Functions of DBA, Entities & Attributes, Entity Types, Value Sets, Key Attributes, Relationships, E-R Diagram.

Data Models: Hierarchical Data Model, Network Data Model & Relational Data Model, Comparison between Models.

Unit-II

Relational Data Models: Domains, Tuples, Attributes, Relations, Characteristics of Relations, Keys, Attributes of Relation, Relational Database, Integrity Constraints.

Query Languages: Relational Algebra & Relational Calculus, Relational Algebra Operations like Select, Project, Division, Intersection, Union, Division, Rename, Join etc.

Unit-III

SQL: Data Definition, Data Manipulation in SQL, Update Statements & Views in SQL Query & Subquery, Query by example Data Storage Definition, Data Retrieval Queries, Set Operations, Aggregate functions, Nested Sub-Queries, Data Manipulation Statements etc . Overview of Tuple Oriented & Domain Oriented Relational Calculus & Operations.

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Unit-IV

Database Design: Introduction to Normalization, Various Normal Forms: 1NF, 2NF, 3NF, BCNF, Functional Dependency, Attribute Closure, Decomposition, Dependency Preservation, Loss Less & Lossy Join, Problems with Null Valued & Dangling Tuple, Multivalued Dependencies.

Unit-V

Transaction Processing Concepts: Introduction, State Diagram, Properties of Transaction, Types of Transaction, Serializability: Conflict and View Serializability, Concurrency Control: Concepts, Techniques, Concurrent Operation of Databases, Recovery: Introduction, Types of Recovery.

Overview of Distributed Databases: Protection, Security & Integrity Constraints. Relational Database Management Systems: Oracle & Microsoft Access Tools. Basic Concepts of Object Oriented Database System & Design.

RECOMMENDED BOOKS

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

COURSE OUTCOMES

After successful completion of the course students will be able to:

- CO1. tell the terminology, features, classifications, and characteristics embodied in database systems.
- CO2. explain different issues involved in the design and implementation of database system.
- CO3. apply transaction processing concepts and recovery methods over real time data.
- CO4. analyze database schema for a given problem domain.

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- CO5. justify principles for logical design of databases, including the E-R method and normalization approach.
- CO6. formulate, using relational algebra and SQL, solutions to a broad range of query problems.
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OPERATING SYSTEM
150403/160403 (DC-7)

COURSE OBJECTIVES

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

Unit I

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

Unit II

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

Unit III

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

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

Unit IV

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

Unit V

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

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

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RECOMMENDED BOOKS

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

COURSE OUTCOMES

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

- CO1. tell the basic concept of operating systems.
- CO2. explain the working of operating system.
- CO3. develop the solution of various operating system problems/issues.
- CO4. analyze the various operating system problems/issues.
- CO5. measure the performance of various scheduling/allocation approaches.
- CO6. test the working of various scheduling/allocation approaches.

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COMPUTER SYSTEM ORGANIZATION
150404/160404 (DC-8)

COURSE OBJECTIVE

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

Unit -I

Introduction: Von Newman Model, Various Subsystems, 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 Microprogrammed 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

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Transfer), 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.

RECOMMENDED BOOKS

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

COURSE OUTCOMES

After completion of the course students would be able to:

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

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CYBER SECURITY
100004 (MC-2)

COURSE OBJECTIVES

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

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

Unit-II

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

Unit-III

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

Unit-IV

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

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Unit-V

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

RECOMMENDED BOOKS

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

COURSE OUTCOMES

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

- CO1. Tell the basic terminologies of Cyber Security.
 - CO2. Explain the basic concept of networking and Internet.
 - CO3. Apply various methods used to protect data in the internet environment in real world situations.
 - CO4. Discover the concept of IP security and architecture.
 - CO5. Compare various types of cyber security threats/vulnerabilities.
 - CO6. Develop the understanding of cyber crime investigation and IT ACT 2000.
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**PROGRAMMING LAB
(JAVA PROGRAMMING)
150405/160405 (DLC-3)**

COURSE OBJECTIVES

- To understand fundamentals of object-oriented programming in java, including defining classes, invoking methods, using class libraries, etc.
 - To acquire the ability to write a computer program to solve specified problems.
 - To be able to use java SDK environment to create, debug and run simple java programs.
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Unit-I

Introduction to Java programming: Overview and Characteristics of Java, Java Virtual Machine, Installing Java, Java Program Development, Java Source File Structure, Compilation, Executions. Packages, Package Access, Variables and Data Types, Conditional and Looping Constructs, Arrays.

