Sinhgad Technical Education Society's
RMD Sinhgad Technical Institutes Campus
Department of Electronics &Telecommunication Engineering

# PROGRAM OUTCOMES (PO)

Engineering Graduates will be able to:

**1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

**6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**11. Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## PROGRAM SPECIFIC OUTCOMES (PSO)

**PSO 1**: To Enhance the ability to design and develop advanced techniques in Secured Communication, Embedded Systems, Signal Processing, latest Semiconductor technologies, RF and Power Systems, Machine Learning and Software Skills.

**PSO 2**: Nurture holistic development of students to pursue higher studies, successful entrepreneurship or cater needs of societal and industrial problems by providing excellent academic environment.

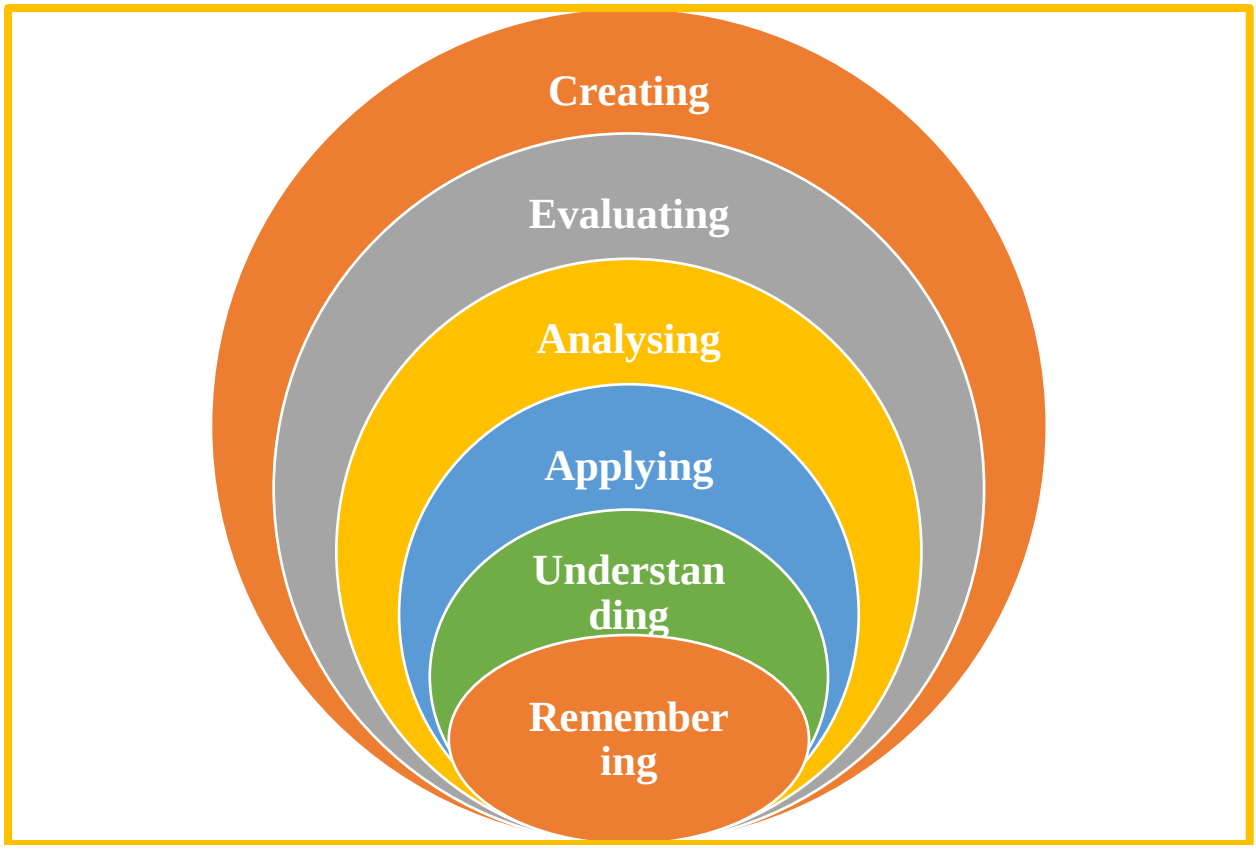
**PSO 3**: Propose energy efficient solutions for various social and environmental issues in real world applications by keeping pace with new technologies.

## COURSE OUTCOMES (CO)

Course Outcomes are the guidelinesfor engineering graduates to know the purpose for pursuing the course and what he will be able to do at the end of the course.A Course outcome should encompass different learning levels as understanding the course and demonstrating & applying the concept of the course. A well-defined COs helps the faculty members in designing suitable teaching plan and assessment methods to achieve the designed CO.**Along with thesyllabi, for many courses COs are defined by the University which is followed by the faculty members.** However, faculty members may redefine / modify COs considering theguidelines of NBA for each programme and Bloom's taxonomy levels.

## OUTCOMES MAPPING

Themapping of COs with POs and PSOs is done for every course, as COs are the path way to attain POs andPSOs and thereby the Mission and Vision of the institute.
Outcome mapping facilitates the alignment of the course-level outcomes with program level outcomes. Outcomes mapping focuses on student learning levels and thereby knowing how students are meeting program-level outcomes at the course level. Mapping levels can reveal gap in the curriculum so the faculty members can plan additional content to increase student achievement in meeting program outcome




# BLOOM's TAXONOMY LEVELs

| Sr. No. | Bloom's Levels | Learning Outcome Verbs |
|---|---|---|
| 01 | Remembering | cite, define, describe, identify, label, list, match, name, outline, quote, recall, report, reproduce, retrieve, show, state, tabulate, and tell. |
| 02 | Understanding | abstract, arrange, articulate, associate, categorize, clarify, classify, compare, compute, conclude, contrast, defend, diagram, differentiate, discuss, distinguish, estimate, exemplify, explain, extend, extrapolate, generalize, give examples of, illustrate, infer, interpolate, interpret, match, outline, paraphrase, predict, rearrange, reorder, rephrase, represent, restate, summarize, transform, and translate. |
| 03 | Applying | apply, calculate, carry out, classify, complete, compute, demonstrate, dramatize, employ, examine, execute, experiment, generalize, illustrate, implement, infer, interpret, manipulate, modify, operate, organize, outline, predict, solve, transfer, translate, and use. |
| 04 | Analysing | Analyze, arrange, break down, categorize, classify, compare, connect, contrast, deconstruct, detect, diagram, differentiate, discriminate, distinguish, divide, explain, identify, integrate, inventory, order, organize, relate, separate, and structure. |
| 05 | Evaluating | appraise, apprise, argue, assess, compare, conclude, consider, contrast, convince, criticize, critique, decide, determine, discriminate, evaluate, grade, judge, justify, measure, rank, rate, recommend, review, score, select, standardize, support, test, and validate. |
| 06 | Creating | arrange, assemble, build, collect, combine, compile, compose, constitute, construct, create, design, develop, devise, formulate, generate, hypothesize, integrate, invent, make, manage, modify, organize, perform, plan, prepare, produce, propose, rearrange, reconstruct, reorganize, revise, rewrite, specify, synthesize, and write. |

Sinhgad Technical Education Society

# RMD SINHGAD SCHOOL OF ENGINEERING, WARJE, PUNE.

## DEPARTMENT OF ELECTRONICS &TELECOMMUNICATION ENGINEERING

## Course Outcomes (CO) and Program Outcomes (PO) Program Specific Outcomes (PSO) Mapping

First year Engineering

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 104010 | 2.50 | 2.33 | 1.67 | 0.83 | 2.50 | 2.50 | 0.00 | 0.00 | 0.00 | 2.17 | 2.00 | 3.00 | 0.83 | 0.00 | 1.00 |

