

**Savitribai Phule Pune University**  
( Formerly University of Pune)



**Circular No. 284 of 2020**

**Important Notification**

**Dates of Commencement and Conclusion of I<sup>st</sup> & II<sup>nd</sup> terms for the Academic Year 2020-2021  
For affiliated Colleges/recognised Institutes Only.**

It is hereby informed that, the dates of Commencement and conclusion of the I<sup>st</sup> and II<sup>nd</sup> term of for the Academic Year 2020-2021 University Courses, under various faculties shall be as under :

**Dates of Commencement and conclusion of First Year of academic session 2020-21 will be declared later.**

| Sr. No.                               | Name of the Courses and Faculties                 | 2020-2021    |            |              |            |
|---------------------------------------|---|--------------|------------|--------------|------------|
|                                       |   | First Term   |            | Second Term  |            |
|                                       |   | Commencement | Conclusion | Commencement | Conclusion |
| 1                                     | <b>Science &amp; Technology</b>                   |              |            |              |            |
|                                       | Science   | 15/06/2020   | 05/12/2020 | 01/01/2021   | 15/05/2021 |
|                                       | Engineering : SE,TE,BE                            | 15/06/2020   | 05/12/2020 | 01/01/2021   | 15/05/2021 |
|                                       | Engineering :ME - II Year.<br>MCA- II & III Year  | 01/07/2020   | 24/12/2020 | 19/01/2021   | 31/05/2021 |
|                                       | B.Architecture II, III, IV & V Year.              | 15/06/2020   | 05/12/2020 | 01/01/2021   | 15/05/2021 |
|                                       | M. Architecture II Year.                          | 01/07/2020   | 24/12/2020 | 19/01/2021   | 31/05/2021 |
|                                       | B. Pharmacy                                       | 15/06/2020   | 05/12/2020 | 01/01/2021   | 15/05/2021 |
|                                       | M. Pharmacy                                       | 01/07/2020   | 24/12/2020 | 19/01/2021   | 31/05/2021 |
| 2                                     | <b>Commerce &amp; Management</b>                  |              |            |              |            |
|                                       | Commerce  | 15/06/2020   | 05/12/2020 | 01/01/2021   | 15/05/2021 |
|                                       | Management  | 01/07/2020   | 24/12/2020 | 19/01/2021   | 31/05/2021 |
| 3                                     | <b>Humanities</b>                                 |              |            |              |            |
|                                       | Arts & Fine Arts                                  | 15/06/2020   | 05/12/2020 | 01/01/2021   | 15/05/2021 |
|                                       | Mental Moral and Social Sciences                  |              |            |              |            |
| Law : UG & PG<br>( II/III/IV/V Year.) | 01/07/2020  | 24/12/2020   | 19/01/2021 | 31/05/2021   |            |
| 4                                     | <b>Inter-disciplinary Studies</b>                 |              |            |              |            |
|                                       | Education II Year.<br>(B.Ed., M.Ed.)              | 01/07/2020   | 24/12/2020 | 19/01/2021   | 31/05/2021 |
|                                       | Physical Education II Year.<br>(B.P.Ed., M.P.Ed.) | 01/07/2020   | 24/12/2020 | 19/01/2021   | 31/05/2021 |

NOTE

1. In view of prevailing COVID-19 situation in the Country, Colleges / Institutes shall required to follow the guidelines / instructions issued by the Government of Maharashtra time to time.
2. In case, the Principal of the affiliated Colleges require to give additional holiday in exceptional circumstances, he may do by the compensating the same by keeping the College working on Sunday.
3. The Term & holidays for the Post-Graduate courses coundected in the Colleges/Institutes will be as per the University Department.

  
Deputy Registrar  
(P.G.Admission)

Ganeshkhind, Pune-07  
Ref. No. PGS/ 1817  
Date: 15/10/2020

Copy to: for Information and necessary action

The Members of the Management Council.  
The Deans of Faculties.  
The Registrar, Savitribai Phule Pune University, Pune.  
The Director, Examinations & Evaluation, Savitribai Phule Pune University, Pune.  
The Heads of all University Departments.  
The Principals of all Affiliated Colleges.  
The Directors of all Recognized Institutes.  
The Heads of all the Administrative Sections of the University Office.  
Asstt. Registrar, office of the Hon. Vice-Chancellor, Savitribai Phule Pune University  
Asstt. Registrar, office of the Hon. Pro-Vice-Chancellor, Savitribai Phule Pune University



**Nutan Maharashtra Vidya Prasarak Mandal's (NMVPM's)**  
**NUTAN MAHARASHTRA INSTITUTE OF ENGINEERING AND TECHNOLOGY (NMIET)**

Under Administrative Support - Pimpri Chinchwad Education Trust (PCET)



ESTD : 1906

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Affiliated to SPPU

| Sr. No.  | Date                     | Details of Activity  | Documents  | Responsibility                            | Monitoring Control                  | Review & Action Take Report              |
|--|--------------------------|--|--|---|-------------------------------------|--|
| <b>Academic Session (SE, TE &amp; BE)—21/06/2021 to 11/12/2021</b> |                          |  |  |   |                                     |  |
| <b>Academic Session (FE)— TO BE NOTIFIED SEPARATELY</b>            |                          |  |  |   |                                     |  |
| 1  | 21/06/2021 to 25/06/2021 | Department meeting (HoD & Faculties-To be attended by Academic Coordinator)<br>Department activity portfolios,<br>Load Distribution,<br>Time Table(w.e.f 21/06/2021)<br>Target setting for Result(In Comparison with previous years),<br>Teaching plan (OBE),<br>Identification of curriculum gap(Procedure & implementation),<br>Target setting for CO & PO attainment,<br>Procedure & implementation for identification of Bright & Weak Students(Extra efforts for both categories),<br>Planning for Co-Curricular & Extra-curricular activities for ODD Sem.<br>Students Activity Planning (Technical Magazine, Participation in events, etc.)<br>Event Calendar | Agenda, MOM and other supporting documents   | HoD, All Faculties, Portfolio In Charges. | Department Advisory Committee / HOD | HOD, CC-Principal & Academic Coordinator |
| 2  | 21/06/2021               | <b>Commencement of Teaching</b>  |  |   |                                     |  |
| 3  | 25/06/2021               | IQAC Meeting (IQAC Members)  | Agenda, Review of targets achieved till date, Benchmarking Parameters-Discussion & description | IQAC Coordinator                          | IQAC Coordinator                    | IQAC                                     |
| 4  | 25/06/2020               | Departmental Prospective Plan (DPP)  | Presentation by  | HoD & NBA                                 | NBA                                 | HoD, Submit                              |



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|----|--------------------------|---|--|---|---|---|
|    |                          | Presentation by Computer Engineering Department   | HoD in Specific Format (Soft Copy) to be provided by NBA Coordinator, Suggestion by Principal and others and Action Taken thereof. | Coordinator   | Coordinator                                     | presentation one day before the schedule, CC to Principal Sir & NBA Coordinator |
| 5  | 26/06/2020               | DPP Presentation by ENTC Department   |  |   |   |   |
| 6  | 27/06/2020               | DPP Presentation by Information Technology Department   |  |   |   |   |
| 7  | 29/06/2020               | DPP Presentation by Mechanical Engineering Department   |  |   |   |   |
| 8  | 06/07/2020               | Final Benchmark Setting (By IQAC to Department)   | Parameter specific (Academic, R&D, III, EDC, Student professional development, etc.)   | IQAC Coordinator & Academic Coordinator               | IQAC  | IQAC to submit to all department, CC to Principal & Academic Coordinator        |
| 9  | 15/06/2020 to 25/06/2020 | Lab Report (Equipment Status & Maintenance, Consumable)   | Lab Test Reports, Requirement of equipments and consumables etc  | Lab Incharges & HoD                                   | HoD   | HoD to submit compiled report to Principal Sir.                                 |
| 10 | 25/06/2020               | Display of List of Student not taken admission- To be jointly verified by department with student section and account section.  | List of Student taken admission with fees paid, List of students not taken admission   | GFM, GFM In charges, Student Section, Account Section | HoD   | HoD to submit compiled report to Principal Sir.                                 |
| 11 | 06/07/2020 to 11/07/2020 | Academic Audit of PREVIOUS YEAR (2019-20) (Course File(Content-NBA Specific), Departmental Files as per NBA Manual, Portfolio files (if other than NBA) etc.)- SCHEDULE TO BE NOTIFIED SEPARATELY | Audit Format(NBA Coordinator), Team formation for cross departmental audit.  | NBA Coordinator                                       | DAC/ HoD/ Academic Coordinator/ NBA Coordinator | NBA Coordinator to submit report to Principal Sir.                              |
| 12 | 13/07/2020 to 17/07/2020 | Faculty Presentation- Department wise.  | Subject presentation, Innovation TL  | HoD   | HoD/ Academic Coordinator                       |   |