Unit-II

Object-Oriented Programming with Java Classes and Objects: Fields and Methods, Constructors, Overloading Methods, Nested Classes, Overriding Methods, Polymorphism, Making Methods and Classes Final, Wrapper Classes.

Unit-III

Extending Classes and Inheritance: Types of Inheritance in Java, Abstract Classes and Methods, Interfaces, Use of 'Super', Polymorphism in Inheritance. Garbage Collection in Java.

Exception handling: Try- Catch, Throw, Throws, Finally constructs, Exception class.

Unit-IV

String Package and Multithreading: Operation on String, Mutable & Immutable String, Tokenizing a String, Creating Strings using String Buffer Class.

Understanding Threads: Needs of Multi-Threaded Programming, Thread Life-Cycle, Thread Priorities and Synchronizing Threads.

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Department of Computer Science & Engineering and Information Technology

Unit-V

The I/O Package: Input Stream and Output Stream classes, Reader and Writer classes, Basics of AWT, Swing and Applets: Layout Managers, Event Handling, Classes for Various Controls such as Label, Choice, List, Checkbox, etc., Dialogs and Frames using Menus.

Basic Concepts of Networking: Working with URLs, Concepts of URLs and Sockets. Basics of Database Connectivity with JDBC.

RECOMMENDED BOOKS

- Programming with JAVA: A Primer, E. Balagurusamy, Tata McGraw Hill.
- JAVA: The Complete Reference, Herbert Schildt, McGraw Hill Education.
- JAVA-2: The Complete Reference, Patrick Naughton, Herbert Schidt.

COURSE OUTCOMES

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

- CO1.** tell the available features in Java programming language.
- CO2.** illustrate Java programming constructs in solving problems.
- CO3.** make use of Java programming language for creating databases.
- CO4.** test for bugs in a software application written in Java programming language.
- CO5.** determine different ways for handling exception, memory management, file handling, I/O management and internet based application development.
- CO6.** build a project for application development using Java programming language.

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Department of Computer Science & Engineering and Information Technology

Syllabi of Subjects
B.Tech V Semester
(Computer Science & Engineering and
Information Technology)
Under Flexible Curriculum



SOFTWARE ENGINEERING
150502/160502 (DC-9)

COURSE OBJECTIVES

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

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

Unit - II

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

Unit - III

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

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Unit - IV

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

Unit - V

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

RECOMMENDED BOOKS

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

COURSE OUTCOMES

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

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

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THEORY OF COMPUTATION
150503/160503 (DC-10)

COURSE OBJECTIVE

- To understand computability, decidability, and complexity through problem solving.
- To analyse and design abstract model of computation & formal languages.
- To understand and conduct mathematical proofs for computation and algorithms.

Unit-I

Introduction of Automata Theory: Examples of Automata Machines, Finite Automata as a Language Acceptor and Translator, Moore Machines and Mealy Machines, Composite Machine, Conversion from Mealy to Moore and vice versa.

Unit-II

Types of Finite Automata: Non Deterministic Finite Automata (NFA), Deterministic Finite Automata Machines, Conversion of NFA to DFA, Minimization of Automata Machines, Regular Expression, Arden's Theorem. Meaning of Union, Intersection, Concatenation and Closure, 2 Way DFA.

Unit-III

Grammars: Types of Grammar, Context Sensitive Grammar, Context Free Grammar, Regular Grammar. Derivation Trees, Ambiguity in Grammar, Simplification of Context Free Grammar, Conversion of Grammar to Automata Machine and Vice Versa, Chomsky Hierarchy of Grammar, Killing Null and Unit Productions. Chomsky Normal Form and Greibach Normal Form.

Unit-IV

Push DOWN Automata: Example of PDA, Deterministic And Non-Deterministic PDA, Conversion of PDA into Context Free Grammar And vice versa, CFG Equivalent to PDA, Petrinet Model.