Second Year Engineering

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 207005 | 2.33 | 1.83 | 1.67 | 0.00 | 3.00 | 1.67 | 0.00 | 0.00 | 0.00 | 3.00 | 2.00 | 3.00 | 1.17 | 0.00 | 0.00 |
| 204181 | 2.50 | 2.33 | 1.67 | 0.83 | 2.50 | 2.50 | 0.00 | 0.00 | 0.00 | 2.17 | 2.00 | 3.00 | 0.83 | 0.00 | 1.00 |
| 204182 | 2.33 | 1.50 | 1.83 | 1.67 | 1.67 | 0.83 | 1.17 | 1.00 | 1.17 | 0.67 | 1.50 | 1.50 | 2.00 | 1.00 | 0.00 |
| 204183 | 2.50 | 2.83 | 2.50 | 2.00 | 2.33 | 2.00 | 1.33 | 1.67 | 1.17 | 1.17 | 1.17 | 2.33 | 2.33 | 2.67 | 0.00 |
| 204184 | 1.67 | 2.67 | 2.50 | 2.83 | 3.00 | 1.83 | 0.50 | 0.00 | 0.00 | 1.17 | 1.50 | 2.17 | 1.50 | 2.50 | 0.00 |
| 204191 | 2.00 | 2.83 | 1.50 | 1.33 | 0.50 | 0.67 | 0.00 | 0.00 | 0.00 | 0.00 | 0.83 | 0.83 | 2.33 | 1.50 | 0.00 |
| 204192 | 2.00 | 2.00 | 1.86 | 2.00 | 0.57 | 0.14 | 0.14 | 0.71 | 0.71 | 0.86 | 0.71 | 0.71 | 2.00 | 2.00 | 1.14 |
| 204193 | 3.00 | 2.00 | 1.67 | 2.00 | 2.00 | 2.00 | 0.83 | 1.00 | 0.67 | 0.50 | 0.50 | 1.00 | 1.00 | 0.50 | 0.00 |
| 204194 | 1.67 | 2.67 | 2.50 | 2.83 | 3.00 | 2.20 | 0.50 | 0.00 | 0.00 | 1.17 | 1.50 | 2.17 | 1.50 | 2.50 | 2.50 |

Sinhgad Technical Education Society

# RMD SINHGAD SCHOOL OF ENGINEERING, WARJE, PUNE.

## DEPARTMENT OF ELECTRONICS &TELECOMMUNICATION ENGINEERING

## Course Outcomes (CO) and Program Outcomes (PO) Program Specific Outcomes (PSO) Mapping

| Third Year Engineering | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| 304181 | 1.50 | 2.50 | 1.50 | 1.17 | 1.00 | 0.67 | 1.00 | 0.83 | 0.67 | 0.67 | 0.83 | 0.83 | 1.67 | 1.50 | 1.50 |
| 304182 | 2.17 | 2.00 | 2.33 | 1.83 | 0.83 | 1.33 | 0.67 | 1.00 | 0.50 | 0.83 | 1.17 | 2.83 | 1.50 | 1.33 | 1.67 |
| 304183 | 1.50 | 2.50 | 1.50 | 1.17 | 1.00 | 0.67 | 1.00 | 0.83 | 0.67 | 0.67 | 0.83 | 0.83 | 1.67 | 1.50 | 1.67 |
| 304184 | 1.50 | 1.50 | 2.17 | 2.33 | 2.50 | 1.33 | 1.33 | 1.33 | 2.00 | 0.67 | 2.33 | 2.00 | 2.50 | 1.83 | 0.00 |
| 304185 | 2.17 | 2.83 | 2.17 | 1.33 | 1.00 | 0.83 | 1.00 | 0.83 | 0.50 | 0.00 | 0.00 | 2.17 | 2.17 | 1.83 | 0.00 |
| 304192 | 2.00 | 1.83 | 1.00 | 1.17 | 1.67 | 0.50 | 1.00 | 0.67 | 1.00 | 1.33 | 0.67 | 1.00 | 1.67 | 1.67 | 0.00 |
| 304193 | 1.50 | 2.50 | 2.00 | 1.17 | 1.67 | 1.83 | 1.50 | 1.50 | 2.00 | 2.17 | 2.50 | 0.83 | 2.50 | 1.83 | 1.83 |
| 304194 | 3.00 | 2.67 | 3.00 | 2.33 | 1.83 | 2.17 | 2.50 | 0.67 | 0.17 | 0.33 | 0.33 | 0.33 | 2.33 | 2.50 | 0.67 |
| 304195 | 2.50 | 2.83 | 2.50 | 2.00 | 2.33 | 1.17 | 0.67 | 0.83 | 0.33 | 0.00 | 0.00 | 2.33 | 2.33 | 2.67 | 1.67 |

Sinhgad Technical Education Society

# RMD SINHGAD SCHOOL OF ENGINEERING, WARJE, PUNE.

## DEPARTMENT OF ELECTRONICS &TELECOMMUNICATION ENGINEERING

## Course Outcomes (CO) and Program Outcomes (PO) Program Specific Outcomes (PSO) Mapping

| Final Year Engineering (BE) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| 404181 | 1.83 | 1.83 | 2.17 | 1.00 | 1.00 | 0.50 | 0.67 | 0.67 | 0.50 | 0.67 | 0.67 | 0.67 | 1.50 | 1.33 | 0.00 |
| 404182 | 2.33 | 2.50 | 1.50 | 1.00 | 0.50 | 1.00 | 0.17 | 0.00 | 0.33 | 0.67 | 1.00 | 1.00 | 2.17 | 1.50 | 0.00 |
| 404183 | 1.83 | 2.00 | 1.67 | 1.00 | 1.00 | 0.50 | 0.67 | 0.67 | 0.50 | 0.67 | 0.67 | 0.67 | 1.50 | 1.33 | 0.00 |
| 404184 | 1.83 | 1.83 | 2.17 | 1.00 | 1.00 | 0.50 | 0.67 | 0.67 | 0.50 | 0.67 | 0.67 | 0.67 | 1.50 | 1.33 | 0.00 |
| 404185 | 3.00 | 2.50 | 3.00 | 2.83 | 1.67 | 1.33 | 1.50 | 1.17 | 0.33 | 0.67 | 0.50 | 0.33 | 2.50 | 2.83 | 1.00 |
| 404189 | 1.67 | 1.33 | 1.33 | 1.17 | 1.33 | 1.00 | 0.83 | 0.83 | 0.83 | 0.83 | 1.33 | 1.17 | 1.50 | 1.67 | 0.00 |
| 404190 | 1.83 | 2.00 | 1.67 | 1.00 | 1.00 | 0.50 | 0.67 | 0.67 | 0.50 | 0.67 | 0.67 | 0.67 | 1.50 | 1.33 | 0.00 |
| 404191 | 1.33 | 1.17 | 0.67 | 0.33 | 0.83 | 0.33 | 0.50 | 0.50 | 0.17 | 0.33 | 0.17 | 1.17 | 1.17 | 0.83 | 1.33 |
| 404192 | 2.33 | 2.50 | 1.50 | 1.00 | 0.50 | 1.00 | 0.50 | 0.17 | 0.33 | 0.67 | 1.00 | 1.00 | 2.17 | 1.50 | 1.67 |

# DEPARTMENT OF E&TC ENGINEERING

## Course Outcomes (CO), Program Outcomes (PO), Program Specific Outcomes Mapping

### First Year of Engineering (A Y 2021-22)

### Program Outcomes (PO)

PO1: Engineering knowledge

PO2: Problem analysis

PO3: Conduct investigations of complex problems

PO4: Conduct investigations of complex problems

PO5: Modern tool usage

PO6: The engineer and society

PO7: Environment and sustainability

PO8: Ethics

PO9: Individual and team work

PO10: Communication

PO11: Project management and finance

PO12: Life-long learning

### Program Specific Outcomes (PSOs)

PSO 1: To Enhance the ability to design and develop advanced techniques in Secured Communication, Embedded Systems, Signal Processing, latest Semiconductor Technologies, RF and Power Systems, Machine Learning and Software Skills..

PSO 2: Nurture holistic development of students to pursue higher studies, successful entrepreneurship or cater needs of societal and industrial problems by providing an excellent Academic environment.

PSO 3: Propose energy efficient solutions for various social and environmental issues in real world applications by keeping pace with new technologies.

