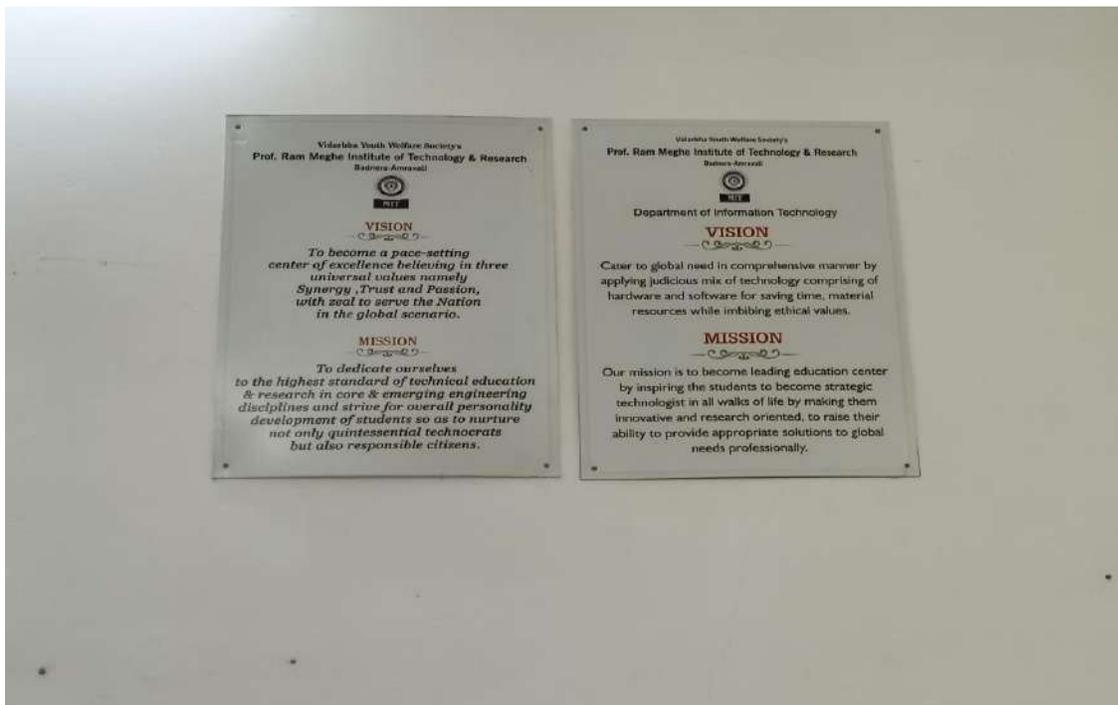
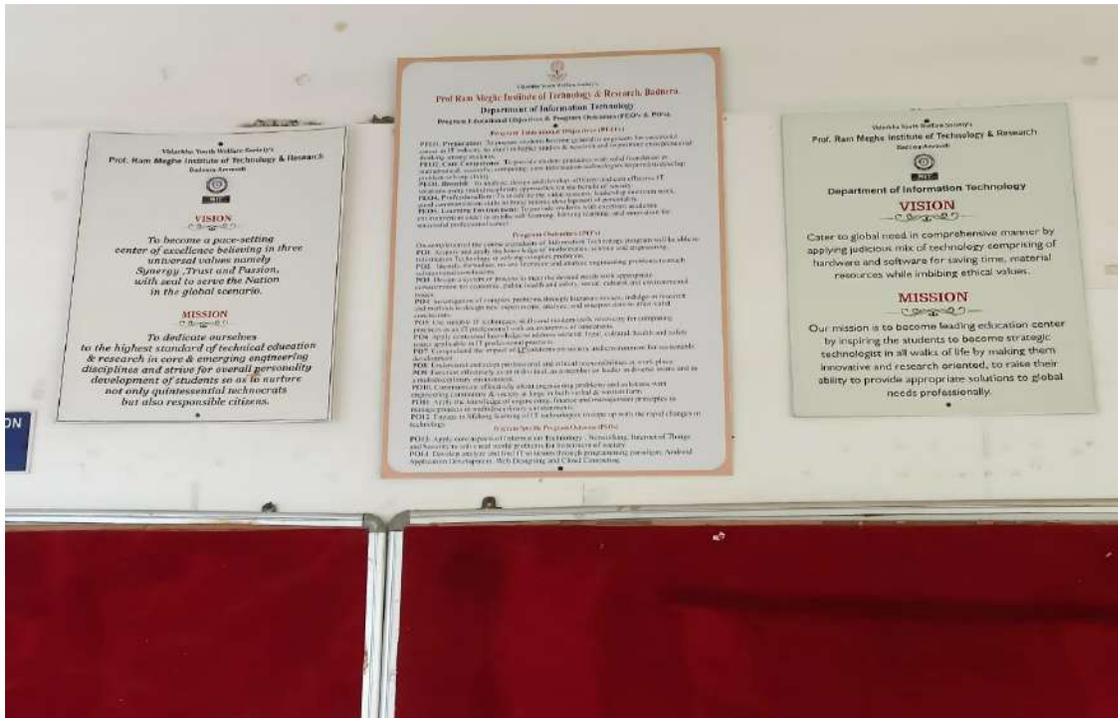