Unit-V

Turing Machine: Techniques for Construction. Universal Turing Machine Multitape, Multihead and Multidimensional Turing Machine, N-P Complete Problems. Decidability and Recursively Enumerable Languages, Decidability, Decidable

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Languages, Undecidable Languages, Halting Problem of Turing Machine & The Post Correspondence Problem.

RECOMMENDED BOOKS

- Introduction to Automata Theory Language & Computation, Hopcroft & Ullman, Narosa Publication.
 - Element of the Theory Computation, Lewis & Christors, Pearson.
 - Theory of Computation, Chandrasekhar & Mishra, PHI.
 - Theory of Computation, Wood, Harper & Row.
 - Introduction to Computing Theory, Daniel I-A Cohen, Wiley.
-

COURSE OUTCOMES

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

- CO1. explain the basic concepts of switching and finite automata theory & languages.
 - CO2. relate practical problems to languages, automata, computability and complexity.
 - CO3. construct abstract models of computing and check their power to recognize the languages.
 - CO4. analyse the grammar, its types, simplification and normal form.
 - CO5. interpret rigorously formal mathematical methods to prove properties of languages, grammars and automata.
 - CO6. develop an overview of how automata theory, languages and computation are applicable in engineering application.
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MICROPROCESSOR & INTERFACING
150504/160504 (DC-11)

COURSE OBJECTIVES

- To understand different processors and basic architecture of 16 bit microprocessors.
 - To understand interfacing of 16 bit microprocessor with memory and peripheral chips involving system design.
 - To understand 8051 microcontroller.
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Unit-I

Microprocessors: Introduction to x86 Microprocessors, RISC and CISC Processors, 8086 Architecture-Functional Diagram, Register Organization, Memory Segmentation, Programming Model, Memory Address, Physical Memory Organization, Minimum and Maximum Mode Signals, Bus Cycle and Timing Diagrams, Instruction Formats, Addressing Modes, Instruction Set, Interrupts of 8086.

Unit-II

Basic Peripherals and Interfacing: 8212, 8155, 8255, 8755, Interfacing with LED's, ADC, DAC, Stepper Motors and I/O & Memory Interfacing.

Unit-III

Special Purpose Programmable Peripheral Devices and Interfacing: 8253, 8254 Programmable Interval Timer, 8259A Programmable Interrupt Controller and 8257 DMA Controllers, Keyboard and Display Interfacing.

Unit-IV

Serial and Parallel Data Transfer: Serial and Parallel Data Transmission, Types of Communication System, Baud Rate RS-232C, Modem and various Bus Standards, USART – 8251A.

Unit-V

Introduction to Microcontrollers: 8051 Microprocessor and its Architectures, Pin Description, Input-Output Configurations, Interrupts, Addressing Modes, Overview of 8051 Instruction Set.



RECOMMENDED BOOKS

- The Intel Microprocessors, Architecture, Programming and Interfacing, B.B. Brey, PHI.
 - Microprocessor 8086: Architecture, Programming and Interfacing, Sunil Mathur, PHI.
 - Advanced Microprocessor and Interfacing, D.V. Hall, Mc-Graw Hill.
 - Advanced Microprocessor and Peripherals – Architecture, Programming and Interfacing, A.K. Ray & K.M. Bhurchandi, Tata McGraw Hill.
 - Interfacing Techniques in Digital Design with Emphasis on Microprocessors, R.L. Krutz, John Wiley.
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COURSE OUTCOMES

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

- CO1. compare the architecture and feature of different 16-bit microprocessor interfacing chips & microcontrollers.
 - CO2. develop programming skills in assembly language of 8086 microprocessor and 8051 microcontroller.
 - CO3. demonstrate the concept of interfacing with peripheral devices.
 - CO4. make use of different interrupts and addressing modes.
 - CO5. design an interfacing for I/O devices.
 - CO6. build a system based on 8086 microprocessor and 8051 microcontroller.
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Department of Computer Science & Engineering and Information Technology

Syllabi of Subjects
B.Tech VI Semester
(Computer Science & Engineering and
Information Technology)
Under Flexible Curriculum



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Department of Computer Science & Engineering and Information Technology

COMPILER DESIGN

150601/160601 (DC-12)

COURSE OBJECTIVES

- To learn finite state machines and context free grammar.
 - To learn, various phases of compiler
 - To understand process of compiler implementation.
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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, Tool Based Approach to Compiler Construction.