**Name of the Subject :104010:Basic Electronics Engineering** **Name of Subject Teacher:Mrs.Suchitra Jagtap**

| CO/PO | | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PS O1 | PS O2 | PS O3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Explain the working of P-N junction diodes and its circuits. | 3 | 3 | 2 | 1 | 3 | 3 | 0 | 0 | 0 | 2 | 2 | 3 | 1 | 0 | 1 |
| CO 2 | Identify types of diodes and plot their characteristics and also can compare BJT with MOSFET. | 2 | 2 | 2 | 1 | 3 | 3 | 0 | 0 | 0 | 2 | 2 | 3 | 1 | 0 | 1 |
| CO 3 | Build and test analog circuits using OP AMP and digital circuits using universal/basic gates and flip flops. | 3 | 3 | 2 | 0 | 3 | 3 | 0 | 0 | 0 | 2 | 2 | 3 | 1 | 0 | 1 |
| CO 4 | Use different electronics measuring instruments to measure various electrical parameters. | 2 | 2 | 1 | 0 | 2 | 2 | 0 | 0 | 0 | 2 | 2 | 3 | 1 | 0 | 1 |
| CO 5 | Select sensors for specific applications. | 2 | 2 | 1 | 2 | 2 | 2 | 0 | 0 | 0 | 2 | 2 | 3 | 1 | 0 | 1 |
| CO 6 | Describe basic principles of communication systems. | 3 | 2 | 2 | 1 | 2 | 2 | 0 | 0 | 0 | 3 | 2 | 3 | 0 | 0 | 1 |
| **Addition** | | 15 | 14 | 10 | 5 | 15 | 15 | 0 | 0 | 0 | 13 | 12 | 18 | 5 | 0 | 6 |
| **Average** | | 2.50 | 2.33 | 1.67 | 0.83 | 2.50 | 2.50 | 0.00 | 0.00 | 0.00 | 2.17 | 2.00 | 3.00 | 0.83 | 0.00 | 1.00 |

**Subject Teacher**
**FE E&TC Engg.**

**I/c CO PO Mapping**
**E&TC Engg.**

**I/c Academic Coordinator**
**E&TC Engg.**

**HOD**
**E&TC Engg.**

# DEPARTMENT OF E&TC ENGINEERING

## Course Outcomes (CO), Program Outcomes (PO), Program Specific Outcomes Mapping

### Second Year of Engineering Sem-I (A Y 2021-22)

### Program Outcomes (PO)

PO1: Engineering knowledge

PO2: Problem analysis

PO3: Conduct investigations of complex problems

PO4: Conduct investigations of complex problems

PO5: Modern tool usage

PO6: The engineer and society

PO7: Environment and sustainability

PO8: Ethics

PO9: Individual and team work

PO10: Communication

PO11: Project management and finance

PO12: Life-long learning

### Program Specific Outcomes (PSOs)

PSO 1: To Enhance the ability to design and develop advanced techniques in Secured Communication, Embedded Systems, Signal Processing, latest Semiconductor Technologies, RF and Power Systems, Machine Learning and Software Skills..

PSO 2: Nurture holistic development of students to pursue higher studies, successful entrepreneurship or cater needs of societal and industrial problems by providing an excellent Academic environment.

PSO 3: Propose energy efficient solutions for various social and environmental issues in real world applications by keeping pace with new technologies.

**Name of the Subject :207005: Engineering Mathematics III**

**Name of Subject Teacher: Mr. Deepak Kokande**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Solve higher order linear differential equations using appropriate techniques for modeling, analyzing electrical circuits and control systems. | 3 | 3 | 2 | 0 | 3 | 2 | 0 | 0 | 0 | 3 | 2 | 3 | 1 | 0 | 0 |
| CO 2 | Apply the concept of Fourier transform & Z-transform and its applications to continuous & discrete systems, signal & image processing and communication systems. | 2 | 2 | 2 | 0 | 3 | 2 | 0 | 0 | 0 | 3 | 2 | 3 | 2 | 0 | 0 |
| CO 3 | Obtain Interpolating polynomials, numerically differentiate and integrate functions, numerical solutions of differential equations using single step and multi-step iterative methods used in modern scientific computing. | 3 | 3 | 2 | 0 | 3 | 2 | 0 | 0 | 0 | 3 | 2 | 3 | 0 | 0 | 0 |
| CO 4 | Perform vector differentiation & integration, analyze the vector fields and apply to electro- magnetic fields & wave theory. | 2 | 2 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 3 | 2 | 3 | 1 | 0 | 0 |
| CO 5 | Analyze Complex functions, Conformal mappings, Contour integration applicable to electrostatics, digital filters, signal and image processing. | 1 | 1 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 3 | 2 | 3 | 1 | 0 | 0 |
| CO 6 | To equip students with the techniques to understand advanced level mathematics and its applications that would enhance analytical thinking power, useful in their disciplines. | 3 | 0 | 2 | 0 | 3 | 2 | 0 | 0 | 0 | 3 | 2 | 3 | 2 | 0 | 0 |
| **Addition** | | 14 | 11 | 10 | 0 | 18 | 10 | 0 | 0 | 0 | 18 | 12 | 18 | 7 | 0 | 0 |
| **Average** | | 2.33 | 1.83 | 1.67 | 0.00 | 3.00 | 1.67 | 0.00 | 0.00 | 0.00 | 3.00 | 2.00 | 3.00 | 1.17 | 0.00 | 0.00 |

**Subject Teacher**
**SE E&TC Engg.**

**I/c CO PO Mapping**
**E&TC Engg.**

**I/c Academic Coordinator**
**E&TC Engg.**

**HOD**
**E&TC Engg.**

**Name of the Subject :204181: Electronic Circuits**

**Name of Subject Teacher: Mrs. Deepali Newaskar**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Assimilate the physics, characteristics and parameters of MOSFET towards its application as an amplifier. | 3 | 2 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 3 | 2 | 0 |
| CO 2 | Design MOSFET amplifiers, with and without feedback, & MOSFET oscillators, for given Specifications | 3 | 2 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 2 | 1 | 0 |
| CO 3 | Analyze and assess the performance of linear and switching regulators, with their variants, towards applications in regulated power supplies. | 2 | 2 | 2 | 2 | 0 | 1 | 0 | 0 | 0 | 2 | 1 | 1 | 2 | 1 | 0 |
| CO 4 | Explain internal schematic of Op-Amp and define its performance parameters. | 2 | 3 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 2 | 1 | 1 | 2 | 1 | 0 |
| CO 5 | Design, Build and test Op-amp based analog signal processing and conditioning circuits towards various real time applications. | 2 | 3 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 0 |
| CO 6 | Understand and compare the principles of various data conversion techniques and PLL with their applications. | 2 | 3 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 0 |
| **Addition** | | 14 | 15 | 9 | 6 | 3 | 6 | 1 | 0 | 2 | 4 | 6 | 6 | 13 | 9 | 0 |
| **Average** | | 2.33 | 2.50 | 1.50 | 1.00 | 0.50 | 1.00 | 0.17 | 0.00 | 0.33 | 0.67 | 1.00 | 1.00 | 2.17 | 1.50 | 0.00 |

**Subject Teacher**
**SE E&TC Engg.**

**I/c CO PO Mapping**
**E&TC Engg.**

**I/c Academic Coordinator**
**E&TC Engg.**

**HOD**
**E&TC Engg.**

**Name of the Subject :204182: Digital Circuits**

**Name of Subject Teacher: Mrs. J. A. Sangogi**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Identify and prevent various hazards and timing problems in a digital design. | 2 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 2 | 1 | 0 |
| CO 2 | Use the basic logic gates and various reduction techniques of digital logic circuits. | 2 | 2 | 2 | 3 | 3 | 1 | 2 | 1 | 1 | 0 | 1 | 2 | 2 | 1 | 0 |
| CO 3 | Analyze, design and implement combinational logic circuits. | 3 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 0 |
| CO 4 | Analyze, design and implement sequential circuits. | 3 | 1 | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 1 | 0 |
| CO 5 | Differentiate between Mealy and Moore machines. | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 3 | 1 | 0 |
| CO 6 | Analyze digital system design using PLD. | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 3 | 1 | 0 |
| **Addition** | | 14 | 9 | 11 | 10 | 10 | 5 | 7 | 6 | 7 | 4 | 9 | 9 | 12 | 6 | 0 |
| **Average** | | 2.33 | 1.50 | 1.83 | 1.67 | 1.67 | 0.83 | 1.17 | 1.00 | 1.17 | 0.67 | 1.50 | 1.50 | 2.00 | 1.00 | 0.00 |

**Subject Teacher**
**SE E&TC Engg.**

**I/c CO PO Mapping**
**E&TC Engg.**

**I/c Academic Coordinator**
**E&TC Engg.**

**HOD**
**E&TC Engg.**

**Name of the Subject :204183: Electrical Circuits**

**Name of Subject Teacher: Mrs. Namrata Mishra**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Analyze the simple DC and AC circuit with circuit simplification techniques | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 3 | 3 | 3 | 0 |
| CO 2 | Formulate and analyze driven and source free RL and RC circuits. | 3 | 3 | 2 | 1 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 2 | 2 | 0 |
| CO 3 | Formulate & determine network parameters for given network and analyze the given network using Laplace Transform to find the network transfer function. | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 2 | 3 | 0 | 0 | 3 | 3 | 3 | 0 |
| CO 4 | Explain construction, working and applications of DC Machines / Single Phase & Three Phase AC Motors. | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 0 | 2 | 2 | 2 | 1 | 2 | 0 |
| CO 5 | Explain construction, working and applications of special purpose motors & understand motors used in electrical vehicles. | 2 | 3 | 2 | 1 | 2 | 3 | 2 | 2 | 0 | 3 | 2 | 2 | 2 | 3 | 0 |
| CO 6 | Analyze and select a suitable motor for different applications | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 2 | 3 | 2 | 3 | 3 | 0 |
| **Addition** | | 15 | 17 | 15 | 12 | 14 | 12 | 8 | 10 | 7 | 7 | 7 | 14 | 14 | 16 | 0 |
| **Average** | | 2.33 | 2.50 | 1.50 | 1.00 | 0.50 | 1.00 | 0.17 | 0.00 | 0.33 | 0.67 | 1.00 | 1.00 | 2.17 | 1.50 | 0.00 |