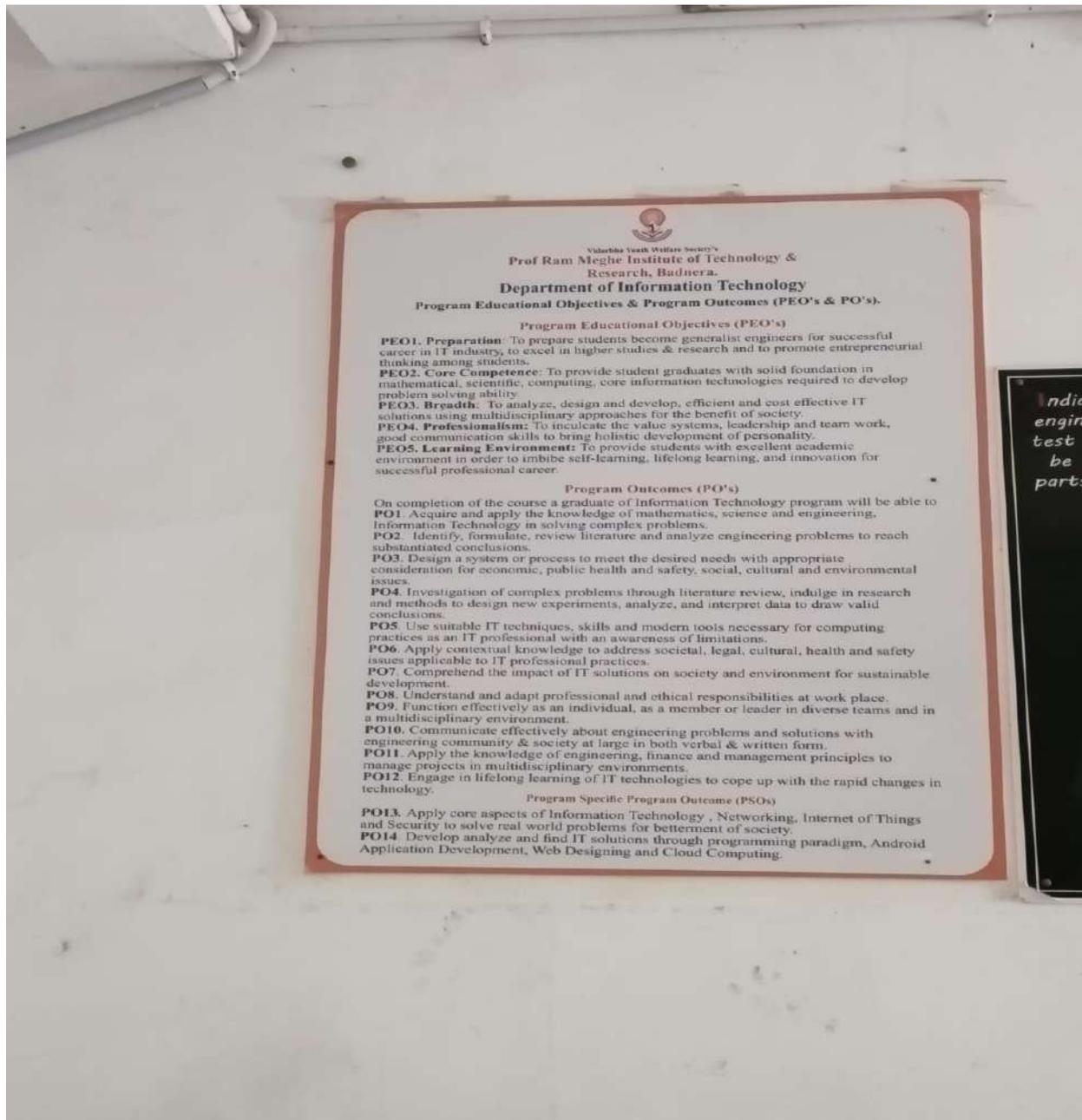