Unit-II

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

Unit-III

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

Unit-IV

Semantic Analysis: Compilation of Expression, Control, Structures, Conditional Statements, Various Intermediate Code Forms, Syntax Directed Translation, Memory Allocation and Symbol Table Organizations, Static and Dynamic Array Allocation,

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String Allocation, Structure Allocation etc., Error Detection Indication and Recovery, Routines or Printing Various Lexical, 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, Code Improving Transformations, Dealing with Aliases, Data Flow Analysis of Structured Flow Graphs.

RECOMMENDED BOOKS

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

COURSE OUTCOMES

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

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

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COMPUTER NETWORKS

150602/160602 (DC-13)

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- 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.

RECOMMENDED BOOKS

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

COURSE OUTCOMES

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

- CO1. explain the fundamental concepts of computer network.
- CO2. illustrate the basic taxonomy & terminologies of computer network protocols.
- CO3. develop a concept for understanding advance computer network.
- CO4. build the skill of IP addressing and routing mechanism.
- CO5. predict the performance of computer network in congestion and internet.
- CO6. construct the network environment for implementation of computer networking concept.

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Department of Computer Science & Engineering and Information Technology

Departmental Elective (DE-1) Courses

DEPARTMENTAL ELECTIVE (DE-1) OFFERED IN VI SEMESTER



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Department of Computer Science & Engineering and Information Technology

List of Departmental Elective (DE-1) Courses

B.Tech (Computer Science & Engineering / Information Technology)

| DE-1 (Offline Mode) | |
|------------------------|------------------------|
| Subject Code | Subject Name |
| 150611 / 160611 | Network & Web Security |
| 150612 / 160612 | Image Processing |
| 150613 | Mobile Computing |
| 160613 | Agile Methodology |

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NETWORK & WEB SECURITY
150611/ 160611 (DE-1)

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.
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Unit-I

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

Unit-II

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

Unit-III

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

Unit -IV

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

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Department of Computer Science & Engineering and Information Technology

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

Unit -V

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

RECOMMENDED BOOKS

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

COURSE OUTCOMES

After completion of the course students would be able to:

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

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IMAGE PROCESSING
150612/ 160612(DE-1)

COURSE OBJECTIVES

- To understand the fundamentals of image acquisition, image processing in various domains.
 - To understand image transformation, enhancement and restoration techniques used in image processing.
 - To know image registration and segmentation used in image processing.
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Unit- I

Introduction and Fundamentals: Introduction to Image Processing Systems, Digital Image Fundamentals: Components of Digital Image Processing System, Image Model, Imaging Geometry, Sampling and Quantization of Images, Classification of Digital Images, Zooming and Shrinking, Relationship Between Pixels.

Unit- II

Image Enhancement in Spatial Domain: Introduction, Basic Gray Level Function, Piecewise Linear Transformation, Contrast Stretching, Histogram Specification, Histogram Equalization, Local Enhancement using Arithmetic and Logical Operation- Image Subtraction, Image Averaging Image Smoothing: Smoothing Spatial Filters, Smoothing Linear Filters, Image Sharpening.

Unit- III

Image Enhancement in Frequency Domain: Introduction to Fourier Transform, Filters: Low Pass and High Pass, Gaussian Filters, Homomorphic Filtering.
Image Restoration- Model of Image Degradation/Restoration Process, Noise Models, Noise Reduction in Spatial Domain and Frequency Domain, Inverse Filtering, Mean Filters, Least Mean Square(Wiener) Filtering, Fir Wiener Filter.

Unit -IV

Morphological Image Processing: Logic Operation Involving Binary Images, Dilation And Erosion, Opening and Closing, Morphological Algorithms: Boundary

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Extraction, Region Filling, Extraction Of Connected Components, Convex Hull, Thinning, and Thickening.

Unit -V

Image Registration: Introduction, Geometric Transformation, Plane to Plane Transformation, Mapping.

Image Segmentation: Introduction, Region Extraction, Pixel Based Approach, Multilevel Thresholding, Local Thresholding, Region Based Approach, Region Growing, Splitting and Merging, Edge and Line Detection, Corner Detection, Detection of Discontinuities, Edge Linking and Boundary Detection.