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|----|---------------------------|--|--|---|---------------------------------|---|
|    |                           |  | Practice adoption  |   |                                 |   |
| 13 | 20/07/2020 to 24/07/2020  | 1 <sup>st</sup> Class Test/ Unit Test/ Online MCQs Based Test. (Based on units)                | Notice, Circulars, Question Paper (OBE), MCQs list         | Subject Teacher, Dept. Exam in charge   | HoD, Academic Coordinator       | Attendance, Assessment  |
| 14 | 27/07/2020                | Display of Marks   | List of Student with Marks, Fast & Slow Learner identified | Attendance & Assessment of Students (Fast & Slow Learners) Department Exam In charge, Dept academic coordinator & HoD |                                 |   |
| 15 | 31/07/2020                | Display of Assignment No. 1  | Unit wise question with COs mentioned                      | Subject Teacher   | Dept academic coordinator & HoD |   |
| 16 | 05/08/2020                | Submission of Assignment No. 1   | Unit wise question with COs mentioned                      | Subject Teacher   | Dept academic coordinator & HoD |   |
| 17 | 05/08/2020                | 1 <sup>st</sup> Provision Detention List (Online & Offline Both)                               | List of students with sign, Attendance review Report       | Class Teacher   | DAC/ HOD                        | GFM, HoD, Academic Coordinator  |
| 18 | 07/08/2020                | Letters to Parents (Attendance & Performance)-OTHER THAN ROUTINE/ WEEKLY MESSAGES THROUGH ERP. | Letters with proper address and record                     | GFM & GFM Incharge  | DAC/HoD                         | GFM, HoD, Academic Coordinator  |
| 19 | 20/08/2020 to 25/08/2020  | Pre In Semester Exam (3 Units)   | Notice, Circulars, Convert Question Paper in OBE format    | Subject Teachers  | DAC/HoD                         | Compile All Question Papers in University & OBE Format in department. |
| 20 | To be Notified Separately | *SPPU's IN SEMESTER EXAMINATION  |  |   |                                 |   |
| 21 | 25/08/2020 to 28/08/2020  | MID TERM PRACTICAL SUBMISSION  | TW Marks calculation Sheet, MID TERM Submission Status     | Faculties, DAC  | HoD                             | HoD, Academic Coordinator   |



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|    |                             |   |  |   |                                 |                                      |
|----|-----------------------------|---|--|---|---------------------------------|--------------------------------------|
|    |                             |   | Report   |   |                                 |                                      |
| 22 | 31/08/2020                  | Display of Marks for Pre In Semester Exam   | List of Student with Marks, Fast & Slow Learner identified | Attendance & Assessment of Students (Fast & Slow Learners) Department Exam In charge, Dept academic coordinator & HoD |                                 |                                      |
| 23 | 01/09/2020                  | Display of Assignment No. 2   | Unit wise question with COs mentioned                      | Subject Teacher   | Dept academic coordinator & HoD |                                      |
| 24 | 07/09/2020                  | Submission of Assignment No.2   | Unit wise question with COs mentioned                      | Subject Teacher   | Dept academic coordinator & HoD |                                      |
| 25 | 07/09/2020                  | 2 <sup>nd</sup> Provision Detention List (Online & Offline Both)                                  | List of students with sign, Attendance review Report       | Class Teacher   | DAC/<br>HOD                     | GFM, HoD,<br>Academic<br>Coordinator |
| 26 | 10/09/2020                  | Letters to Parents (Attendance & Performance)-OTHER THAN ROUTINE/<br>WEEKLY MESSAGES THROUGH ERP. | Letters with proper address and record                     | GFM & GFM Incharge  | DAC/HoD                         | GFM, HoD,<br>Academic<br>Coordinator |
| 27 | 25/09/2020 to<br>30/09/2020 | 2 <sup>nd</sup> Class Test/ Unit Test/ Online MCQs Based Test (Based on units)                    | Notice, Circulars, Question Paper (OBE), MCQs list         | Subject Teacher, Dept. Exam in charge   | HoD,<br>Academic<br>Coordinator | Attendance,<br>Assessment            |
| 28 | 30/09/2020                  | Display of Marks  | List of Student with Marks, Fast & Slow Learner identified | Attendance & Assessment of Students (Fast & Slow Learners) Department Exam In charge, Dept academic coordinator & HoD |                                 |                                      |
| 29 | 01/10/2020                  | <b>Conclusion of Teaching</b>   |  |   |                                 |                                      |
| 30 | 03/10/2020                  | Final Detention List (Online & Offline Both)  | List of students with sign, Attendance review Report       | Class Teacher   | DAC/<br>HOD                     | GFM, HoD,<br>Academic<br>Coordinator |
| 31 | To be notified separately   | REMEDIAL TEACHING & ASSESSMENT FOR SLOW LEARNERS  | Session Attd, Assessment &                                 | Subject Teachers,   | DAC/HoD                         | HoD, Academic<br>Coordinator         |



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|    |                             |   |   |                                |         |                              |
|----|-----------------------------|---|---|--------------------------------|---------|------------------------------|
|    |                             |   | analysis Report   | GFM                            |         |                              |
| 32 | 05/10/2020 to<br>09/10/2020 | Pre End Semester Exam (Complete Syllabus) | END TERM<br>Submission Status<br>Report                                   | Faculties,<br>Exam<br>Incharge | DAC/HoD | Academic<br>Coordinator      |
| 33 | 12/10/2020 to<br>14/10/2020 | FINAL PRACTICAL SUBMISSION                | TW Marks<br>calculation Sheet,<br>MID TERM<br>Submission Status<br>Report | Faculties,<br>DAC              | HoD     | HoD, Academic<br>Coordinator |
| 34 | 15/10/2020                  | <b>Conclusion of Semester</b>             |   |                                |         |                              |



## Academic Calendar Session 2020-21(Semester II)

| Sr. No. | Academic Activities  | Scheduled Date/ Period         |
|---------|--|--------------------------------|
|         |  | Higher Semester                |
| 01      | EVEN SEMESTER SESSION  | 25/01/2021 to 30/04/2021       |
| 02      | Commencement of Classes  | 25/01/2021                     |
| 03      | Display of Student's Monthly Attendance ( Dept. to ensure information must be sent to parents) | First Week of Every Month      |
| 04      | Final Year Project Review III  | 01/02/2021 to 06/02/2021       |
| 05      | PUT, ASSIGNMENTS<br>(Continuous Evaluation Activity, Class Test on Each Unit)                  |                                |
|         | Display of Schedule of Assignment I  | 25/02/2021                     |
|         | Pre-In sem. (30 Marks)   | 01/03/2021 to 05/03/2021       |
|         | Display of Pre-In Marks  | 07/03/2021                     |
|         | Identification of Weak Students/ Slow Learner  | 10/03/2021                     |
|         | Display of Schedule of Assignment II   | 20/03/2021                     |
|         | Pre-End Sem. Exam  | 12/04/2021 to 16/04/2021       |
|         | Display of PUT II Marks  | 16/04/2021                     |
| 06      | Final Year Project Review IV   | 08/03/2021 to 10/03/2021       |
| 07      | Remedial Classes for Weaker Students   | 19/04/2021 to 24/04/2021       |
| 08      | Mock Practical Exam  |                                |
| 09      | Performance Improvement Test for Academically Weaker Students                                  | 26/04/2021 to 30/04/2021       |
| 10      | Display of Performance Improvement Test Marks  |                                |
| 11      | Completion of Syllabus   | 10/04/2021                     |
| 12      | Display of Provisional Detention List-I of Students  | 25/02/2021                     |
|         | Display of Provisional Detention List-II of Students   | 25/03/2021                     |
|         | Display of Final Detention List of Students  | 10/04/2021                     |
| 13      | Internal Practical Exam/ Submission/ Project Seminar/Viva                                      | To Be Notified Separately      |
| 14      | External Practical Exam  | As per University Notification |
| 15      | Commencement of University Theory Exam   |                                |

**Note: -**

- Schedule for Seminar, Audit Course, PBL etc (if any) as per curriculum shall be displayed at department level as and when required.
- Academic Calendar for First Year will be notified separately.