1. POs, PSOs and Vision- Mission are displayed in Main Corridor of the department.



2. POs & PSOs are displayed at the entrance of the department.





**Vidarbha Youth Welfare Society's
Prof. Ram Meghe Institute of Technology & Research, Badnera**

**Department of Master in Computer Application
Programme Educational Objectives(PEOs)**

Preparation: To strive for overall personality development of students so as to nurture not only quintessential technocrats but also responsible citizens and to steer the organization towards becoming a pace setting centre of excellence.

Core Competence: To equip the students with the fundamentals of Data Structures, Database management system, Computer Oriented Optimization techniques and Programming methodology. To teach the students about the collection, analysis, organization of data and enhance their ability to convert it into useful information. Also to make the students understand management of information systems along with an understanding of the principles of management and of business systems.

Breadth: To develop the ability in students to analyze data, apply technical concepts and synthesize both for robust software designs

Professionalism: To inculcate the value systems, leadership and team work, skills, bring holistic development of personality and to promote entrepreneurial thinking among students.

Learning environment: To provide students with encouraging environment that builds rigor and stimulated innovative thinking for a successful professional career.

Programme Outcomes(POs)

- a) An ability to apply knowledge of mathematics, computing and management in the field of computer software.
- b) An ability to identify, formulate, design and solve intricate computing problems, as well as to analyze and interpret data.
- c) Able to develop algorithms, and implement them in various programming languages.
- d) An ability to create and use techniques, expertise and modern computing tools necessary to solve complex computing problems
- e) An ability to effectively communicate technical information and complex problems through improved communication and interpersonal skills
- f) Graduates will develop an attitude of continuous learning.
- g) Graduates will demonstrate knowledge of values and professional ethics in their activities
- h) Graduates will develop confidence to face challenges in their career.



GPS Map Camera

Professor Ram
Meghe Institute
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Amphi Theater

Ele and Telecom

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Amravati, Amravati, 444701,
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Department of Civil Engineering