**Subject Teacher**
**SE E&TC Engg.**

**I/c CO PO Mapping**
**E&TC Engg.**

**I/c Academic Coordinator**
**E&TC Engg.**

**HOD**
**E&TC Engg.**

**Name of the Subject :204184 :Data structures** **Name of Subject Teacher: Ms. Rupali Patil**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Solve mathematical problems using the C programming language. | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 0 | 0 | 1 | 2 | 3 | 3 | 3 | 0 |
| CO 2 | Implement sorting and searching algorithms and calculate their complexity. | 2 | 2 | 2 | 3 | 3 | 3 | 1 | 0 | 0 | 2 | 2 | 3 | 2 | 3 | 0 |
| CO 3 | Develop applications of stack and queue using arrays. | 2 | 3 | 2 | 3 | 3 | 2 | 0 | 0 | 0 | 0 | 1 | 3 | 2 | 2 | 0 |
| CO 4 | Demonstrate applicability of Linked List. | 1 | 3 | 3 | 2 | 3 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 1 | 0 |
| CO 5 | Demonstrate applicability of nonlinear data structures - Binary Tree with respect to its time complexity | 1 | 2 | 2 | 3 | 3 | 2 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 3 | 0 |
| CO 6 | Apply the knowledge of graphs for solving the problems of spanning tree and shortest path algorithms. | 1 | 3 | 3 | 3 | 3 | 2 | 1 | 0 | 0 | 1 | 1 | 2 | 2 | 3 | 0 |
| **Addition** | | 10 | 16 | 15 | 17 | 18 | 11 | 3 | 0 | 0 | 7 | 9 | 13 | 9 | 15 | 0 |
| **Average** | | 1.67 | 2.67 | 2.50 | 2.83 | 3.00 | 1.83 | 0.50 | 0.00 | 0.00 | 1.17 | 1.50 | 2.17 | 1.50 | 2.50 | 0.00 |

**Subject Teacher**
**SE E&TC Engg.**

**I/c CO PO Mapping**
**E&TC Engg.**

**I/c Academic Coordinator**
**E&TC Engg.**

**HOD**
**E&TC Engg.**

# DEPARTMENT OF E&TC ENGINEERING

## Course Outcomes (CO), Program Outcomes (PO), Program Spécific Outcomes Mapping

### Second Year of Engineering Sem-II (A Y 2021-22)

### Program Outcomes (PO)

PO1: Engineering knowledge

PO2: Problem analysis

PO3: Conduct investigations of complex problems

PO4: Conduct investigations of complex problems

PO5: Modern tool usage

PO6: The engineer and society

PO7: Environment and sustainability

PO8: Ethics

PO9: Individual and team work

PO10: Communication

PO11: Project management and finance

PO12: Life-long learning

### Program Specific Outcomes (PSOs)

PSO 1: To Enhance the ability to design and develop advanced techniques in Secured Communication, Embedded Systems, Signal Processing, latest Semiconductor Technologies, RF and Power Systems, Machine Learning and Software Skills..

PSO 2: Nurture holistic development of students to pursue higher studies, successful entrepreneurship or cater needs of societal and industrial problems by providing an excellent Academic environment.

PSO 3: Propose energy efficient solutions for various social and environmental issues in real world applications by keeping pace with new technologies.

**Name of the Subject :204191: Signals & Systems** **Name of Subject Teacher: Ms.Deepali Amol Newaskar**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | To understand the mathematical representation of continuous and discrete time signals and systems. | 3 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 2 | 0 |
| CO 2 | To classify signals and systems into different categories. | 3 | 3 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 1 | 0 |
| CO 3 | To analyze Linear Time Invariant (LTI) systems in time and transform domains. | 2 | 3 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 0 |
| CO 4 | To build basics for understanding of courses such as signal processing, control system and communication. | 2 | 3 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 0 |
| CO 5 | To develop basis of probability and random variables | 1 | 3 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 0 |
| CO 6 | Model Signals and Systems using probability theory and random variables. | 1 | 3 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 0 |
| **Addition** | | 12 | 17 | 9 | 8 | 3 | 4 | 0 | 0 | 0 | 0 | 5 | 5 | 14 | 9 | 0 |
| **Average** | | 2.00 | 2.83 | 1.50 | 1.33 | 0.50 | 0.67 | 0.00 | 0.00 | 0.00 | 0.00 | 0.83 | 0.83 | 2.33 | 1.50 | 0.00 |

**Subject Teacher**
**SE E&TC Engg.**

**I/c CO PO Mapping**
**E&TC Engg.**

**I/c Academic Coordinator**
**E&TC Engg.**

**HOD**
**E&TC Engg.**

**Name of the Subject :204192: Control Systems**

**Name of Subject Teacher: Mrs. Shilpa Dhanorkar**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Determine and use models of physical systems in forms suitable for use in the analysis and design of control systems. | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 |
| CO 2 | Determine the (absolute) stability of a closed-loop control system. | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 2 | 1 | 0 |
| CO 3 | Perform time domain analysis of control systems required for stability analysis. | 2 | 1 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 3 |
| CO 4 | Perform frequency domain analysis of control systems required for stability analysis. | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 2 | 1 | 1 |
| CO 5 | Apply root-locus, Frequency Plots technique to analyze control systems. | 2 | 3 | 1 | 2 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 2 | 1 | 0 |
| CO 6 | Express and solve system equations in state variable form. | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 2 | 2 |
| CO 7 | Differentiate between various digital controllers and understand the role of the controllers in Industrial automation | 3 | 2 | 2 | 2 | 1 | 0 | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 1 |
| **Addition** | | 14 | 13 | 13 | 14 | 4 | 1 | 1 | 5 | 5 | 6 | 5 | 5 | 13 | 11 | 8 |
| **Average** | | 2.00 | 1.86 | 1.86 | 2.00 | 0.57 | 0.14 | 0.14 | 0.71 | 0.71 | 0.86 | 0.71 | 0.71 | 1.86 | 1.57 | 1.14 |

**Subject Teacher**
**SE E&TC Engg.**

**I/c CO PO Mapping**
**E&TC Engg.**

**I/c Academic Coordinator**
**E&TC Engg.**

**HOD**
**E&TC Engg.**

**Name of the Subject :204193: Principles of Communication Systems**

**Name of Subject Teacher: Mrs. Jyoti Ashok Sangogi**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | To compute & compare the bandwidth and transmission power requirements by analyzing time and frequency domain spectra of signal required for modulation schemes under study. | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 |
| CO 2 | Describe and analyze the techniques of generation, transmission and reception of Amplitude Modulation Systems. | 2 | 2 | 1 | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| CO 3 | Explain generation and detection of FM systems and compare with AM systems. | 2 | 2 | 1 | 1 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| CO 4 | Exhibit the importance of Sampling Theorem and correlate with Pulse Modulation technique (PAM, PWM, and PPM). | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 0 |
| CO 5 | Characterize the quantization process and elaborate digital representation techniques (PCM, DPCM, DM and ADM). | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| CO 6 | Illustrate waveform coding, multiplexing and synchronization techniques and articulate their importance in baseband digital transmission. | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 0 |
| **Addition** | | 16 | 12 | 10 | 10 | 12 | 10 | 5 | 6 | 4 | 3 | 3 | 6 | 8 | 3 | 0 |
| **Average** | | 2.67 | 2.00 | 1.67 | 1.67 | 2.00 | 1.67 | 0.83 | 1.00 | 0.67 | 0.50 | 0.50 | 1.00 | 1.33 | 0.50 | 0.00 |