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Ref. No. :

Date : 20/01/2021

**Academic Calendar**  
**Session 2020-21(Semester II)**  
List of Holidays (SPPU Calendar)

| Sr. No. | Day of Holiday                      | Date       | Day       |
|---------|-------------------------------------|------------|-----------|
| 1       | Republic Day                        | 26-01-2021 | Tuesday   |
| 2       | Chhatrapati Shivaji Maharaj Jayanti | 19-02-2021 | Friday    |
| 3       | Mahashivratri                       | 11-03-2021 | Thursday  |
| 4       | Holi (Second Day)                   | 29-03-2021 | Monday    |
| 5       | Good Friday                         | 02-04-2021 | Friday    |
| 6       | Gudhi Padwa                         | 13-04-2021 | Tuesday   |
| 7       | Dr. Babasaheb Ambedkar Jayanti      | 14-04-2021 | Wednesday |
| 8       | Ram Navami                          | 21-04-2021 | Wednesday |
| 9       | Maharashtra Din                     | 01-05-2021 | Saturday  |
| 10      | Ramzan - Id (Id-UI-Fitr)(Shawal-1)  | 13-05-2021 | Thursday  |
| 11      | Buddha Pournima                     | 26-05-2021 | Wednesday |
| 12      | Bakri - Id (Id-Uz-Zuha)             | 21-07-2021 | Wednesday |
| 13      | Parsi New Year (Shahenshahi)        | 16-08-2021 | Monday    |
| 14      | Moharum                             | 19-08-2021 | Thursday  |
| 15      | Ganesh Chaturthi                    | 10-09-2021 | Friday    |
| 16      | Mahatma Gandhi Jayanti              | 02-10-2021 | Saturday  |
| 17      | Dasara                              | 15-10-2021 | Friday    |
| 18      | Id-E-Milad                          | 19-10-2021 | Tuesday   |
| 19      | Diwali Amavasaya (Laxmi Pujan)      | 04-11-2021 | Thursday  |
| 20      | Diwali (Bali Pratipada)             | 05-11-2021 | Friday    |
| 21      | Diwali (Bhaubeej)                   | 06-11-2021 | Saturday  |
| 22      | Guru Nanak Jayanti                  | 19-11-2021 | Friday    |
| 23      | Christmas                           | 25-12-2021 | Saturday  |

Academic Coordinator

Principal



## Computer Engineering Department

### Our Department Vision

- “Imbibing quality Technical Education and overall development by endowing students with technical skills and competency in Computer engineering department”

### Our Department Mission

- To impart technical knowledge by adopting effective teaching learning processes.
- To inculcate the students with emerging technologies to transform them as professionally competent to serve needs of industry and society.
- To provide a better environment to achieve problem solving skills in students.
- To educate students to be responsive in research, ethical, soft skills and social as a holistic development.

## Programme Outcome (POs)

The students in the course will attain:

1. **Engineering Knowledge:**  
An ability to apply knowledge of computing, mathematics including discrete mathematics as well as probability and statistics, science, and engineering and technology;
2. **Problem Analysis:**  
An ability to define a problem and provide a systematic solution with the help of conducting experiments, as well as analyzing and interpreting the data;
3. **Design / Development of Solutions:**  
An ability to identify, formulate, and provide systematic solutions to complex engineering problems;
4. **Conduct investigations of complex problems:**  
An ability to use the techniques, skills, and modern engineering technologies tools, standard processes necessary for practice as an IT professional;
5. **Modern Tool Usage**  
An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modelling and design of computer-based systems with necessary constraints and assumptions;
6. **The Engineer and Society**  
An ability to analyze the local and global impact of computing on individuals, organizations and society;
7. **Environment and Sustainability**  
An ability to understand professional, ethical, legal, security and social issues and responsibilities;

8. **Ethics**

An ability to function effectively as an individual or as a team member to accomplish a desired goal.

9. **Individual and Team Work**

An ability to engage in life - long learning and continuing professional development to cope up with fast changes in the technologies/tools with the help of electives, professional organizations and extra - curricular activities;

10. **Communication**

An ability to communicate effectively in engineering community at large by means of effective presentations, report writing, paper publications, demonstrations;

11. **Project Management & Finance**

An ability to understand engineering, management, financial aspects, performance, optimizations and time complexity necessary for professional practice;

12. **Lifelong learning**

An ability to apply design and development principles in the construction of software systems of varying complexity.

## Programme Specifics Outcomes (PSO)

A graduate of the Computer Engineering Program will demonstrate

**PSO1: Professional Skills** - The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying.

**PSO2: Problem-Solving Skills** - The ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.

**PSO3: Successful Career and Entrepreneurship** - The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, and a zest for higher studies.

## Programme Educational Objectives (PEO's)

The students of Computer Engineering course after passing out will

**PEO1** : To prepare globally competent graduates having strong fundamentals, domain knowledge, updated with modern technology to provide the effective solutions for engineering problems.

**PEO2** : To prepare the graduates to work as a committed professional with strong professional ethics and values, sense of responsibilities, understanding of legal, safety, health, societal, cultural and environmental issues.

**PEO3** : To prepare committed and motivated graduates with research attitude, lifelong learning, investigative approach, and multidisciplinary thinking..

**PEO4 :** To prepare the graduates with strong managerial and communication skills to work effectively as individual as well as in teams

## **Electronics & Telecommunication Department**

### **Institute Vision, Mission, E&TC Department Vision, Mission, PEOs, PSOs, POs**

#### **Vision of Institute:**

To be a recognizable institution for providing quality technical education & ensuring holistic development of students

#### **Mission of Institute:**

To nurture engineering graduates with highest technical competence, professionalism and problem solving skills to serve needs of industry & society.

#### **Department Vision:**

To be recognizable in Electronics & Telecommunication engineering for providing quality technical education & ensuring holistic development of students.

#### **Department Mission:**

- 1) By imparting quality technical education for students with the help of excellent teaching learning process.
- 2) To enhance the employability through Industry Institute Partnership.
- 3) To enhance the knowledge of the students in research by project based learning.
- 4) To inculcate the needs of profession for the society.

#### **Program Educational Objectives (PEOs)**

The students of E&TC Engineering course after passing out will

1. Provide graduates with a strong foundation in mathematics, science and engineering fundamentals to enable them to devise and deliver efficient solutions to challenging problems in Electronics, Communications and allied disciplines.
2. Impart analytic and thinking skills to develop initiatives and innovative ideas for R&D, Industry and societal requirements.
3. Provide sound theoretical and practical knowledge of E&C Engineering, managerial and entrepreneurial skills to enable students to contribute to the well-being of society with a global outlook.
4. Inculcate qualities of teamwork as well as social, interpersonal and leadership skills and an ability to adapt to evolving professional environments in the domains of engineering and technology.

#### **Program Specific Outcomes (PSOs)**

The Program Specific Outcomes for E&TC Engineering course are

1. The ability to absorb and apply fundamental knowledge of core Electronics and Communication Engineering subjects in the analysis, design, and development of various types of integrated electronic systems as well as to interpret and synthesize the experimental data leading to valid conclusions.

2. Competence in using electronic modern IT tools (both software and hardware) for the design and analysis of complex electronic systems in furtherance to research activities.
3. Excellent adaptability to changing work environment, good interpersonal skills as a leader in a team in appreciation of professional ethics and societal responsibilities.