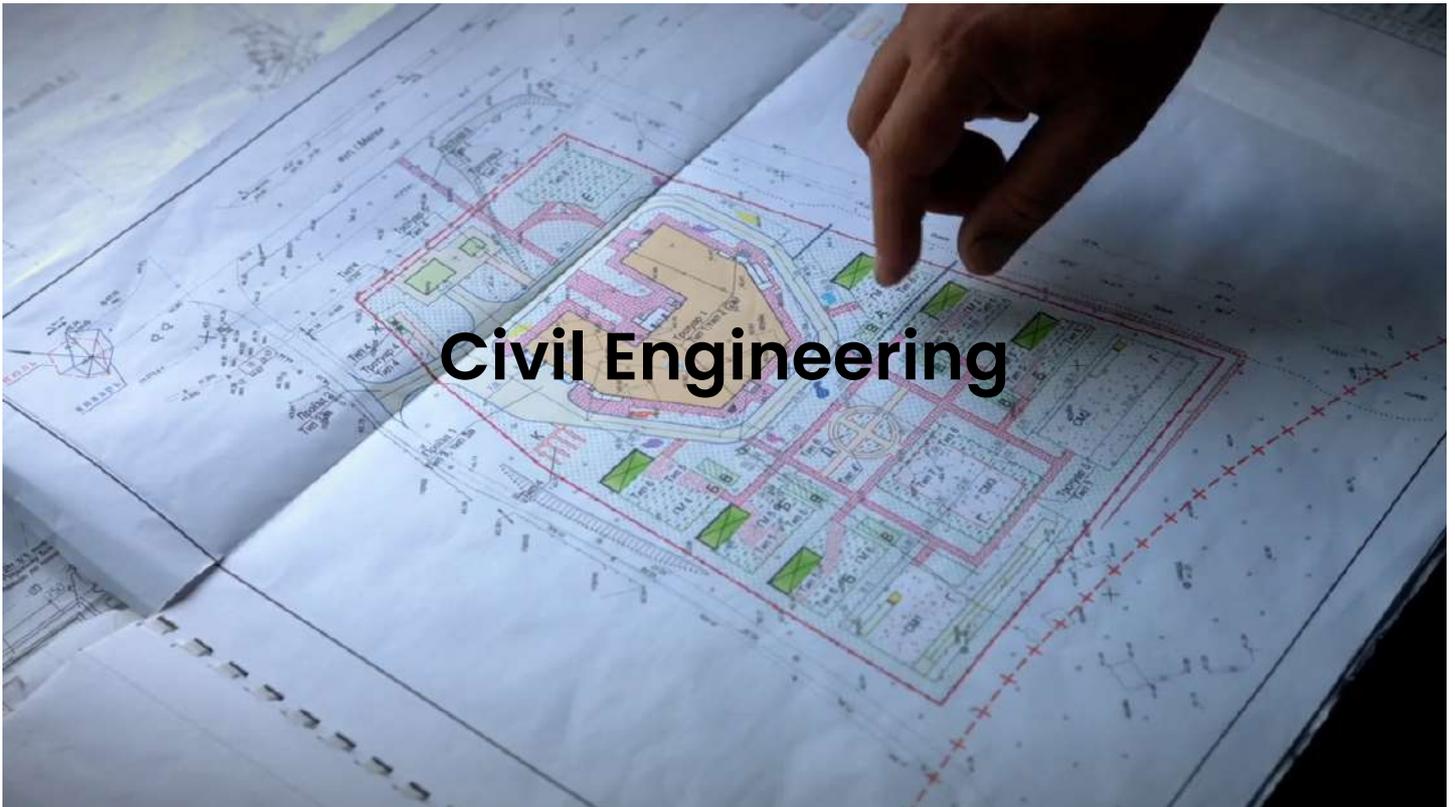


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Program Educational Objectives

1. Preparation: To strive for overall personality development of students so as to nurture not only quintessential technocrats but also responsible citizens.
2. Core Competence: To make the students apply the necessary problem-solving, design, and application skills for successful careers in Civil Engineering.
3. Breadth: To provide the educational foundation and communication skills that prepare the students for diverse career paths.
4. Professionalism: To inculcate the value systems & ethics, leadership and team work skills, bring holistic development of personality and to promote entrepreneurial thinking among students.
5. Learning environment: To provide students with an environment that develops confidence and stimulates innovative thinking for successful professional career.

Program Outcomes

Engineering Graduates will be able to:

PO1: Engineering Knowledge: Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO3: Design/ Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.

PO5: 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.

PO6: 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 professional engineering practice.

PO7: Environment and Sustainability: Understand the impact of professional engineering solutions in societal and

environmental contexts and demonstrate knowledge of and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

PO9: Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

PO10: 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.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of 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.

PO12: 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 Program Outcomes

Engineering Graduates will be able to:

PO13: Computer Based Civil and Structural Engineering Design: Design Civil and Structural engineering systems using contemporary software used by design and analysis firms.

PO14: Entrepreneurial spirit: Demonstrate ability to organize activities, work with and lead teams, understand prevalent trade practices, understand site culture.

Course Outcomes (<https://mitra.ac.in/uploads/dept-pdf/COs-Department-of-Civil-Engineering-converted.pdf>)

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Programme Educational Objectives (PEOs)

PEO1. Preparation: To prepare students for successful careers in the software industry that meet the needs of Indian and multinational companies or to excel in Higher studies.

PEO2. Core competence: To develop the ability among students to synthesize data and technical concepts for software design and development.

PEO3. Breadth: To inculcate in students professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach and an ability to relate engineering issues to broader social context.

PEO4. Professionalism: To provide students with a sound foundation in the mathematical, scientific and computer engineering fundamentals required to solve engineering problems and also pursue higher studies.

PEO5. Learning Environment: To promote student with an academic environment aware of excellence, leadership, written ethical codes and guidelines and the life-long learning needed for a successful professional career.

Programme Outcomes (POs)

Engineering Graduate will be able to:

PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. Problem analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. 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.

PO4. 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.

PO5. 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.

PO6. 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.

PO7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and the need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. 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.

PO11. 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.

PO12. 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's)

PSO1: Foundation of Computer System Development: Ability to use knowledge of computer systems and design principles in building the hardware and software components, products in the domain of embedded system, artificial intelligence, databases, networking, web technology and mobile computing.

PSO2: Problem Solving Ability: Ability to apply knowledge in various problem domains and implement innovative and suitable solutions to cater to needs of industry, business and e-governance by imbuing highest ethical and economical values.
Course Outcomes