**Subject Teacher**
**SE E&TC Engg.**

**I/c CO PO Mapping**
**E&TC Engg.**

**I/c Academic Coordinator**
**E&TC Engg.**

**HOD**
**E&TC Engg.**

**Name of the Subject :204194: Object Oriented Programming**

**Name of Subject Teacher: Ms.Rupali Ashok Patil**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Describe the principles of object oriented programming. | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 0 | 0 | 1 | 2 | 3 | 3 | 3 | 3 |
| CO 2 | Apply the concepts of data encapsulation, inheritance in C++. | 2 | 2 | 2 | 3 | 3 | 3 | 1 | 0 | 0 | 2 | 2 | 3 | 2 | 3 | 3 |
| CO 3 | Understand Operator overloading and friend functions in C++. | 2 | 3 | 2 | 3 | 3 | 2 | 0 | 0 | 0 | 0 | 1 | 3 | 2 | 2 | 2 |
| CO 4 | Apply the concepts of classes, methods inheritance and polymorphism to write programs C++. | 1 | 3 | 3 | 2 | 3 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 1 | 1 |
| CO 5 | Apply Templates, Namespaces and Exception Handling concepts to write programs in C++. | 1 | 2 | 2 | 3 | 3 | 2 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 3 | 3 |
| CO 6 | Describe and use of File handling in C++. | 1 | 3 | 3 | 3 | 3 | 2 | 1 | 0 | 0 | 1 | 1 | 2 | 2 | 3 | 3 |
| **Addition** | | 10 | 16 | 15 | 17 | 18 | 11 | 3 | 0 | 0 | 7 | 9 | 13 | 9 | 15 | 15 |
| **Average** | | 1.67 | 2.67 | 2.50 | 2.83 | 3.00 | 1.83 | 0.50 | 0.00 | 0.00 | 1.17 | 1.50 | 2.17 | 1.50 | 2.50 | 2.50 |

**Subject Teacher**
**SE E&TC Engg.**

**I/c CO PO Mapping**
**E&TC Engg.**

**I/c Academic Coordinator**
**E&TC Engg.**

**HOD**
**E&TC Engg.**

## DEPARTMENT OF E&TC ENGINEERING

### Course Outcomes (CO), Program Outcomes (PO), Program Specific Outcomes Mapping

### Third Year of Engineering Sem-I (A Y 2021-22)

### Program Outcomes (PO)

PO1: Engineering knowledge

PO2: Problem analysis

PO3: Conduct investigations of complex problems

PO4: Conduct investigations of complex problems

PO5: Modern tool usage

PO6: The engineer and society

PO7: Environment and sustainability

PO8: Ethics

PO9: Individual and team work

PO10: Communication

PO11: Project management and finance

PO12: Life-long learning

### Program Specific Outcomes (PSOs)

PSO 1: To Enhance the ability to design and develop advanced techniques in Secured Communication, Embedded Systems, Signal Processing, latest Semiconductor Technologies, RF and Power Systems, Machine Learning and Software Skills..

PSO 2: Nurture holistic development of students to pursue higher studies, successful entrepreneurship or cater needs of societal and industrial problems by providing an excellent Academic environment.

PSO 3: Propose energy efficient solutions for various social and environmental issues in real world applications by keeping pace with new technologies.

**Name of the Subject : 304181 : Digital Communication**

**Name of Subject Teacher: Mr. Anant More**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Apply the statistical theory for describing various signals in a communication system. | 2 | 2 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 2 | 2 | 1 |
| CO 2 | Understand and explain various digital modulation techniques used in digital communication systems and analyze their performance in presence of AWGN noise. | 2 | 2 | 3 | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 3 | 1 | 2 |
| CO 3 | Describe and analyze the digital communication system with spread spectrum modulation. | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 2 | 1 | 0 |
| CO 4 | Analyze a communication system using information theoretic approach. | 1 | 2 | 2 | 1 | 2 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 3 |
| CO 5 | Use error control coding techniques to improve performance of a digital communication system. | 1 | 3 | 0 | 1 | 0 | 1 | 2 | 2 | 1 | 0 | 1 | 1 | 1 | 2 | 1 |
| CO 6 | Study of application of Theoretical Concepts in present Technology use. | 1 | 3 | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| **Addition** | | 9 | 15 | 9 | 7 | 6 | 4 | 6 | 5 | 4 | 4 | 5 | 5 | 10 | 9 | 9 |
| **Average** | | 1.50 | 2.50 | 1.50 | 1.17 | 1.00 | 0.67 | 1.00 | 0.83 | 0.67 | 0.67 | 0.83 | 0.83 | 1.67 | 1.50 | 1.50 |

**Subject Teacher**
**TE E&TC Engg.**

**I/c CO PO Mapping**
**E&TC Engg.**

**I/c Academic Coordinator**
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**HOD**
**E&TC Engg.**

**Name of the Subject :304182: Electromagnetic Field Theory** **Name of Subject Teacher: Ms. Rupali Patil**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Apply the basic electromagnetic principles and determine the fields (E & H) due to the given source. | 3 | 0 | 2 | 0 | 0 | 2 | 1 | 2 | 0 | 0 | 0 | 3 | 2 | 2 | 2 |
| CO 2 | Apply boundary conditions to the boundaries between various media to interpret behavior of the fields on either side. | 0 | 2 | 3 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 1 |
| CO 3 | State, Identify and Apply Maxwell's equations (integral and differential forms) in both the forms (Static, time-varying or Time-harmonic field) for various sources, Calculate the time average power density using Poynting Theorem, Retarded magnetic vector potential. | 3 | 3 | 3 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 2 | 2 | 2 |
| CO 4 | Formulate, Interpret and solve simple uniform plane wave (Helmholtz Equations) equations, and analyze the incident/reflected/transmitted waves at normal incidence. | 2 | 1 | 3 | 3 | 0 | 2 | 0 | 3 | 0 | 0 | 1 | 2 | 0 | 1 | 1 |
| CO 5 | Interpret and Apply the transmission line equation to transmission line problems with load impedance to determine input and output voltage/current at any point on the Transmission line, Find input/load impedance, input/load admittance, reflection coefficient, SWR, Vmax/Vmin, length of transmission line using Smith Chart. | 2 | 3 | 3 | 3 | 2 | 0 | 2 | 1 | 0 | 2 | 0 | 3 | 2 | 1 | 3 |
| CO 6 | Carry out a detailed study, interpret the relevance and applications of Electromagnetics. | 3 | 3 | 0 | 2 | 0 | 2 | 0 | 0 | 3 | 3 | 3 | 3 | 2 | 2 | 1 |
| **Addition** | | 13 | 12 | 14 | 11 | 5 | 8 | 4 | 6 | 3 | 5 | 7 | 17 | 9 | 8 | 10 |
| **Average** | | 2.17 | 2.00 | 2.33 | 1.83 | 0.83 | 1.33 | 0.67 | 1.00 | 0.50 | 0.83 | 1.17 | 2.83 | 1.50 | 1.33 | 1.67 |

**Subject Teacher**
**TE E&TC Engg.**

**I/c CO PO Mapping**
**E&TC Engg.**

**I/c Academic Coordinator**
**E&TC Engg.**

**HOD**
**E&TC Engg.**

**Name of the Subject : 304183: Database Management**

**Name of Subject Teacher: Mr. Tushar Zombade**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Ability to implement the underlying concepts of a database system. | 2 | 2 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 2 | 2 | 1 |
| CO 2 | Design and implement a database schema for a given problem-domain using a data model. | 2 | 2 | 3 | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 3 | 1 | 2 |
| CO 3 | Formulate, using SQL/DML/DDL commands, solutions to a wide range of query and update problems. | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 2 | 1 | 1 |
| CO 4 | Implement transactions, concurrency control, and be able to do Database recovery. | 1 | 2 | 2 | 1 | 2 | 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 2 |
| CO 5 | Able to understand various Parallel Database Architectures and its applications. | 1 | 3 | 0 | 1 | 0 | 1 | 2 | 2 | 1 | 0 | 1 | 1 | 1 | 2 | 2 |
| CO 6 | Able to understand various Distributed Databases and its applications. | 1 | 3 | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| **Addition** | | 9 | 15 | 9 | 7 | 6 | 4 | 6 | 5 | 4 | 4 | 5 | 5 | 10 | 9 | 10 |
| **Average** | | 1.50 | 2.50 | 1.50 | 1.17 | 1.00 | 0.67 | 1.00 | 0.83 | 0.67 | 0.67 | 0.83 | 0.83 | 1.67 | 1.50 | 1.67 |