RECOMMENDED BOOKS

- Digital Image Processing, Rafael C Gonzalez, Richard E Woods, Pearson Education.
- Fundamentals of Digital Image Processing, K. Jain, Pearson Education.
- Digital Image Processing, S. Esakkirajan, S. Jayaraman, T. Veerakumar, Tata McGraw-Hill Education.

COURSE OUTCOMES

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

- CO1. define different modalities and current techniques in image processing.
- CO2. classify spatial and frequency domain techniques used in image processing.
- CO3. apply image processing techniques to enhance visual images.
- CO4. analyse the constraints in image processing when dealing with real problems.
- CO5. evaluate various enhancement, restoration and retrieval techniques of image processing.
- CO6. design a system using the mathematical models and principles of digital image processing for real world problems.

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Department of Computer Science & Engineering and Information Technology

MOBILE COMPUTING
150613 (DE-1)

COURSE OBJECTIVES

- To introduce the basic concepts and principles in mobile computing.
- To provide a computer systems perspective on the converging areas of wireless networking, mobile devices, and network protocols.
- To introduce wireless communication and networking principles, that support connectivity to cellular networks, wireless internet and sensor devices.

Unit-I

Review of Personal Communication Services (PCS): Basic Concepts of Cellular Systems, Global System for Mobile Communication (GSM), Protocols, Handover, Data Services, and Multiple Division Techniques.

Unit-II

General Packet Radio Services (GPRS): GPRS Architecture, GPRS Network Nodes. Mobile Data Communication: WLANs (Wireless LANs) IEEE 802.11 Standard. Mobile IP.

Unit-III

Wireless Application Protocol (WAP): Mobile Internet Standard. WAP Gateway and Protocols, Wireless Markup Languages (WML).

Unit-IV

Third Generation (3G) Mobile Services: Introduction to International Mobile Telecommunications 2000 (IMT 2000) Vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of Services in 3G.

Unit-V

Wireless Local Loop (WLL): Introduction to WLL Architecture, WLL Technologies. Global Mobile Satellite Systems: Case Studies of IRIDIUM and GLOBALSTAR Systems. Bluetooth Technology, Wi-Fi and Wi-Max.

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RECOMMENDED BOOKS

- Mobile communications, J. Schiller, Pearson Education.
- Wireless and Mobile Networks Architecture, by Yi —Bing Lin, John Wiley & Sons.
- Mobile & Personnel Communication Systems and Services, Raj Pandya, Prentice Hall India.
- Wireless Communication- Principles and Practices, Theodore S. Rappaport, Pearson Education.
- The Wireless Application Protocol, Singhal & Bridgman, Pearson Education.

COURSE OUTCOMES

After completion of the course students would be able to:

- CO1. explain the basic concepts of mobile telecommunications system.
- CO2. demonstrate the infrastructure to develop mobile communications system.
- CO3. classify the different generations and technology for mobile communications.
- CO4. examine the working of different protocols of wireless mobile communication technology.
- CO5. determine the importance of each technology suitable for different situation of mobile and wireless communications.
- CO6. develop protocols for adhoc and infrastructure based wireless networks.

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Department of Computer Science & Engineering and Information Technology

AGILE METHODOLOGY

160613 (DE-1)

COURSE OBJECTIVES

- To understand the background and driving forces for taking an agile approach to software development.
- To understand the business value of adopting agile approaches.
- To understand the agile development practices.

Unit -I

Fundamentals of Agile: The Genesis of Agile, Introduction and Background, Agile Manifesto and Principles, Overview of Scrum, Extreme Programming, Feature Driven Development, Lean Software, Development, Agile Project Management, Design and Development Practices in Agile Projects, Test Driven Development, Continuous Integration, Refactoring, Pair Programming, Simple Design, User Stories, Agile Testing, Agile Tools.

Unit- II

Agile Scrum Framework: Introduction to Scrum, Project Phases, Agile Estimation, Planning Game, Product Backlog, Sprint Backlog, Iteration Planning, User Story Definition, Characteristics and Content of User Stories, Acceptance Tests and Verifying Stories, Project Velocity, Burn Down Chart, Sprint Planning and Retrospective, Daily Scrum, Scrum Roles – Product Owner, Scrum Master, Scrum Team, Scrum Case Study, Tools for Agile Project Management.