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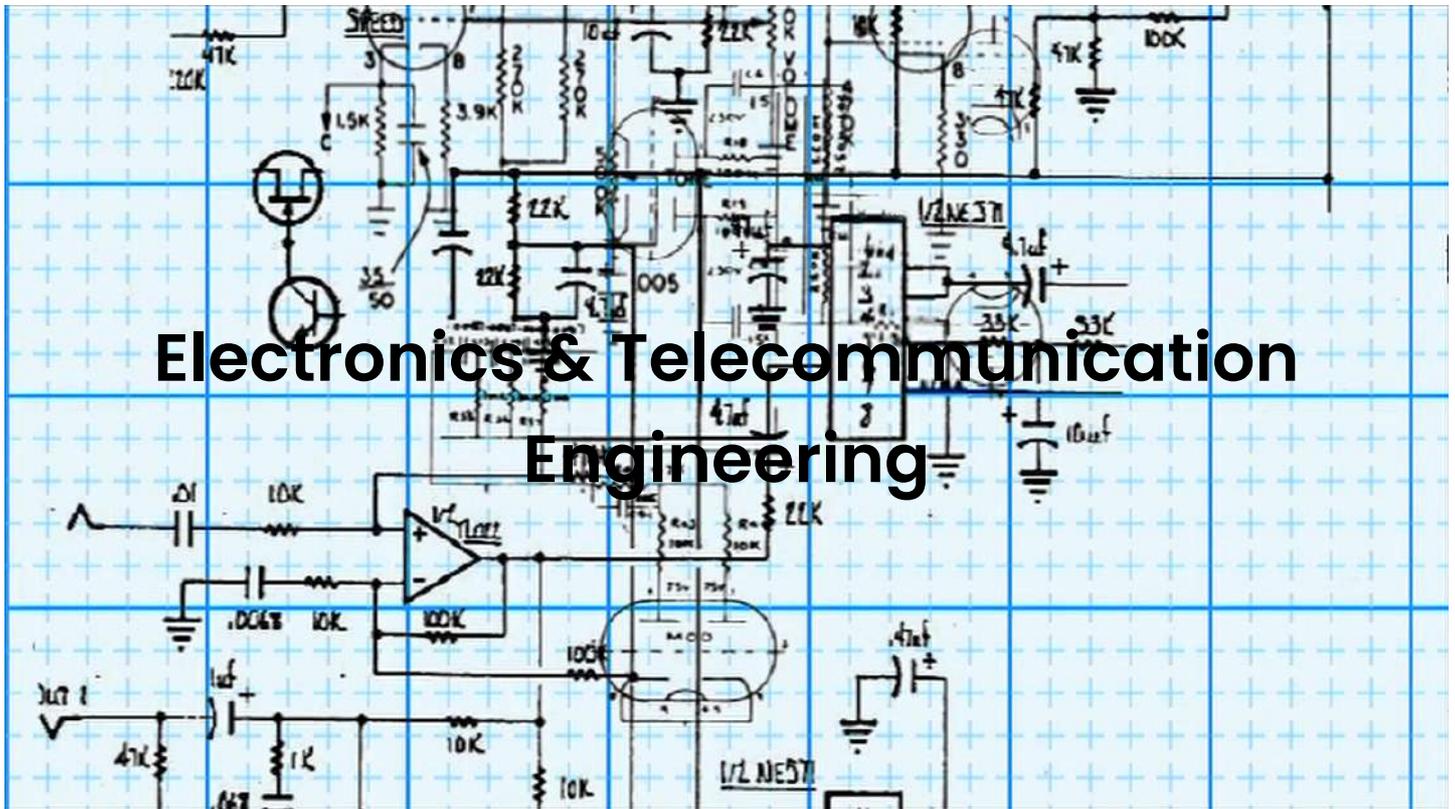
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PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

- 1. Preparation:** To prepare the students to solve socio-engineering problems so as to steer the organization towards excellence through systematic thinking, excel in higher studies and be a successful technical professional through rigorous education/ training.
- 2. Core competence:** To provide students with solid foundation in Mathematics and Fundamentals of Engineering Sciences, Electronic circuit design, Telecommunication Engineering and Signal processing so as to solve engineering problems and also pursue higher studies.
- 3. Breadth:** To impart students with such skills that enable them to comprehend, analyze, design and implement so as to provide multidisciplinary solutions to real world social and technical problems with innovative ideas.
- 4. Professionalism:** To inculcate in students social awareness, value based systems, leadership qualities, professional and ethical attitude, good communication skills to bring holistic development of personality and ability to relate engineering issues in social context.
- 5. Learning Environment:** To provide students with excellent academic and social environment aware of leadership, ethical codes, team spirit, lifelong learning, to build a sound professional career with stimulated innovative thinking.

(A) PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

- PO1. Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2. Problem Analysis:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3. 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.
- PO4. 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.
- PO5. 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.
- PO6. 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.
- PO7. 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.
- PO8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. 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.

PO11. 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.

PO12. 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.

(B) PROGRAM SPECIFIC OUTCOMES (PSOs)

Engineering Graduates will be able to:

PO13. Develop ability to analyze, simulate, design and implement analog as well as digital circuits, communication systems, microcomputer system, instrumentation and control system and power system.