**Subject Teacher**
**TE E&TC Engg.**

**I/c CO PO Mapping**
**E&TC Engg.**

**I/c Academic Coordinator**
**E&TC Engg.**

**HOD**
**E&TC Engg.**

**Name of the Subject :304184 : Microcontrollers** **Name of Subject Teacher: Mrs. J. A. Sangogi**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Understand the fundamentals of microcontroller and programming. | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 0 | 3 | 0 | 3 | 3 | 3 | 2 | 0 |
| CO 2 | Interface various electronic components with microcontrollers. | 1 | 2 | 3 | 3 | 3 | 1 | 2 | 1 | 3 | 1 | 3 | 3 | 3 | 3 | 0 |
| CO 3 | Analyze the features of PIC 18F XXXX. | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 2 | 2 | 1 | 2 | 3 | 2 | 2 | 0 |
| CO 4 | Describe the programming details in peripheral support. | 2 | 1 | 1 | 2 | 3 | 1 | 1 | 1 | 2 | 1 | 3 | 1 | 2 | 1 | 0 |
| CO 5 | Develop interfacing models according to applications. | 1 | 1 | 3 | 2 | 2 | 1 | 2 | 3 | 1 | 1 | 2 | 1 | 3 | 1 | 0 |
| CO 6 | Evaluate the serial communication details and interfaces. | 1 | 2 | 2 | 3 | 3 | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 2 | 2 | 0 |
| **Addition** | | 9 | 9 | 13 | 14 | 15 | 8 | 8 | 8 | 12 | 4 | 14 | 12 | 15 | 11 | 0 |
| **Average** | | 1.50 | 1.50 | 2.17 | 2.33 | 2.50 | 1.33 | 1.33 | 1.33 | 2.00 | 0.67 | 2.33 | 2.00 | 2.50 | 1.83 | 0.00 |

**Subject Teacher**
**TE E&TC Engg.**

**I/c CO PO Mapping**
**E&TC Engg.**

**I/c Academic Coordinator**
**E&TC Engg.**

**HOD**
**E&TC Engg.**

**Name of the Subject :304185:Elective I: Fundamentals of JAVA Programming** **Name of Subject Teacher: Mrs. Varsha Nanavare**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Understand the basic principles of Java programming language | 3 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 3 | 2 | 3 | 0 |
| CO 2 | Apply the concepts of classes and objects to write programs in Java | 2 | 3 | 3 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 3 | 2 | 0 |
| CO 3 | Demonstrate the concepts of methods & Inheritance | 2 | 3 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 0 |
| CO 4 | Use the concepts of interfaces & packages for program implementation | 2 | 3 | 3 | 2 | 1 | 2 | 0 | 1 | 1 | 0 | 0 | 2 | 1 | 2 | 0 |
| CO 5 | Understand multithreading and Exception handling in Java to develop robust programs | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 0 | 0 | 2 | 3 | 1 | 0 |
| CO 6 | Use Graphics class, AWT packages and manage input and output files in Java | 2 | 3 | 2 | 2 | 3 | 1 | 2 | 1 | 1 | 0 | 0 | 2 | 2 | 1 | 0 |
| **Addition** | | 13 | 17 | 13 | 8 | 6 | 5 | 6 | 5 | 3 | 0 | 0 | 13 | 13 | 11 | 0 |
| **Average** | | 2.17 | 2.83 | 2.17 | 1.33 | 1.00 | 0.83 | 1.00 | 0.83 | 0.50 | 0.00 | 0.00 | 2.17 | 2.17 | 1.83 | 0.00 |

**Subject Teacher**
**TE E&TC Engg.**

**I/c CO PO Mapping**
**E&TC Engg.**

**I/c Academic Coordinator**
**E&TC Engg.**

**HOD**
**E&TC Engg.**

# DEPARTMENT OF E&TC ENGINEERING

## Course Outcomes (CO), Program Outcomes (PO), Program Specific Outcomes Mapping

### Third Year of Engineering Sem-II (A Y 2021-22)

### Program Outcomes (PO)

PO1: Engineering knowledge

PO2: Problem analysis

PO3: Conduct investigations of complex problems

PO4: Conduct investigations of complex problems

PO5: Modern tool usage

PO6: The engineer and society

PO7: Environment and sustainability

PO8: Ethics

PO9: Individual and team work

PO10: Communication

PO11: Project management and finance

PO12: Life-long learning

### Program Specific Outcomes (PSOs)

PSO 1: To Enhance the ability to design and develop advanced techniques in Secured Communication, Embedded Systems, Signal Processing, latest Semiconductor Technologies, RF and Power Systems, Machine Learning and Software Skills..

PSO 2: Nurture holistic development of students to pursue higher studies, successful entrepreneurship or cater needs of societal and industrial problems by providing an excellent Academic environment.

PSO 3: Propose energy efficient solutions for various social and environmental issues in real world applications by keeping pace with new technologies.

**Name of the Subject :304192: Cellular Networks**

**Name of Subject Teacher: Mr. Tushar Zombade**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Understand fundamentals of wireless communications | 2 | 1 | 0 | 1 | 2 | 1 | 3 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 0 |
| CO 2 | Discuss and study OFDM and MIMO concepts | 2 | 1 | 1 | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 2 | 2 | 0 |
| CO 3 | Elaborate fundamentals mobile communication | 3 | 2 | 1 | 0 | 2 | 1 | 1 | 1 | 0 | 2 | 0 | 2 | 1 | 2 | 0 |
| CO 4 | Describes aspects of wireless system planning | 1 | 2 | 1 | 2 | 3 | 0 | 0 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 0 |
| CO 5 | Understand of modern and futuristic wireless networks architecture | 1 | 3 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 2 | 1 | 0 |
| CO 6 | Summarize different issues in performance analysis | 3 | 2 | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 0 |
| **Addition** | | 12 | 11 | 6 | 7 | 10 | 3 | 6 | 4 | 6 | 8 | 4 | 6 | 10 | 10 | 0 |
| **Average** | | 2.00 | 1.83 | 1.00 | 1.17 | 1.67 | 0.50 | 1.00 | 0.67 | 1.00 | 1.33 | 0.67 | 1.00 | 1.67 | 1.67 | 0.00 |

**Subject Teacher**
**TE E&TC Engg.**

**I/c CO PO Mapping**
**E&TC Engg.**

**I/c Academic Coordinator**
**E&TC Engg.**

**HOD**
**E&TC Engg.**

**Name of the Subject :304193: Project Management**

**Name of Subject Teacher: Mr. Anant Raghunath More**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Apply the fundamental knowledge of project management for effectively handling the projects. | 2 | 2 | 3 | 0 | 1 | 3 | 1 | 0 | 2 | 2 | 2 | 1 | 3 | 2 | 2 |
| CO 2 | Identify and select the appropriate project based on feasibility study and undertake its effective planning. | 1 | 2 | 1 | 2 | 2 | 0 | 3 | 3 | 1 | 1 | 3 | 0 | 3 | 1 | 1 |
| CO 3 | Assimilate effectively within the organizational structure of the project and handle project management related issues in an efficient manner. | 2 | 3 | 2 | 2 | 2 | 1 | 1 | 0 | 3 | 3 | 2 | 1 | 2 | 3 | 3 |
| CO 4 | Apply the project scheduling techniques to create a Project Schedule Plan and accordingly utilize the resources to meet the project deadline. | 1 | 2 | 2 | 1 | 2 | 3 | 0 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 1 |
| CO 5 | Identify and assess the project risks and manage finances in line with the Project Financial Management Process. | 2 | 3 | 1 | 1 | 0 | 1 | 2 | 3 | 2 | 3 | 3 | 1 | 3 | 2 | 3 |
| CO 6 | Develop new products assessing their commercial viability and develop skill sets for becoming successful entrepreneurs while being fully aware of the legal issues related to Product development and Entrepreneurship. | 1 | 3 | 3 | 1 | 3 | 3 | 2 | 1 | 3 | 2 | 3 | 1 | 3 | 2 | 1 |
| **Addition** | | 9 | 15 | 12 | 7 | 10 | 11 | 9 | 9 | 12 | 13 | 15 | 5 | 15 | 11 | 11 |
| **Average** | | 1.50 | 2.50 | 2.00 | 1.17 | 1.67 | 1.83 | 1.50 | 1.50 | 2.00 | 2.17 | 2.50 | 0.83 | 2.50 | 1.83 | 1.83 |