### **Program Outcomes (POs)**

The students in the course will attain:

#### **1. Engineering Knowledge:**

An ability to apply knowledge of computing, mathematics including discrete mathematics as well as probability and statistics, science, and engineering and technology;

#### **2. Problem Analysis:**

An ability to define a problem and provide a systematic solution with the help of conducting experiments, as well as analyzing and interpreting the data;

#### **3. Design / Development of Solutions:**

An ability to identify, formulate, and provide systematic solutions to complex engineering problems;

#### **4. Conduct investigations of complex problems:**

An ability to use the techniques, skills, and modern engineering technologies tools, standard processes necessary for practice as an IT professional;

#### **5. Modern Tool Usage**

An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modelling and design of computer-based systems with necessary constraints and assumptions.

6. The Engineer and Society An ability to analyze the local and global impact of computing on individuals, organizations and society;

#### **7. Environment and Sustainability**

An ability to understand professional, ethical, legal, security and social issues and responsibilities;

#### **8. Ethics**

An ability to function effectively as an individual or as a team member to accomplish a desired goal(s);

#### **9. Individual and Team Work**

An ability to engage in life - long learning and continuing professional development to cope up with fast changes in the technologies/tools with the help of electives, professional organizations and extra - curricular activities;

#### **10. Communication**

An ability to communicate effectively in engineering community at large by means of effective presentations, report writing, paper publications, demonstrations;

### **11. Project Management & Finance**

An ability to understand engineering, management, financial aspects, performance, optimizations and time complexity necessary for professional practice;

### **12. Lifelong learning**

An ability to apply design and development principles in the construction of software systems of varying complexity.

## **Information Technology (IT) Department**

### **Our Department Vision**

- “The vision of the Information Technology Department is to be a reputed organization in engineering education and research which aimed towards betterment of society.”

### **Our Department Mission**

- Provide quality education to meet the employability skill of industry and betterment of society.
- Provide a learning ambience to enhance innovations, problem solving skills, leadership qualities, team-spirit and ethical responsibilities.
- Establish Industry Institute Interaction program to enhance the entrepreneurship skills
- Promote research based education in the emerging areas of technology convergence

## **Programme Outcome (POs)**

**The students in the course will attain:**

1. **Engineering Knowledge:**  
An ability to apply knowledge of computing, mathematics including discrete mathematics as well as probability and statistics, science, and engineering and technology;
2. **Problem Analysis:**  
An ability to define a problem and provide a systematic solution with the help of conducting experiments, as well as analyzing and interpreting the data;
3. **Design / Development of Solutions:**  
An ability to identify, formulate, and provide systematic solutions to complex engineering problems;
4. **Conduct investigations of complex problems:**  
An ability to use the techniques, skills, and modern engineering technologies tools, standard processes necessary for practice as an IT professional;
5. **Modern Tool Usage**  
An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modelling and design of computer-based systems with necessary constraints and assumptions;

6. **The Engineer and Society**  
An ability to analyze the local and global impact of computing on individuals, organizations and society;
7. **Environment and Sustainability**  
An ability to understand professional, ethical, legal, security and social issues and responsibilities;
8. **Ethics**  
An ability to function effectively as an individual or as a team member to accomplish a desired goal.
9. **Individual and Team Work**  
An ability to engage in life - long learning and continuing professional development to cope up with fast changes in the technologies/tools with the help of electives, professional organizations and extra - curricular activities;
10. **Communication**  
An ability to communicate effectively in engineering community at large by means of effective presentations, report writing, paper publications, demonstrations;
11. **Project Management & Finance**  
An ability to understand engineering, management, financial aspects, performance, optimizations and time complexity necessary for professional practice;
12. **Lifelong learning**  
An ability to apply design and development principles in the construction of software systems of varying complexity.

## **Programme Specifics Outcomes (PSO)**

A graduate of the Information Technology Program will demonstrate:

**PSO1** - An ability to apply the theoretical concepts and practical knowledge of Information Technology in analysis, design, development and management of information processing systems and applications in the interdisciplinary domain.

**PSO2** - An ability to analyze a problem, and identify and define the computing infrastructure and operations requirements appropriate to its solution. IT graduates should be able to work on large-scale computing systems

**PSO3** - An understanding of professional, business and business processes, ethical, legal, security and social issues and responsibilities.

**PSO4** - Practice communication and decision-making skills through the use of appropriate technology and be ready for professional responsibilities.

## **Programme Educational Objectives (PEO's)**

ThA graduate of the Information Technology Program will demonstrate:

**PEO1** : Possess strong fundamental concepts in mathematics, science, engineering and Technology to address technological challenges.

**PE02** : Possess knowledge and skills in the field of Computer Science and Information Technology for analyzing, designing and implementing complex engineering problems of any domain with innovative approaches.

**PE03** : Possess an attitude and aptitude for research, entrepreneurship and higher studies in the field of Computer Science and Information Technology.

**PE04** : Have commitment to ethical practices, societal contributions through communities and life-long learning

**PE05** : Possess better communication, presentation, time management and teamwork skills leading to responsible & competent professionals and will be able to address challenges in the field of IT at global level.

## **Mechanical Engineering Department**

### **Vision of the Department**

“To be recognizable mechanical engineering education provider for serving needs of industry, society & satisfying all stakeholders”

### **Mission of the Department**

1. To provide quality technical education with best possible infrastructure.
2. To facilitate students with real life industrial problem by building strong bridge between industry and department.
3. To inculcate students with aptitude of research, innovation and entrepreneurship skills.
4. To sensitize graduates with professionalism and sense of gratitude towards society.

### **Programme Outcome (POs)**

**The students in the course will attain:**

1. Engineering Knowledge: An ability to apply knowledge of computing, mathematics including discrete mathematics as well as probability and statistics, science, and engineering and technology;
2. Problem Analysis: An ability to define a problem and provide a systematic solution with the help of conducting experiments, as well as analyzing and interpreting the data;
3. Design / Development of Solutions: An ability to identify, formulate, and provide systematic solutions to complex engineering problems;
4. Conduct investigations of complex problems: An ability to use the techniques, skills, and modern engineering technologies tools, standard processes necessary for practice as an IT professional;



5. Modern Tool Usage: An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modelling and design of computer-based systems with necessary constraints and assumptions;
6. The Engineer and Society: An ability to analyze the local and global impact of computing on individuals, organizations and society;
7. Environment and Sustainability: An ability to understand professional, ethical, legal, security and social issues and responsibilities;
8. Ethics: An ability to function effectively as an individual or as a team member to accomplish a desired goal(s);
9. Individual and Team Work: An ability to engage in life - long learning and continuing professional development to cope up with fast changes in the technologies/tools with the help of electives, professional organizations and extra - curricular activities;
10. Communication: An ability to communicate effectively in engineering community at large by means of effective presentations, report writing, paper publications, demonstrations;
11. Project Management & Finance: An ability to understand engineering, management, financial aspects, performance, optimizations and time complexity necessary for professional practice;
12. Lifelong learning: An ability to apply design and development principles in the construction of software systems of varying complexity.

## Programme Specifics Outcomes (PSO)

**PSO 1** - Analyzing and designing optimal solution(s) in the fields of Design, Thermal, Manufacturing and Industrial Engineering according to industry needs.

**PSO 2**- Develop an aptitude of innovative product development & providing solution to live industrial problems by equipping with modern analytical tools.

## Programme Educational Objectives (PEO's)

Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

| Program Educational Objectives (PEOs). |  |
|--|--|
| PEO1                                   | To build strong foundation in engineering fundamentals to synthesize innovative solution                 |
| PEO2                                   | To develop technical professional to solve complex engineering problem                                   |
| PEO3                                   | To impart engineering & technical skills along with lifelong learning to make aware about latest trends. |
| PEO4                                   | To inculcate the spirit for professional & social ethics.  |







# **Fourth Year of Information Technology (2015 Course)**

## **414453: Information and Cyber Security**

### **Course Outcomes:**

By the end of the course, students should be able to

1. Use basic cryptographic techniques in application development.
2. Apply methods for authentication, access control, intrusion detection and prevention.
3. To apply the scientific method to digital forensics and perform forensic investigations.
4. To develop computer forensics awareness.
5. Ability to use computer forensics tools.

## **414454: Machine Learning and Applications**

### **Course Outcomes:**

By the end of the course, students should be able to

1. Model the learning primitives.
2. Build the learning model.
3. Tackle real world problems in the domain of Data Mining and Big Data Analytics, Information Retrieval, Computer vision, Linguistics and Bioinformatics.