PO14. Utilize probability and statistics; transform methods, engineering mathematics in support of electronics and telecommunication systems.

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Program Education Objectives (PEOs)

PEO1: To provide a sustainable foundation in mathematics, science and engineering to enable them to become competent IT Engineers

PEO2: To deliver a comprehensive education in Information Technology and related engineering fields to ensure the core competency to be successful in Industry and in higher studies.

PEO3: To analyze, design and create solutions in alignment with industry and emerging trends in multidisciplinary environments.

PEO4: To communicate effectively as a part of team for self-learning, lifelong learning and career enhancement in industry and society.

Program Outcomes

On completion of the course a graduate of Information Technology program will be able to

PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO3: 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.

PO4: 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 for complex problems.

PO5: Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6: 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.

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PO11: 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.

PO12: Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

Program specific program outcome (PSPOs)

PSO1. Apply core aspects of Information Technology, Networking, Internet of Things and Security to pursue successful career in IT industry.

PSO2. *Develop, analyze and find IT solutions through programming paradigm, Web Designing and Cloud Computing.*

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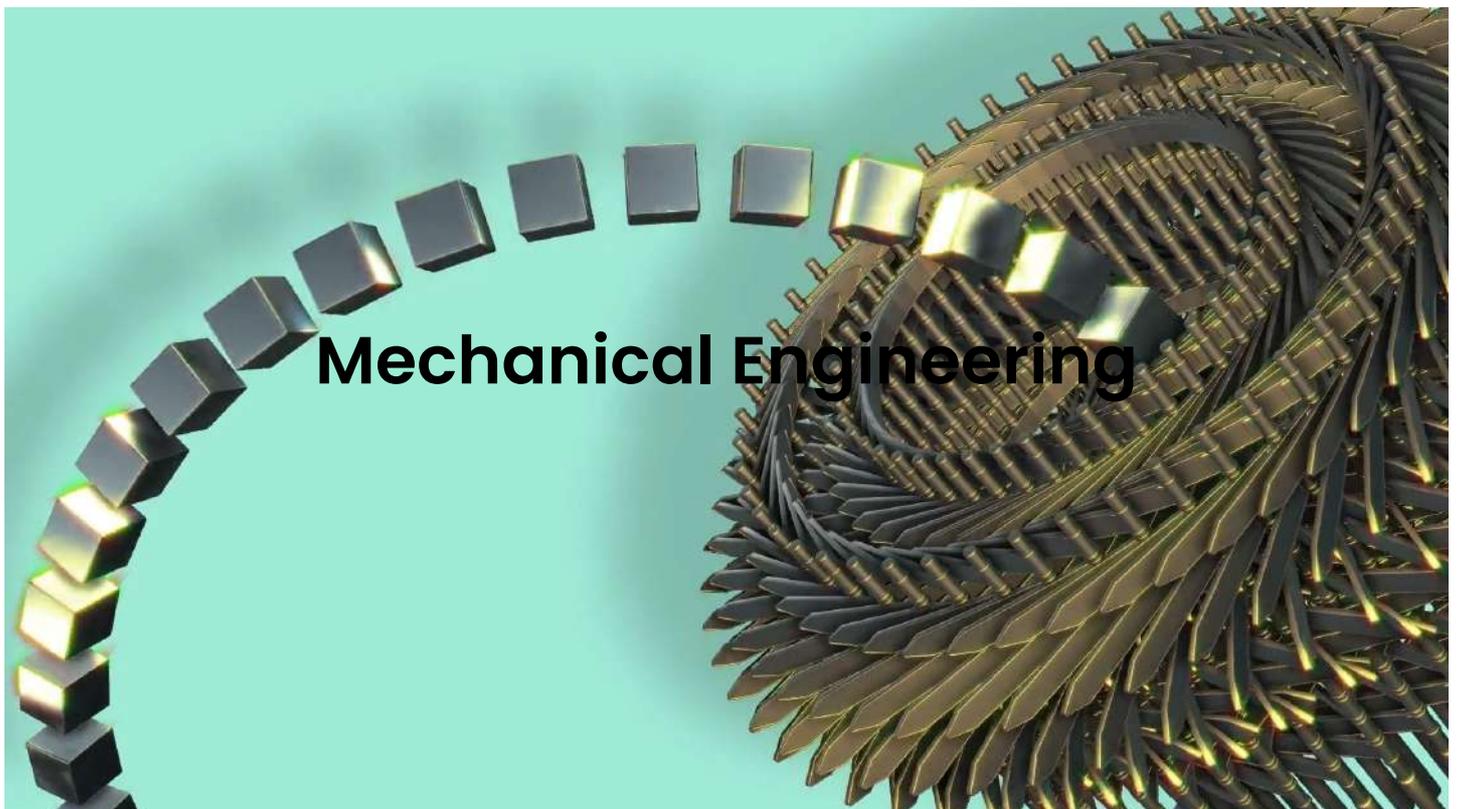