Unit- III

Agile Testing: Agile Lifecycle and its Impact on Testing, Test-Driven Development (TDD), Xunit Framework and Tools for TDD, Testing User Stories - Acceptance Tests and Scenarios, Planning and Managing Testing Cycle, Exploratory Testing, Risk Based Testing, Regression Tests, Test Automation, Tools to Support Agile Tester.

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Unit- IV

Agile Software Design and Development: Agile Design Practices, Role of Design Principles Including Single Responsibility Principle, Open Closed Principle, Liskov Substitution Principle, Interface Segregation Principles, Dependency Inversion Principle in Agile Design, Need and Significance of Refactoring, Refactoring Techniques, Continuous Integration, Automated Build Tools, Version Control.

Unit -V

Industry Trends: Market scenario and Adoption of Agile, Agile ALM, Roles in Agile Project, Agile applicability, Agile in Distributed Teams, Business Benefits, Challenges in Agile, Risks and Mitigation, Agile Projects on Cloud, Balancing Agility with Discipline, Agile Rapid Development Technologies.

RECOMMENDED BOOKS

- Agile Software Development with Scrum, Ken Schwaber, Mike Beedle, Pearson.
- Agile Testing: A Practical Guide for Testers and Agile Teams, Lisa Crispin, Janet Gregory, Addison Wesley.
- Agile Software Development, Principles, Patterns and Practices, Robert C. Martin, Prentice Hall.
- Agile Software Development: The Cooperative Game, Alistair Cockburn, Addison Wesley.
- User Stories Applied: For Agile Software, Mike Cohn, Addison Wesley.

COURSE OUTCOMES

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

- CO1. demonstrate scrum release planning, and scrum sprint planning.
- CO2. apply user stories into tasks and ideal day estimates.
- CO3. classify a sprint with sprint reviews and sprint retrospectives.
- CO4. examine the scrum with multiple team or distributed project teams.
- CO5. design test driven and agile principal based software.
- CO6. develop any application using agile methodology.

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***Departmental Elective (DE-2) Courses
offered through
SWAYAM/NPTEL/MOOC Platform
Under Flexible Curriculum***

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Department of Computer Science & Engineering and Information Technology

List of Departmental Elective (DE) Courses

B.Tech (Computer Science & Engineering)

| DE-2 (Online Mode) (through SWAYAM/NPTEL/MOOC based learning platform) | |
|---|----------------------------------|
| Subject Code | Subject Name |
| 150651 | Data Analytics with Python |
| 150652 | Introduction to Machine Learning |
| 150653 | Cloud Computing |

List of Departmental Elective (DE) Courses

B.Tech (Information Technology)

| DE-2 (Online Mode) (through SWAYAM/NPTEL/MOOC based learning platform) | |
|---|----------------------------------|
| Subject Code | Subject Name |
| 160651 | Data Analytics with Python |
| 160652 | Introduction to Machine Learning |
| 160653 | Cloud Computing |

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DEPARTMENTAL ELECTIVE (DE-2) OFFERED IN VI SEMESTER



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Department of Computer Science & Engineering and Information Technology

Open Category (OC) Courses
(offered by Department of CSE & IT)
Under Flexible Curriculum

OPEN CATEGORY (OC-1) OFFERED IN VI SEMESTER



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Department of Computer Science & Engineering and Information Technology

List of Open Category (OC-1) Courses

| OC-1 (To be opted by other department students) | |
|--|----------------------|
| Subject Code | Subject Name |
| 900106 | Data Structures |
| 900107 | Python Programming |
| 900108 | Software Engineering |

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OPEN CATEGORY (OC-1) OFFERED IN VI SEMESTER



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Department of Computer Science & Engineering and Information Technology

DATA STRUCTURES
900106 (OC-1)

COURSE OBJECTIVES

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

Unit-I

Introduction to Data Structures: Algorithms & their Characteristics, Asymptotic Notations. Arrays and its Representations, Index to Address Translation. **Linked List:** Introduction, Implementation of Linked List, Operations, Circular Linked List, Doubly Linked List, Polynomial Manipulation using Linked List.