## **414455: Software Design and Modeling**

### **Course Outcomes:**

By the end of the course, students should be able to

1. Understand object oriented methodologies, basics of Unified Modeling Language (UML).
2. Understand analysis process, use case modeling, domain/class modeling
3. Understand interaction and behavior modeling.
4. Understand design process and business, access and view layer class design
5. Get started on study of GRASP principles and GoF design patterns.
6. Get started on study of architectural design principles and guidelines in the various type of application development.

## **414456A: Elective-I**

### **Wireless Communications**

### **Course Outcomes:**

By the end of the course, students should be able to

1. Understand the basics of propagation of radio signals.
2. Understand the basic concepts of basic Cellular System and the design requirements.
3. Have an understanding of the basic principles behind radio resource management techniques such as power control, channel allocation and handoffs.
4. Gain insights into various mobile radio propagation models and how the diversity can

beexploited to improve performance.

5. Gain knowledge and awareness of the technologies for how to effectively share spectrum through multiple access techniques i.e. TDMA, CDMA, FDMA etc.
6. Have in-depth understanding of the design consideration and architecture for different Wireless Systems like GSM, CDMA, GPRS etc.
7. Understanding of the emerging trends in Wireless communication like WiFi, WiMAX, Software Defined Radio (SDR) and related issues and challenges.

# Final Year E&TC Engineering (2015 Course)

## 404181 VLSI Design & Technology

### Course Outcomes:

On completion of the course, student will be able to

1. Write effective HDL coding for digital design.
2. Apply knowledge of real time issues in digital design.
3. Model digital circuit with HDL, simulate, synthesis and prototype in PLDs.
4. Design CMOS circuits for specified applications.
5. Analyze various issues and constraints in design of an ASIC
6. Apply knowledge of testability in design and build self test circuit.

## 404182 Computer Networks & Security

### Course Outcomes:

On completion of the course, student will be able to

1. Understand fundamental underlying principles of computer networking
2. Describe and analyze the hardware, software, components of a network and their interrelations.
3. Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies
4. Have a basic knowledge of installing and configuring networking applications.
5. Specify and identify deficiencies in existing protocols, and then go onto select new and better protocols.
6. Have a basic knowledge of the use of cryptography and network security.

## 404183 Radiation and Microwave Techniques

### Course Outcomes:

On completion of the course, student will be able to

1. Differentiate various performance parameters of radiating elements.
2. Analyze various radiating elements and arrays.
3. Apply the knowledge of waveguide fundamentals in design of transmission lines.
4. Design and set up a system consisting of various passive microwave components.
5. Analyze tube based and solid state active devices along with their applications.
6. Measure various performance parameters of microwave components.

## 404184 Digital Image and Video Processing (Elective-I)

### Course Outcomes:

On completion of the course, student will be able to

1. Develop and implement basic mathematical operations on digital images.
2. Analyze and solve image enhancement and image restoration problems.

3. Identify and design image processing techniques for object segmentation and recognition.
4. Represent objects and region of the image with appropriate method.
5. Apply 2-D data compression techniques for digital images.
6. Explore video signal representation and different algorithm for video processing.



# **Fourth Year of Computer Engineering (2015 Course)**

## **410241: High Performance Computing**

### **Course Outcomes:**

On completion of the course, student will be able to–

- Describe different parallel architectures, inter-connect networks, programming models
- Develop an efficient parallel algorithm to solve given problem
- Analyze and measure performance of modern parallel computing systems
- Build the logic to parallelize the programming task

## **410242: Artificial Intelligence and Robotics**

### **Course Outcomes:**

On completion of the course, student will be able to–

- Identify and apply suitable Intelligent agents for various AI applications
- Design smart system using different informed search / uninformed search or heuristic approaches.
- Identify knowledge associated and represent it by ontological engineering to plan a strategy to solve given problem.
- Apply the suitable algorithms to solve AI problems

## **410243: Data Analytics**

### **Course Outcomes:**

On completion of the course, student will be able to–

- Write case studies in Business Analytic and Intelligence using mathematical models
- Present a survey on applications for Business Analytic and Intelligence
- Provide problem solutions for multi-core or distributed, concurrent/Parallel environments

### **Elective I**

## **410244(A): Digital Signal Processing**

### **Course Outcomes:**

On completion of the course, student will be able to–

- Understand the mathematical models and representations of DT Signals and Systems
- Apply different transforms like Fourier and Z-Transform from applications point of view.
- Understand the design and implementation of DT systems as DT filters with filter structures and different transforms.
- Demonstrate the knowledge of signals and systems for design and analysis of systems
- Apply knowledge and use the signal transforms for digital processing applications

## Second Year of Computer Engineering (2019 Course)

### 210241: Discrete Mathematics

#### *Course Outcomes:*

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

- CO1: Formulate** problems precisely, solve the problems, apply formal proof techniques, and explain the reasoning clearly.
- CO2: Apply** appropriate mathematical concepts and skills to solve problems in both familiar and unfamiliar situations including those in real-life contexts.
- CO3: Design and analyze** real world engineering problems by applying set theory, propositional logic and to construct proofs using mathematical induction.
- CO4: Specify, manipulate and apply** equivalence relations; construct and use functions and apply these concepts to solve new problems.
- CO5: Calculate** numbers of possible outcomes using permutations and combinations; to model and analyze computational processes using combinatorics.
- CO6: Model and solve** computing problem using tree and graph and solve problems using appropriate algorithms.
- CO7: Analyze** the properties of binary operations, apply abstract algebra in coding theory and evaluate the algebraic structures.

### 210242: Fundamentals of Data Structures

#### *Course Outcomes:*

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

- CO1: Design** the algorithms to solve the programming problems, **identify** appropriate algorithmic strategy for specific application, and **analyze** the time and space complexity.
- CO2: Discriminate** the usage of various structures, **Design/Program/Implement** the appropriate data structures; use them in implementations of abstract data types and Identity the appropriate data structure in approaching the problem solution.
- CO3: Demonstrate** use of sequential data structures- Array and Linked lists to store and process data.
- CO4: Understand** the computational efficiency of the principal algorithms for searching and sorting and choose the most efficient one for the application.

**CO5: Compare and contrast** different implementations of data structures (dynamic and static).

**CO6: Understand, Implement and apply** principles of data structures-stack and queue to solve computational problems.

### 210243: Object Oriented Programming (OOP)

#### *Course Outcomes:*

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

**CO1: Apply** constructs- sequence, selection and iteration; classes and objects, inheritance, use of predefined classes from libraries while developing software.

**CO2: Design** object-oriented solutions for small systems involving multiple objects.

**CO3: Use** virtual and pure virtual function and complex programming situations.

**CO4: Apply** object-oriented software principles in problem solving.

**CO5: Analyze** the strengths of object-oriented programming.

**CO6: Develop** the application using object oriented programming language (C++).

### 210244: Computer Graphics

#### *Course Outcomes:*

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

**CO1: Identify** the basic terminologies of Computer Graphics and interpret the mathematical foundation of the concepts of computer graphics.

**CO2: Apply** mathematics to develop Computer programs for elementary graphic operations.

**CO3: Illustrate** the concepts of windowing and clipping and **apply** various algorithms to fill and clip polygons.

**CO4: Understand and apply** the core concepts of computer graphics, including transformation into two and three dimensions, viewing and projection.