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Vidarbha Youth Welfare Society's
Prof. Ram Meghe Institute of Technology and Research
Badnera - Amravati 444701(MS)
(Formerly College of Engineering, Badnera) - Estd. 1983
Department of Mechanical Engineering



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Programme Educational Objectives (PEO)

1. **Preparation:** To strive for overall personality development of students so as to nurture not only quintessential technocrats but also responsible citizens and to steer the organization towards becoming a pace setting centre of excellence. The scheme of Mechanical Engineering is designed considering the important fields of study and market requirement. This structure is a unique combination of Basic sciences, humanities and core competency. The various subjects are introduced at various levels considering the prerequisites of the subjects as well as skill level of the students.
2. **Core Competence:** To educate students with the fundamentals of engineering sciences, basic Mechanical engineering, mechanical design and analysis to improve their overall engineering skills so that graduates will able to design mechanical systems containing functionality, aesthetics, safety, cost effectiveness and sustainability.
3. **Breadth:** To impart students with the skills for the design, improvement and installation of integrated systems of Men, material and machine for the social & national cause.
4. **Professionalism:** To inculcate the value systems & ethics, leadership and team work skills, bring holistic development of personality and to promote entrepreneurial thinking among students.
5. **Learning environment:** Democratic learning environment that develops confidence and stimulates innovative thinking for successful professional career.
6. **Creating a Dream:** To make every student dream. Dream about a government /private sector job or dream about higher studies or dream about becoming an entrepreneur.
7. **Employment avenues:** As per the fast changing global trend and demand, to make the students aware and assist for offering employment in various sectors.

Program Outcomes

Engineering Graduates will be able to:

- PO1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2. Problem analysis:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3. 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.
- PO4. 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.
- PO5. 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.

PO6. 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.

PO7. 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.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. 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.

PO11. 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.

PO12. 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 Program Outcomes

Engineering Graduates will be able to:

PO13. Design and develop mechatronics systems.

PO14. Utilize probability and statistics; transform methods, engineering mathematics in support of mechanical engineering systems.

Course Outcomes (<https://mitra.ac.in/uploads/dept-pdf/COs-Department-of-Civil-Engineering-converted.pdf>)

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Vidarbha Youth Welfare Society's

**Prof. Ram Meghe Institute of Technology and Research
Badnera - Amravati 444701(MS)**

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Department of First Year Engineering



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About First Year Engineering

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Programme Educational Objectives (PEOs):

- 1) To prepare students for successful careers in industry that meet the needs of Indian and multinational companies.
- 2) To develop the ability among students to synthesize data and technical concepts for application to product design.
- 3) To provide opportunity for students to work as part of teams on multidisciplinary projects.
- 4) To provide students with a sound foundation in the mathematical, scientific and engineering fundamentals necessary to formulate, solve and analyze engineering problems and to prepare them for graduate studies.
- 5) To promote student awareness of the life-long learning and to introduce them to professional ethics and codes of professional practice.

Program Outcomes (POs)

Engineering Graduate 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 principle 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 professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and the 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 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 Managements and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply 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 preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Outcome

Group – A

1. A1 ENGINEERING MATHEMATICS-I

Course Outcomes:

On completion of the course the students will learn:

1. Rolle's Theorem and its applications to Engineering Problems.
2. Understand maxima minima concept.
3. Demoiver's theorem in various concepts of complex number.
4. Differential equations of certain types that they might encounter in the same or higher semester.

1. A2 ENGINEERING PHYSICS

At the end of the course the students would be exposed to fundamental, knowledge in:

1. Electromagnetic phenomena and wave propagation.
2. Interferometric techniques in metrology, communication.
3. Application of quantum physics to optical & electrical phenomena.
4. Application of lasers and Fiber Optics in Engineering and Technology.
5. Conducting, superconducting and dielectric materials.
6. Semi conducting and new engineering materials.
7. Physics of Modern engineering materials.
8. Application of ultrasonic's, acoustics.