**Subject Teacher**
**TE E&TC Engg.**

**I/c CO PO Mapping**
**E&TC Engg.**

**I/c Academic Coordinator**
**E&TC Engg.**

**HOD**
**E&TC Engg.**

**Name of the Subject :304194: Power Devices & Circuits**

**Name of Subject Teacher: Ms. Nandini Vaibhav Dhole**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | To differentiate based on the characteristic parameters among SCR, GTO, MOSFET & IGBT and identify suitability of the power device for certain applications and understand the significance of device ratings | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 |
| CO 2 | To design triggering / driver circuits for various power devices | 3 | 3 | 3 | 2 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 |
| CO 3 | To evaluate and analyze various performance parameters of the different converters and its topologies. | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 1 | 0 | 0 | 0 | 0 | 3 | 3 | 2 |
| CO 4 | To understand significance and design of various protection circuits for power devices. | 3 | 3 | 3 | 3 | 1 | 1 | 3 | 2 | 0 | 0 | 0 | 0 | 3 | 2 | 0 |
| CO 5 | To evaluate the performance of uninterruptible power supplies, switch mode power supplies and battery | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 1 | 0 | 0 | 1 | 1 | 3 | 3 | 1 |
| CO 6 | To understand case studies of power electronics in applications like electric vehicles, solar systems etc | 3 | 1 | 3 | 2 | 3 | 3 | 2 | 0 | 1 | 2 | 1 | 1 | 1 | 3 | 1 |
| **Addition** | | 18 | 16 | 18 | 14 | 11 | 13 | 15 | 4 | 1 | 2 | 2 | 2 | 14 | 15 | 4 |
| **Average** | | 3.00 | 2.67 | 3.00 | 2.33 | 1.83 | 2.17 | 2.50 | 0.67 | 0.17 | 0.33 | 0.33 | 0.33 | 2.33 | 2.50 | 0.67 |

**Subject Teacher**
**TE E&TC Engg.**

**I/c CO PO Mapping**
**E&TC Engg.**

**I/c Academic Coordinator**
**E&TC Engg.**

**HOD**
**E&TC Engg.**

**Name of the Subject :304195: Elective-II: Advanced JAVA Programming** **Name of Subject Teacher: Ms.Varsha Nanavare**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Design and develop GUI applications using Applets. | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 3 | 3 | 3 | 1 |
| CO 2 | Apply relevant AWT/ swing components to handle the given event. | 3 | 3 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 |
| CO 3 | Design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing and Event Handling. | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 2 | 0 | 0 | 0 | 3 | 3 | 3 | 2 |
| CO 4 | Learn to access database through Java programs, using Java Database Connectivity (JDBC) | 2 | 2 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 2 | 2 |
| CO 5 | Invoke the remote methods in an application using Remote Method Invocation (RMI) | 2 | 3 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 3 | 2 |
| CO 6 | Develop a program for client /server communication using Java Networking classes. | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 0 | 0 | 2 | 3 | 3 | 1 |
| **Addition** | | 15 | 17 | 15 | 12 | 14 | 7 | 4 | 5 | 2 | 0 | 0 | 14 | 14 | 16 | 10 |
| **Average** | | 2.50 | 2.83 | 2.50 | 2.00 | 2.33 | 1.17 | 0.67 | 0.83 | 0.33 | 0.00 | 0.00 | 2.33 | 2.33 | 2.67 | 1.67 |

**Subject Teacher**
**TE E&TC Engg.**

**I/c CO PO Mapping**
**E&TC Engg.**

**I/c Academic Coordinator**
**E&TC Engg.**

**HOD**
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# DEPARTMENT OF E&TC ENGINEERING

## Course Outcomes (CO), Program Outcomes (PO), Program Specific Outcomes Mapping

## Fourth Year of Engineering Sem-I (A Y 2021-22)

### Program Outcomes (PO)

PO1: Engineering knowledge

PO2: Problem analysis

PO3: Conduct investigations of complex problems

PO4: Conduct investigations of complex problems

PO5: Modern tool usage

PO6: The engineer and society

PO7: Environment and sustainability

PO8: Ethics

PO9: Individual and team work

PO10: Communication

PO11: Project management and finance

PO12: Life-long learning

### Program Specific Outcomes (PSOs)

PSO 1: To Enhance the ability to design and develop advanced techniques in Secured Communication, Embedded Systems, Signal Processing, latest Semiconductor Technologies, RF and Power Systems, Machine Learning and Software Skills..

PSO 2: Nurture holistic development of students to pursue higher studies, successful entrepreneurship or cater needs of societal and industrial problems by providing an excellent Academic environment.

PSO 3: Propose energy efficient solutions for various social and environmental issues in real world applications by keeping pace with new technologies.

**Name of the Subject :404183: Radiation & Microwave Techniques**

**Name of Subject Teacher: Mr. Tushar Zombade**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Differentiate various performance parameters of radiating elements. | 2 | 2 | 0 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 0 |
| CO 2 | Analyze various radiating elements and arrays. | 2 | 3 | 1 | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| CO 3 | Apply the knowledge of waveguide fundamentals in design of transmission lines. | 2 | 1 | 3 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 2 | 0 |
| CO 4 | Design and set up a system consisting of various passive microwave components. | 1 | 1 | 3 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 1 | 0 | 1 | 0 |
| CO 5 | Analyze tube based and solid state active devices along with their applications. | 1 | 3 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 1 | 0 |
| CO 6 | Measure various performance parameters of microwave components. | 3 | 2 | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 0 |
| **Addition** | | 11 | 12 | 10 | 6 | 6 | 3 | 4 | 4 | 3 | 4 | 4 | 4 | 9 | 8 | 0 |
| **Average** | | 1.83 | 2.00 | 1.67 | 1.00 | 1.00 | 0.50 | 0.67 | 0.67 | 0.50 | 0.67 | 0.67 | 0.67 | 1.50 | 1.33 | 0.00 |

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**Name of the Subject :404181: VLSI Design and Technology**

**Name of Subject Teacher: Mr. R. U. Shekokar**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Write effective HDL coding for digital design | 2 | 1 | 3 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 0 |
| CO 2 | Apply knowledge of real time issues in digital design | 2 | 3 | 1 | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| CO 3 | Model digital circuit with HDL, simulate, synthesize and prototype in PLDs. | 2 | 1 | 3 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 2 | 0 |
| CO 4 | Design CMOS circuits for specified applications. | 1 | 1 | 3 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 1 | 0 | 1 | 0 |
| CO 5 | Analyze various issues and constraints in design of an ASIC | 1 | 3 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 1 | 0 |
| CO 6 | Apply knowledge of testability in design and build self test circuits. | 3 | 2 | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 0 |
| **Addition** | | 11 | 11 | 13 | 6 | 6 | 3 | 4 | 4 | 3 | 4 | 4 | 4 | 9 | 8 | 0 |
| **Average** | | 1.83 | 1.83 | 2.17 | 1.00 | 1.00 | 0.50 | 0.67 | 0.67 | 0.50 | 0.67 | 0.67 | 0.67 | 1.50 | 1.33 | 0.00 |

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**Name of the Subject :404182:Computer Networks & Security**

**Name of Subject Teacher: Mrs. Deepali Newaskar**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Understand fundamental underlying principles of computer networking | 3 | 2 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 3 | 2 | 0 |
| CO 2 | Describe and analyze the hardware, software, components of a network and their interrelations. | 3 | 2 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 2 | 1 | 0 |
| CO 3 | Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies | 2 | 2 | 2 | 2 | 0 | 1 | 0 | 0 | 0 | 2 | 1 | 1 | 2 | 1 | 0 |
| CO 4 | Have a basic knowledge of installing and configuring networking applications. | 2 | 3 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 2 | 1 | 1 | 2 | 1 | 0 |
| CO 5 | Specify and identify deficiencies in existing protocols, and then go onto select new and better protocols | 2 | 3 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 0 |
| CO 6 | Have a basic knowledge of the use of cryptography and network security | 2 | 3 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 0 |
| **Addition** | | 14 | 15 | 9 | 6 | 3 | 6 | 1 | 0 | 2 | 4 | 6 | 6 | 13 | 9 | 0 |
| **Average** | | 2.33 | 2.50 | 1.50 | 1.00 | 0.50 | 1.00 | 0.17 | 0.00 | 0.33 | 0.67 | 1.00 | 1.00 | 2.17 | 1.50 | 0.00 |

**Subject Teacher**
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**Name of the Subject :404184:Elective - I: Internet of Things**

**Name of Subject Teacher: Mrs. Namrata Mishra**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Understand roles of sensors in IoT | 2 | 1 | 3 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 0 |
| CO 2 | Understand the various concepts, terminologies and architecture of IoT systems. | 2 | 3 | 1 | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| CO 3 | Use sensors and actuators for design of IoT | 2 | 1 | 3 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 2 | 0 |
| CO 4 | Understand and apply various protocols for design of IoT systems | 1 | 1 | 3 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 1 | 0 | 1 | 0 |
| CO 5 | Use various techniques of data storage and analytics in IoT | 1 | 3 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 1 | 0 |
| CO 6 | Understand various applications of IoT | 3 | 2 | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 0 |
| **Addition** | | 11 | 11 | 13 | 6 | 6 | 3 | 4 | 4 | 3 | 4 | 4 | 4 | 9 | 8 | 0 |
| **Average** | | 1.83 | 1.83 | 2.17 | 1.00 | 1.00 | 0.50 | 0.67 | 0.67 | 0.50 | 0.67 | 0.67 | 0.67 | 1.50 | 1.33 | 0.00 |