**CO5: Understand** the concepts of color models, lighting, shading models and hidden surface elimination.

**CO6: Create** effective programs using concepts of curves, fractals, animation and gaming.

### 210245: Digital Electronics and Logic Design

#### *Course Outcomes:*

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

**CO1: Simplify** Boolean Expressions using K Map.

**CO2: Design and implement** combinational circuits.

**CO3: Design and implement** sequential circuits.

**CO4: Develop** simple real-world application using ASM and PLD.

**CO5: Differentiate and choose** appropriate logic families IC packages as per the given design specifications.

**CO6: Explain** organization and architecture of computer system

## **Third Year of Computer Engineering (2019 Course)**

### **310241: Database Management Systems**

#### **Course Outcomes:**

After completion of the course, students should be able to

- CO1:** Analyze and design database management system using different data models
- CO2:** Implement database queries using database languages
- CO3:** Normalize the database design using normal forms
- CO4:** Design & develop transaction processing approach for relational databases.
- CO5:** Use NoSQL databases for processing unstructured data
- CO6:** Understand advances in databases

### **310242: Theory of Computation**

#### **Course Outcomes:**

After completion of the course, students should be able to

- CO1:** Understand formal language, translation logic, essentials of translation, alphabets, languagerepresentation and apply it to design Finite Automata and its variants
- CO2:** Construct regular expression to present regular language and understand pumping lemma forRE
- CO3:** Design Context Free Grammars and learn to simplify the grammar
- CO4:** Construct Pushdown Automaton model for the Context Free Language
- CO5:** Design Turing Machine for the different requirements outlined by theoretical computerscience
- CO6:** Understand different classes of problems, classify and analyze them and study concepts ofNP completeness

### **310243: Systems Programming & Operating System**

#### **Course Outcomes:**

On completion of the course, students should be able to

- CO1:** Analyze basic system software
- CO2:** Design & implement system software
- CO3:** Analyze different schemes for designing loader and linker
- CO4:** Use language translation tools like LEX & YACC
- CO5:** Understand Operating System concepts
- CO6:** Analyze the organization of memory and memory management

## **310244: Computer Networks and Security**

### **Course Outcomes:**

On completion of the course, students should be able to

- CO1:** Analyze computer networks, architectures, protocols and technologies
- CO2:** Illustrate the working and functions of data link layer
- CO3:** Analyze the working of different routing protocols and mechanisms
- CO4:** Implement client-server applications using sockets
- CO5:** Illustrate role of application layer with its protocols, Client-Server architectures
- CO6:** Comprehend the basics of information security

## **310245(A): Internet of Things and Embedded Systems**

### **Course Outcomes:**

On completion of the course, students should be able to

- CO1:** Understand the fundamentals and need of embedded system for the Internet of Things
- CO2:** Apply IoT enabling technologies for developing IoT systems
- CO3:** Apply design methodology for designing and implementing IoT applications
- CO4:** Analyze IoT protocols for making IoT devices communication
- CO5:** Design cloud based IoT systems
- CO6:** Design and Develop secured IoT applications

**Savitribai Phule Pune University Final Year of Mechanical Engineering (2015 Course) :**

**Course Code : 402041      Course Name : Hydraulics and Pneumatics**

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

- Understand working principle of components used in hydraulic & pneumatic systems
- Identify various applications of hydraulic & pneumatic systems
- Selection of appropriate components required for hydraulic and pneumatic systems
- Analyse hydraulic and pneumatic systems for industrial/mobile applications
- Design a system according to the requirements
- Develop and apply knowledge to various applications

**Course Code : 402042      Course Name : CAD CAM and Automation**

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

- Apply homogeneous transformation matrix for geometrical transformations of 2D CAD entities for basic geometric transformations.
- Use analytical and synthetic curves and surfaces in part modeling.
- Do real time analysis of simple mechanical elements like beams, trusses, etc. and comment on safety of engineering components using analysis software.
- Generate CNC program for Turning / Milling and generate tool path using CAM software.
- Demonstrate understanding of various rapid manufacturing techniques and develop competency in designing and developing products using rapid manufacturing technology.
- Understand the robot systems and their applications in manufacturing industries.

**Course Code : 402043      Course Name : Dynamics of Machinery**

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

- Apply balancing technique for static and dynamic balancing of multi cylinder inline and radial engines.
- Estimate natural frequency for single DOF undamped & damped free vibratory systems.

- Determine response to forced vibrations due to harmonic excitation, base excitation and excitation due to unbalance forces.
- Estimate natural frequencies, mode shapes for 2 DOF undamped free longitudinal and torsional vibratory systems.
- Describe vibration measuring instruments for industrial / real life applications along with suitable method for vibration control.
- Explain noise, its measurement & noise reduction techniques for industry and day today life problems.

**Course Code : 402044 A      Course Name : Elective – I Finite Element Analysis**

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

- Understand the different techniques used to solve mechanical engineering problems.
- Derive and use 1-D and 2-D element stiffness matrices and load vectors from various methods to solve for displacements and stresses.
- Apply mechanics of materials and machine design topics to provide preliminary results used for testing the reasonableness of finite element results.
- Explain the inner workings of a finite element code for linear stress, displacement, temperature and modal analysis.
- Use commercial finite element analysis software to solve complex problems in solid mechanics and heat transfer.
- Interpret the results of finite element analyses and make an assessment of the results in terms of modeling (physics assumptions) errors, discretization (mesh density and refinement toward convergence) errors, and numerical (round-off) errors.

**Course Code : 402044 B      Course Name : Elective – I Computational Fluid Dynamics**

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

- Analyze and model fluid flow and heat transfer problems.
- Generate high quality grids and interpret the correctness of numerical results with physics.
- Conceptualize the programming skills.
- Use a CFD tool effectively for practical problems and research.

**Course Code : 402044 C**                      **Course Name : Elective – I Heating, Ventilation, Air Conditioning and Refrigeration Engineering**

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

- Determine the performance parameters of trans-critical & ejector refrigeration systems
- Estimate thermal performance of compressor, evaporator, condenser and cooling tower.
- Describe refrigerant piping design, capacity & safety controls and balancing of vapour compressor system.
- Explain importance of indoor and outdoor design conditions, IAQ, ventilation and air distribution system.
- Estimate heat transmission through building walls using CLTD and decrement factor & time lag methods with energy-efficient and cost-effective measures for building envelope.
- Explain working of types of desiccant, evaporative, thermal storage, radiant cooling, clean room and heat pump air-conditioning systems.

**Course Code : 402045 A**                      **Course Name : Elective – II Automobile Engineering**

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

- To compare and select the proper automotive system for the vehicle.
- To analyse the performance of the vehicle.
- To diagnose the faults of automobile vehicles.
- To apply the knowledge of EVs, HEVs and solar vehicles

**Course Code : 402045 B**                      **Course Name : Elective – II Operation Research**

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

- Apply LPP and Decision Theory to solve the problems
- Apply the concept of transportation models to optimize available resources.
- Decide optimal strategies in conflicting situations.
- Implement the project management techniques.
- Minimize the process time
- Optimize multi stage decision making problems





N.M.V.P. Mandal's  
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Engineering & Technology

Record No:

Revision:

Date:

Teaching Plan:20-21 TE ENTC Sem 1 - DC-Digital  
Communication(304181)

|                            |  |                               |
|----------------------------|--|-------------------------------|
| Department :ENTC           | Academic Year :2020-2021                 | Semester :Sem 1               |
| Class :20-21 TE ENTC Sem 1 | Course :DC-Digital Communication(304181) | Staff :Neeta Pramod Karhadkar |
| Teaching Scheme :          | Lecture/Week : 4 / week                  | Tutorials/week :              |
| Examination Scheme :       | Theory :<br>T/W :                        | O/L Exam :                    |

Summary

| Unit No | Title                                 | No.of Lecture | Planned | Completed | % Complete | Planned Date of Completion | Actual Date of Completion |
|---------|---------------------------------------|---------------|---------|-----------|------------|----------------------------|---------------------------|
| 1       | Digital Transmission of Analog Signal | 9             | 0       | 9         | 100.00     |                            | 10 Aug 2020               |
| 2       | Baseband Digital Transmission         | 7             | 0       | 7         | 100.00     |                            | 09 Sep 2020               |
| 3       | Random Signal & Noise                 | 8             | 0       | 2         | 25.00      |                            |                           |
| 4       | Baseband Receiver                     | 8             | 0       | 0         | 0.00       |                            |                           |
| 5       | PassbandDigital Transmission          | 8             | 0       | 0         | 0.00       |                            |                           |
| 6       | Spread Spectrum Modulation            | 8             | 0       | 0         | 0.00       |                            |                           |