Unit-II

Stacks: Concepts and Implementation of Stacks, Operations on Stack, Conversion of Infix to Postfix Notation, Evaluation of Postfix Expression, Recursion.
Queues: Concepts and Implementation, Operations on Queues, Dequeue, Priority Queues, Circular Queues and Application.

Unit-III

Trees: Types, Terminology, Binary Tree -Representations, Traversal, Conversion of General Tree to Binary Tree, Binary Search Tree, Threaded Binary Tree and Height Balanced Tree.

Unit-IV

Searching & Sorting: Linear Search, Binary Search, Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort, Radix Sort and Heap Sort, Comparison between Sorting Techniques, Hashing and Collision Resolution Techniques.

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Unit-V

Graphs: Background, Graph Theory Terminologies, Representation of Graphs- Sequential & Linked Representation, Path Matrix, Graph Traversals- BFS, DFS, Spanning Trees, Applications of Graph.

RECOMMENDED BOOKS

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

COURSE OUTCOMES

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

- CO1. outline the basics of algorithms and their performance criteria.
- CO2. explain the working of linear/non-linear data structures.
- CO3. identify the appropriate data structure to solve specific problems.
- CO4. analyze the performance of various data structures & their applications.
- CO5. evaluate the time/space complexities of various data structures & their applications.
- CO6. design the optimal algorithmic solutions for various problems.

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PYTHON PROGRAMMING
900107 (OC-1)

COURSE OBJECTIVES

- To understand the structure and components of a python program.
- To learn the basic construct of python programming for implementing interdisciplinary research-based problems.
- To plot data using appropriate python visualization libraries for analysis.

Unit I

Introduction to Python: Setting Up Programming Environment, Running Python Programs from a Terminal, Variables and Simple Data Types: Variables, Strings, Numbers and Maths, Comments, Conditional Statements, Introducing Loops, Working of Input Function.

Unit II

Tuples and Lists: Tuples, Lists, List Operations, Using If Statements with Lists, Organizing a List, Working with Lists: Looping through Entire List, Making Numeric Lists, Working with Part of List. **Dictionaries and Sets:** Simple Dictionary, Looping Through a Dictionary, Nesting, Example with a Dictionary, Fibonacci and Dictionaries, Global Variables, Defining a Set, Set Operations.

Unit III

Functions: Defining a Function, Passing Arguments, Return Values, Passing a List, Passing an Arbitrary Number of Arguments, Storing Functions in Module, In- Built Functions, Lambda Functions. **Classes and Inheritance:** Object Oriented Programming, Creating and using a Class, Working with Class Instances, Methods, Inheritance, Importing Classes, Python Standard Library.

Unit IV

Files and Exceptions: Reading from a File, Writing to a File, File Operations, Assertions, Exceptions, Exception example. **Debugging:** Programming Challenges, Classes of Tests, Bugs, and Debugging, Debugging examples.

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Unit V

Data Visualization: Installing Matplotlib, Plotting a Simple Line Graph, Random Walks, Making Histogram. **Graphical User Interfaces:** Event-Driven Programming Paradigm; Tkinter Module, Creating Simple GUI; Buttons, Labels, Entry Fields, Dialogs; Widget Attributes - Sizes, Fonts, Colors, Layouts, Nested Frames.

RECOMMENDED BOOKS

- Python Crash Course: A Hands-On, Project-Based Introduction to Programming, By Eric Matthes.
- Learn Python the Hard Way: 3rd Edition.
- T.R. Padmanabhan, Programming with Python, Springer, 1st Ed., 2016.
- Kenneth Lambert, Fundamentals of Python: First Programs, Cengage Learning, 1st Ed., 2012.

COURSE OUTCOMES

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

- CO1. explain the numbers, math, functions, strings, list, tuples and dictionaries in python.
- CO2. apply different decision-making statements and functions.
- CO3. identify the object-oriented programming in python.
- CO4. analyze the different file handling operations.
- CO5. design GUI applications in python and evaluate different database operations.
- CO6. develop client-server network applications using python.

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Department of Computer Science & Engineering and Information Technology

SOFTWARE ENGINEERING
900108 (OC-1)

COURSE OBJECTIVES

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

Unit - I

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

Unit - II

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

Unit - III

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

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Unit - IV

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

Unit - V

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

RECOMMENDED BOOKS

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

COURSE OUTCOMES

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

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

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