**Subject Teacher**
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**Name of the Subject : 404185: Elective - II: Electronics Product Design**

**Name of Subject Teacher: Mrs. Nandini Dhole**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Understand various stages of hardware, software and PCB design. | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 0 |
| CO 2 | Importance of product test & test specifications. | 3 | 3 | 3 | 3 | 1 | 2 | 1 | 3 | 2 | 2 | 2 | 0 | 3 | 3 | 1 |
| CO 3 | Special design considerations and importance of documentation. | 3 | 2 | 3 | 3 | 2 | 1 | 3 | 2 | 0 | 2 | 0 | 1 | 2 | 2 | 2 |
| CO 4 | Learn the different considerations of analog, digital and mixed circuit design. | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 3 | 3 | 1 |
| CO 5 | Understand the importance of testing in the product design cycle. | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 3 | 3 | 1 |
| CO 6 | Understand the stages of product (hardware/ software) design and development. | 3 | 1 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 1 |
| **Addition** | | 18 | 15 | 18 | 17 | 10 | 8 | 9 | 7 | 2 | 4 | 3 | 2 | 15 | 17 | 6 |
| **Average** | | 3.00 | 2.50 | 3.00 | 2.83 | 1.67 | 1.33 | 1.50 | 1.17 | 0.33 | 0.67 | 0.50 | 0.33 | 2.50 | 2.83 | 1.00 |

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# DEPARTMENT OF E&TC ENGINEERING

## Course Outcomes (CO), Program Outcomes (PO), Program Specific Outcomes Mapping

### Fourth Year of Engineering Sem-II (A Y 2021-22)

### Program Outcomes (PO)

PO1: Engineering knowledge

PO2: Problem analysis

PO3: Conduct investigations of complex problems

PO4: Conduct investigations of complex problems

PO5: Modern tool usage

PO6: The engineer and society

PO7: Environment and sustainability

PO8: Ethics

PO9: Individual and team work

PO10: Communication

PO11: Project management and finance

PO12: Life-long learning

### Program Specific Outcomes (PSOs)

PSO 1: To Enhance the ability to design and develop advanced techniques in Secured Communication, Embedded Systems, Signal Processing, latest Semiconductor Technologies, RF and Power Systems, Machine Learning and Software Skills..

PSO 2: Nurture holistic development of students to pursue higher studies, successful entrepreneurship or cater needs of societal and industrial problems by providing an excellent Academic environment.

PSO 3: Propose energy efficient solutions for various social and environmental issues in real world applications by keeping pace with new technologies.

**Name of the Subject :404189 Mobile Communication**

**Name of Subject Teacher:Mr. Tushar Zombade**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Apply the concepts of switching technique and traffic engineering to design multistage networks. | 1 | 1 | 2 | 1 | 2 | 0 | 1 | 0 | 1 | 0 | 2 | 1 | 2 | 2 | 0 |
| CO 2 | Explore the architecture of GSM. | 2 | 2 | 1 | 3 | 1 | 2 | 1 | 1 | 2 | 0 | 1 | 2 | 1 | 1 | 0 |
| CO 3 | Differentiate thoroughly the generations of mobile technologies. | 2 | 1 | 2 | 0 | 2 | 1 | 1 | 1 | 0 | 2 | 1 | 0 | 2 | 2 | 0 |
| CO 4 | Nurture students with knowledge of traffic engineering to design networks. | 1 | 1 | 2 | 1 | 2 | 2 | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 2 | 0 |
| CO 5 | Realize the importance of cellular concepts and its propagation mechanism. | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 2 | 2 | 2 | 1 | 0 |
| CO 6 | Understand switching techniques for voice and data traffic. | 2 | 2 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 0 |
| **Addition** | | 10 | 8 | 8 | 7 | 8 | 6 | .5 | 5 | 5 | 5 | 8 | 7 | 9 | 10 | 0 |
| **Average** | | 1.67 | 1.33 | 1.33 | 1.17 | 1.33 | 1.00 | 0.83 | 0.83 | 0.83 | 0.83 | 1.33 | 1.17 | 1.50 | 1.67 | 0.00 |

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**Name of the Subject :404190 Broadband Communication Systems** **Name of Subject Teacher:Mr. Rajesh Uttamrao Shekokar**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Perform Link power budget and Rise Time Budget by proper selection of components and check its viability. | 2 | 2 | 0 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 0 |
| CO 2 | Perform Satellite Link design for UpLink and DownLink. | 2 | 3 | 1 | 1 | 2 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| CO 3 | Comprehend the three primary components of a fiber optic communication system. | 2 | 1 | 3 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 2 | 2 | 0 |
| CO 4 | Understand the system design issues and the role of WDM components in advanced light wave systems. | 1 | 1 | 3 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 1 | 0 | 1 | 0 |
| CO 5 | Understand the basics of orbital mechanics and the look angles from ground stations to the satellite. | 1 | 3 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 1 | 0 |
| CO 6 | Apply subject understanding in Link Design | 3 | 2 | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 0 |
| **Addition** | | 11 | 12 | 10 | 6 | 6 | 3 | 4 | 4 | 3 | 4 | 4 | 4 | 9 | 8 | 0 |
| **Average** | | 1.83 | 2.00 | 1.67 | 1.00 | 1.00 | 0.50 | 0.67 | 0.67 | 0.50 | 0.67 | 0.67 | 0.67 | 1.50 | 1.33 | 0.00 |

**Subject Teacher**
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**Name of the Subject :404191:Elective III:Audio Video Engineering** **Name of Subject Teacher:Mrs. Jyoti Sangogi**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Apply the fundamentals of Analog Television and Colour Television standards. | 3 | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 0 | 1 | 1 | 1 | 2 | 2 | 2 |
| CO 2 | Explain the fundamentals of Digital Television, DTV standards and parameters. | 2 | 3 | 1 | 1 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 |
| CO 3 | Study and understand various HDTV standards and Digital TV broadcasting systems and become acquainted with different types of analog, digital TV and HDTV systems. | 2 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 2 | 2 | 2 | 2 |
| CO 4 | Understand acoustic fundamentals and various acoustic systems. | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 1 | 3 |
| CO 5 | Learn and understand the working of real life video systems and the different elements of video systems plus the encoding/decoding techniques. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CO 6 | Understand different channel allocations, differences between various systems present in this world, their transmission and reception techniques. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Addition** | | 8 | 7 | 4 | 2 | 5 | 2 | 3 | 3 | 1 | 2 | 1 | 7 | 7 | 5 | 8 |
| **Average** | | 1.33 | 1.17 | 0.67 | 0.33 | 0.83 | 0.33 | 0.50 | 0.50 | 0.17 | 0.33 | 0.17 | 1.17 | 1.17 | 0.83 | 1.33 |

**Subject Teacher**
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**Name of the Subject :404192:Elective-IV:Wireless Sensor Networks** **Name of Subject Teacher:Ms.Deepali Amol Newaskar**

| CO/PO | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | Explain various concepts and terminologies used in WSN | 3 | 2 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 3 | 2 | 2 |
| CO 2 | Describe importance and use of radio communication and link management in WSN | 3 | 2 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 2 | 1 | 1 |
| CO 3 | Explain various wireless standards and protocols associated with WSN | 2 | 2 | 2 | 2 | 0 | 1 | 0 | 0 | 0 | 2 | 1 | 1 | 2 | 1 | 2 |
| CO 4 | Recognize importance of localization and routing techniques used in WSN | 2 | 3 | 2 | 2 | 1 | 1 | 2 | 1 | 0 | 2 | 1 | 1 | 2 | 1 | 3 |
| CO 5 | Understand techniques of data aggregation and importance of security in WSN | 2 | 3 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 2 |
| CO 6 | Examine the issues involved in design and deployment of WSN | 2 | 3 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 0 |
| **Addition** | | 14 | 15 | 9 | 6 | 3 | 6 | 3 | 1 | 2 | 4 | 6 | 6 | 13 | 9 | 10 |
| **Average** | | 2.33 | 2.50 | 1.50 | 1.00 | 0.50 | 1.00 | 0.50 | 0.17 | 0.33 | 0.67 | 1.00 | 1.00 | 2.17 | 1.50 | 1.67 |

**Subject Teacher**
**BE E&TC Engg.**

**I/c CO PO Mapping**
**E&TC Engg.**

**I/c Academic Coordinator**
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