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Date:

| Lect #                                       | Contents to be Covered  | Content Delivery Method(CDM) used | Proposed Date | Conducted Date |
|--|---|-----------------------------------|---------------|----------------|
| <b>Digital Transmission of Analog Signal</b> |   |                                   |               |                |
| 1  | UNIT I :Introduction to Digital Communication System: Block Diagram and transformations | Lecture With Interaction          |               | 29 Jun 2020    |
| 2  | Basic Digital Communication Nomenclature  | Lecture With Interaction          |               | 02 Jul 2020    |
| 3  | Digital Versus Analog Performance Criteria  | Lecture With Interaction          |               | 03 Jul 2020    |
| 4  | Sampling Process  | Lecture With Interaction          |               | 06 Jul 2020    |
| 5  | PCM Generation and Reconstruction   | Lecture With Interaction          |               | 09 Jul 2020    |
| 6  | Quantization Noise  | Lecture With Interaction          |               | 17 Jul 2020    |
| 7  | PCM with noise: Decoding noise  | Lecture With Interaction          |               | 23 Jul 2020    |
| 8  | Delta Modulation  | Lecture With Interaction          |               | 29 Jul 2020    |
| 9  | Delta Sigma Modulation  | Lecture With Interaction          |               | 10 Aug 2020    |
| <b>Baseband Digital Transmission</b>         |   |                                   |               |                |
| 10   | UNIT II :Digital Multiplexing: Multiplexers and hierarchies Data Multiplexers           | Lecture With Interaction          |               | 12 Aug 2020    |
| 11   | Data formats and their spectra  | Lecture With Interaction          |               | 27 Aug 2020    |
| 12   | synchronization: Bit Synchronization  | Lecture With Interaction          |               | 31 Aug 2020    |
| 13   | Scramblers  | Lecture With Interaction          |               | 02 Sep 2020    |
| 14   | Frame Synchronization   | Lecture With Interaction          |               | 03 Sep 2020    |
| 15   | Inter-symbol interference   | Lecture With Interaction          |               | 04 Sep 2020    |
| 16   | Equalization  | Lecture With Interaction          |               | 09 Sep 2020    |
| <b>Random Signal &amp; Noise</b>             |   |                                   |               |                |
| 17   | UNIT-III :Introduction  | Lecture With Interaction          |               | 24 Sep 2020    |
| 18   | Stationary processes  | Lecture With Interaction          |               | 18 Nov 2020    |
| 19   | Correlation & Covariance function   | Lecture With Interaction          |               |                |
| 20   | Ergodic processes   | Lecture With Interaction          |               |                |
| 21   | Transmission of a random process through a LTI filter                                   | Lecture With Interaction          |               |                |
| 22   | Power spectral density  | Lecture With Interaction          |               |                |
| 23   | noise   | Lecture With Interaction          |               |                |
| 24   | Representation of narrowband noise in terms of in phase & quadrature components.        | Lecture With Interaction          |               |                |
| <b>Baseband Receiver</b>                     |   |                                   |               |                |
| 25   | UNIT IV:Signal space representation : Geometric representation of signal                | Lecture With Interaction          |               |                |
| 26   | Conversion of continuous AWGN channel to vector channel                                 | Lecture With Interaction          |               |                |
| 27   | Likelihood functions  | Lecture With Interaction          |               |                |
| 28   | Coherent Detection of binary signals in presence of noise                               | Lecture With Interaction          |               |                |
| 29   | Optimum Filter  | Lecture With Interaction          |               |                |
| 30   | Matched Filter  | Lecture With Interaction          |               |                |
| 31   | Probability of Error of Matched Filter  | Lecture With Interaction          |               |                |
| 32   | Correlation receiver.   | Lecture With Interaction          |               |                |
| <b>Passband Digital Transmission</b>         |   |                                   |               |                |
| 33   | UNIT V:Pass band transmission model   | Lecture With Interaction          |               |                |
| 34   | Generation and detection  | Lecture With Interaction          |               |                |
| 35   | Error Probability derivation and Power spectra of coherent BPSK                         | Lecture With Interaction          |               |                |
| 36   | BFSK and QPSK   | Lecture With Interaction          |               |                |
| 37   | Geometric representation  | Lecture With Interaction          |               |                |
| 38   | Generation and detection of - M-ary PSK   | Lecture With Interaction          |               |                |
| 39   | M-ary QAM and their error probability   | Lecture With Interaction          |               |                |
| 40   | Non-coherent BFSK   | Lecture With Interaction          |               |                |



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Record No:

Revision:

Date:

| Lect #                            | Contents to be Covered                             | Content Delivery Method(CDM) used | Proposed Date | Conducted Date |
|-----------------------------------|--|-----------------------------------|---------------|----------------|
| <b>Spread Spectrum Modulation</b> |  |                                   |               |                |
| 41                                | Unit VI : Spread Spectrum Modulation Introduction  | Lecture With Interaction          |               |                |
| 42                                | Pseudo noise sequences                             | Lecture With Interaction          |               |                |
| 43                                | A notion of spread spectrum                        | Lecture With Interaction          |               |                |
| 44                                | Direct sequence spread spectrum with coherent BPSK | Lecture With Interaction          |               |                |
| 45                                | Signal space dimensionality & processing gain      | Lecture With Interaction          |               |                |
| 46                                | Probability of error                               | Lecture With Interaction          |               |                |
| 47                                | Concept of jamming                                 | Lecture With Interaction          |               |                |
| 48                                | Frequency hop spread spectrum.                     | Lecture With Interaction          |               |                |

| Sr.No. | Short Code | Course Outcome  |
|--------|------------|---|
| 1      | C301.1     | Understand working of waveform coding techniques and analyse their performance.   |
| 2      | C301.2     | Analyze the performance of a baseband and pass band digital communication system in terms of error rate and spectral efficien |
| 3      | C301.3     | Perform the time and frequency domain analysis of the signals in a digital communication system.                              |
| 4      | C301.4     | Design of digital communication system.   |
| 5      | C301.5     | Understand working of spread spectrum communication system and analyze its performance.                                       |

|   |  |                      |
|---|--|----------------------|
| Neeta Pramod Karhadkar<br><b>Course In charge</b> | <b>Head of the department / F.E. Coordinator / Shift Coordinator</b> | <b>Academic Dean</b> |
|---|--|----------------------|



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Record No:

Revision:

Date:

**:20-21 SE IT Sem 2 - PA-Processor Architecture (214451)**

|   |   |                                   |
|---|---|-----------------------------------|
| <b>Department</b> :Information Technology | <b>Academic Year</b> :2020-2021                   | <b>Semester</b> :Sem 2            |
| <b>Class</b> :20-21 SE IT Sem 2           | <b>Course</b> :PA-Processor Architecture (214451) | <b>Staff</b> :Sushma Sunil Bhosle |
| <b>Teaching Scheme</b> :                  | <b>/Week</b> : 3 / week                           | <b>Tutorials/week</b> :           |
| <b>Examination Scheme</b> :               | <b>Theory</b> :<br><b>T/W</b> :                   | <b>O/L Exam</b> :                 |

**Summary**

| Unit No | Title                                    | No.of | Planned | Completed | % Complete | Planned Date of Completion | Actual Date of Completion |
|---------|--|-------|---------|-----------|------------|----------------------------|---------------------------|
| 1       | PIC Microcontroller Architecture         | 12    | 12      | 10        | 83.33      | 23 Feb 2021                | 25 Feb 2021               |
| 2       | PIC I/O Ports And Timer                  | 6     | 6       | 6         | 100.00     | 09 Mar 2021                | 16 Mar 2021               |
| 3       | PIC I/O Ports And Timer (Case Study)     | 1     | 1       | 1         | 100.00     | 10 Mar 2021                | 17 Mar 2021               |
| 4       | PIC Interrupts & Interfacing-I           | 7     | 7       | 7         | 100.00     | 26 Mar 2021                | 07 Apr 2021               |
| 5       | PIC Interfacing-II                       | 5     | 5       | 5         | 100.00     | 07 Apr 2021                | 19 May 2021               |
| 6       | PIC Interfacing-III                      | 6     | 6       | 6         | 100.00     | 26 May 2021                | 28 May 2021               |
| 7       | Current Trends In Processor Architecture | 6     | 6       | 6         | 100.00     | 09 Jun 2021                | 05 Jun 2021               |



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Record No:

Revision:

Date:

|   | <b>Contents to be Covered</b>   | <b>Content Delivery Method(CDM) used</b> | <b>Proposed Date</b> | <b>Conducted Date</b> |
|---|---|--|----------------------|-----------------------|
| <b>PIC Microcontroller Architecture</b>     |   |  |                      |                       |
| 1   | Introduction: introduction to microcontroller, Brief history of microcontrollers, Difference between microprocessor and microcontroller | Lecture With Interaction PPT             | 25 Jan 2021          |                       |
| 2   | Criteria for selection of microcontroller, PIC18FXXX: Features  | Lecture With Interaction PPT             | 27 Jan 2021          |                       |
| 3   | Assembler directives, Far and near procedure  | Lecture With Interaction PPT             | 02 Feb 2021          | 02 Feb 2021           |
| 4   | architecture, comparison of PIC 18 series microcontrollers  | Lecture With Interaction PPT             | 03 Feb 2021          | 10 Feb 2021           |
| 5   | PIC18F458/452 Pin out connection  | Lecture With Interaction PPT             | 05 Feb 2021          | 03 Feb 2021           |
| 6   | Registers of PIC18F   | Lecture With Interaction PPT             | 09 Feb 2021          | 05 Feb 2021           |
| 7   | Registers of PIC18F   | Lecture With Interaction PPT             | 10 Feb 2021          | 09 Feb 2021           |
| 8   | Registers of PIC18F   | Lecture With Interaction PPT             | 12 Feb 2021          | 12 Feb 2021           |
| 9   | Program and data memory organization: The Program Counter and Programmable ROM space in the PIC   | Lecture With Interaction PPT             | 15 Feb 2021          | 22 Feb 2021           |
| 10  | File register and Access bank, Bank switching in PIC18;   | Lecture With Interaction PPT             | 17 Feb 2021          | 23 Feb 2021           |
| 11  | Addressing modes: Addressing modes with instruction example, Oscillator configurations  | Lecture With Interaction PPT             | 18 Feb 2021          | 24 Feb 2021           |
| 12  | Reset operations, Brownout reset, Watchdog timer, Power down modes & Configuration registers.   | Lecture With Interaction PPT             | 23 Feb 2021          | 25 Feb 2021           |
| <b>PIC I/O Ports And Timer</b>              |   |  |                      |                       |
| 13  | I/O Port: I/O Port structure with programming   | Lecture With Interaction PPT             | 24 Feb 2021          | 27 Feb 2021           |
| 14  | I/O Bit manipulation Programming.   | Lecture With Interaction PPT             | 02 Mar 2021          | 02 Mar 2021           |
| 15  | I/O Bit manipulation Programming.   | Lecture With Interaction PPT             | 02 Mar 2021          | 09 Mar 2021           |
| 16  | Timer/Counter: Registers used for Timer/Counter operation   | Lecture With Interaction PPT             | 03 Mar 2021          | 10 Mar 2021           |
| 17  | Delay calculations, Programming of Timers using Embedded C.   | Lecture With Interaction PPT             | 05 Mar 2021          | 12 Mar 2021           |
| 18  | Delay calculations, Programming of Timers using Embedded C.   | Lecture With Interaction PPT             | 09 Mar 2021          | 16 Mar 2021           |
| <b>PIC I/O Ports And Timer (Case Study)</b> |   |  |                      |                       |
| 19  | Traffic light signal controller using Timer/Counter   | Lecture With Interaction PPT             | 10 Mar 2021          | 17 Mar 2021           |
| <b>PIC Interrupts &amp; Interfacing-I</b>   |   |  |                      |                       |
| 20  | PIC Interrupts: Interrupt Vs Polling, IVT   | Lecture With Interaction PPT             | 12 Mar 2021          | 19 Mar 2021           |
| 21  | Steps in executing interrupt, Sources of interrupts;  | Lecture With Interaction PPT             | 16 Mar 2021          | 22 Mar 2021           |
| 22  | Enabling and disabling interrupts, Interrupt registers  | Lecture With Interaction PPT             | 17 Mar 2021          | 23 Mar 2021           |
| 23  | Priority of interrupts, Programming of: Timer using interrupts  | Lecture With Interaction PPT             | 19 Mar 2021          | 24 Mar 2021           |
| 24  | External hardware interrupts, Serial communication interrupt;   | Lecture With Interaction PPT             | 23 Mar 2021          | 26 Mar 2021           |
| 25  | Interfacing of LED, Interfacing 16X2 LCD (8 bits)   | Lecture With Interaction PPT             | 24 Mar 2021          | 06 Apr 2021           |
| 26  | Key board (4 x 4 Matrix), Interfacing Relay & Buzzer.   | Lecture With Interaction PPT             | 26 Mar 2021          | 07 Apr 2021           |
| <b>PIC Interfacing-II</b>                   |   |  |                      |                       |
| 27  | CCP modes: Capture, Compare and PWM generation  | Lecture With Interaction PPT             | 30 Mar 2021          | 08 Apr 2021           |
| 28  | CCP modes: Capture, Compare and PWM generation  | Lecture With Interaction PPT             | 31 Mar 2021          | 18 Apr 2021           |
| 29  | DC Motor speed control with CCP, Stepper motor interfacing with PIC   | Lecture With Interaction PPT             | 02 Apr 2021          | 18 May 2021           |
| 30  | Basics of Serial communication protocols: Study of RS232, I2C   | Lecture With Interaction PPT             | 06 Apr 2021          | 18 May 2021           |
| 31  | SPI, UART, Serial communication programming using Embedded C.   | Lecture With Interaction PPT             | 07 Apr 2021          | 19 May 2021           |



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|   | Contents to be Covered   | Content Delivery Method(CDM) used | Proposed Date | Conducted Date |
|---|--|-----------------------------------|---------------|----------------|
| <b>PIC Interfacing-III</b>                      |  |                                   |               |                |
| 32  | Interfacing : Interfacing of ADC and DAC 0808 with PIC                             | Lecture With Interaction PPT      | 09 Apr 2021   | 27 May 2021    |
| 33  | .Interfacing : Interfacing of ADC and DAC 0808 with PIC                            | Lecture With Interaction PPT      | 18 May 2021   | 21 May 2021    |
| 34  | Temperature sensor interfacing using ADC and I2C with PIC                          | Lecture With Interaction PPT      | 19 May 2021   | 22 May 2021    |
| 35  | Temperature sensor interfacing using ADC and I2C with PIC                          | Lecture With Interaction PPT      | 21 May 2021   | 22 May 2021    |
| 36  | Interfacing of RTC (DS1306) using I2C with PIC                                     | Lecture With Interaction PPT      | 25 May 2021   | 25 May 2021    |
| 37  | Interfacing of EEPROM using SPI with PIC   | Lecture With Interaction PPT      | 26 May 2021   | 28 May 2021    |
| <b>Current Trends In Processor Architecture</b> |  |                                   |               |                |
| 38  | ARM & RISC :ARM and RISC design philosophy, Introduction to ARM processor          | Lecture With Interaction PPT      | 28 May 2021   | 29 May 2021    |
| 39  | its versions ARM 7, ARM 9, ARM 11, Features  | Lecture With Interaction PPT      | 01 Jun 2021   | 01 Jun 2021    |
| 40  | advantages of ARM processor, Suitability of ARM processor in embedded applications | Lecture With Interaction PPT      | 02 Jun 2021   | 01 Jun 2021    |
| 41  | ARM 7 dataflow model, Programmers model.   | Lecture With Interaction PPT      | 04 Jun 2021   | 04 Jun 2021    |
| 42  | CPSR & SPSR registers, Modes of operation  | Lecture With Interaction PPT      | 08 Jun 2021   | 04 Jun 2021    |
| 43  | Difference between PIC and ARM.  | Lecture With Interaction PPT      | 09 Jun 2021   | 05 Jun 2021    |

| Sr.No. | Short Code | Course Outcome   |
|--------|------------|--|
| 1      | CO1        | Apprehend architecture and memory organization of PIC 18 microcontroller |
| 2      | CO2        | Implement embedded C programming for PIC 18.                             |
| 3      | CO3        | Use concepts of timers and interrupts of PIC 18.                         |
| 4      | CO4        | Demonstrate real life applications using PIC 18.                         |
| 5      | CO5        | Analyze architectural details of ARM processor                           |

|   |   |               |
|---|---|---------------|
| Sushma Sunil Bhosle<br>Course In charge | Head of the department / F.E. Coordinator / Shift Coordinator | Academic Dean |
|---|---|---------------|