1. A3 ENGINEERING MECHANICS

Course Outcomes:

At the end of course students will be able to –

1. Compose and resolve the forces along with its effect.
2. Apply principles of statics to the system of rigid bodies and analyse simple structures.
3. Calculate frictional forces for simple contact, wedges and belt friction.
4. Locate centroid and calculate moment of inertia.
5. Calculate various kinematic quantities.
6. Solve the problems using different kinetic equations related to direct and interconnected particles.
7. Apply principle of conservation of momentum and laws of impact.

1. A4 COMPUTER PROGRAMMING

Course Outcomes:

On completion of the course the students will be able to:

1. Upon completion of this course, the students will gain knowledge of different manufacturing processes which are commonly employed in industry.
2. Upon completion of this course, the students will be able to fabricate the components using various manufacturing techniques.
3. The students will be conversant with the concept of dimensional accuracy and tolerances

Group – B

1.B1 ENGINEERING MATHEMATICS-II

Course Outcomes:

On completion of the course the students will be able to:

1. The essential tool of matrices and linear Algebra in a comprehensive Manner.
2. Evaluation of Integrals by Reduction Formulae, Gamma and Beta Function
3. Use the tool of Fourier series for learning advanced engineering mathematics.
4. Use new techniques DUIS to evaluate Integrals and Tracing of Curves

5. The Mathematical tools needed in evaluating Multiple Integrals and their usage

1.B2 ENGINEERING CHEMISTRY

Course Outcomes:

On completion of the course the students will be able to:

1. Apply the knowledge of chemistry in softening processes involved in water technology.
2. Identify various types of methods to protect the metallic structures from corrosive environment
3. Understanding of the energy storage system (battery) .
4. Apply the knowledge of useful engineering materials such as cement, lubricants, ceramics, refractories and nano materials based on their properties.
5. Develop the technique involved in the manufacturing process of cement
6. Apply the knowledge about the properties of chemical fuels for the generation of power.
7. Apply the knowledge of various polymeric material, their synthesis and applications.
8. Identify various phases of material at different thermodynamics variables.
9. Identification and analysis of materials by using advanced analytical techniques.

1.B3 BASIC ELECTRICAL ENGINEERING

Course Outcomes:

On completion of the course the students will be able to:

A student completing this course should able to do the following:

- 1] Explain the basic concepts of electric and magnetic circuits.
- 2] The students will be able to solve problems on AC fundamentals & three phase circuits
- 3] Explain the operating principles of various electrical machines and describe the working of various measuring instruments and importance of earthing

1. B4 ENGINEERING GRAPHICS

Course Outcome:

On successful completion of the course, the students will be able to attain following Course Outcomes:

1. Students will able to read/prepare/understand the engineering drawings
2. Students will able to create the projections and sectional views of 3D objects
3. Students will able to draw the orthographic and isometric views of 3D objects
4. Students will able to use graphics software to create Engineering drawings and represent engineering systems

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Department of Master of Business Administration



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Program Education Objectives

1. **Preparation:** To prepare students to become leader for providing managerial problem solving and steer the organization towards excellence in ethics and beneficial to society.
2. **Core Competence:** To provide students with the fundamentals of management Sciences, General management, Marketing management, Human Resource management, Finance management.
3. **Breadth:** To impart students with the knowledge skills and attitudes for overall improvement in management design, improvement and installation of integrated systems of men for the social cause.
4. **Professionalism:** To inculcate the ethical value systems, leadership and team work, group dynamism, skills and attitude, bring holistic development of personality and to promote entrepreneurial thinking among students.
5. **Learning Environment:** To provide students with encouraging environment that builds rigor and stimulated innovative thinking for successful professional career.

Program Outcomes

- a. Students will exhibit knowledge of basic General management Marketing Management, Human Resource management and Finance management
- b. Students will exhibit ability to identify, formulate, solve and implement solutions for managerial and societal problems.
- c. Students s will exhibit live projects, operation workouts and Survey, analyze and Interpret data through simulated industrial environment.
- d. Students s will exhibit ability to design managerial tools and techniques to meet the external and internal environment of the society.
- e. Students will exhibit ability to comprehend and solve multidisciplinary managerial Problems through systematic approach
- f. Students will familiarize with modern management methods by using state of the art equipment to analyze problems.
- g. Students will demonstrate knowledge of values and professional ethics in their activities.
- h. Students will be effective in soft skills and communication skills
- i. Students will show the ability to appreciate contemporary issues and develop solution for societal betterment at micro and macro levels
- j. Students will develop positive attitude & behaviors of continuous learning.
- k. Students will develop confidence to face challenges in their career.

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Vidarbha Youth Welfare Society's

**Prof. Ram Meghe Institute of Technology and Research
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Department of Master in Computer Application

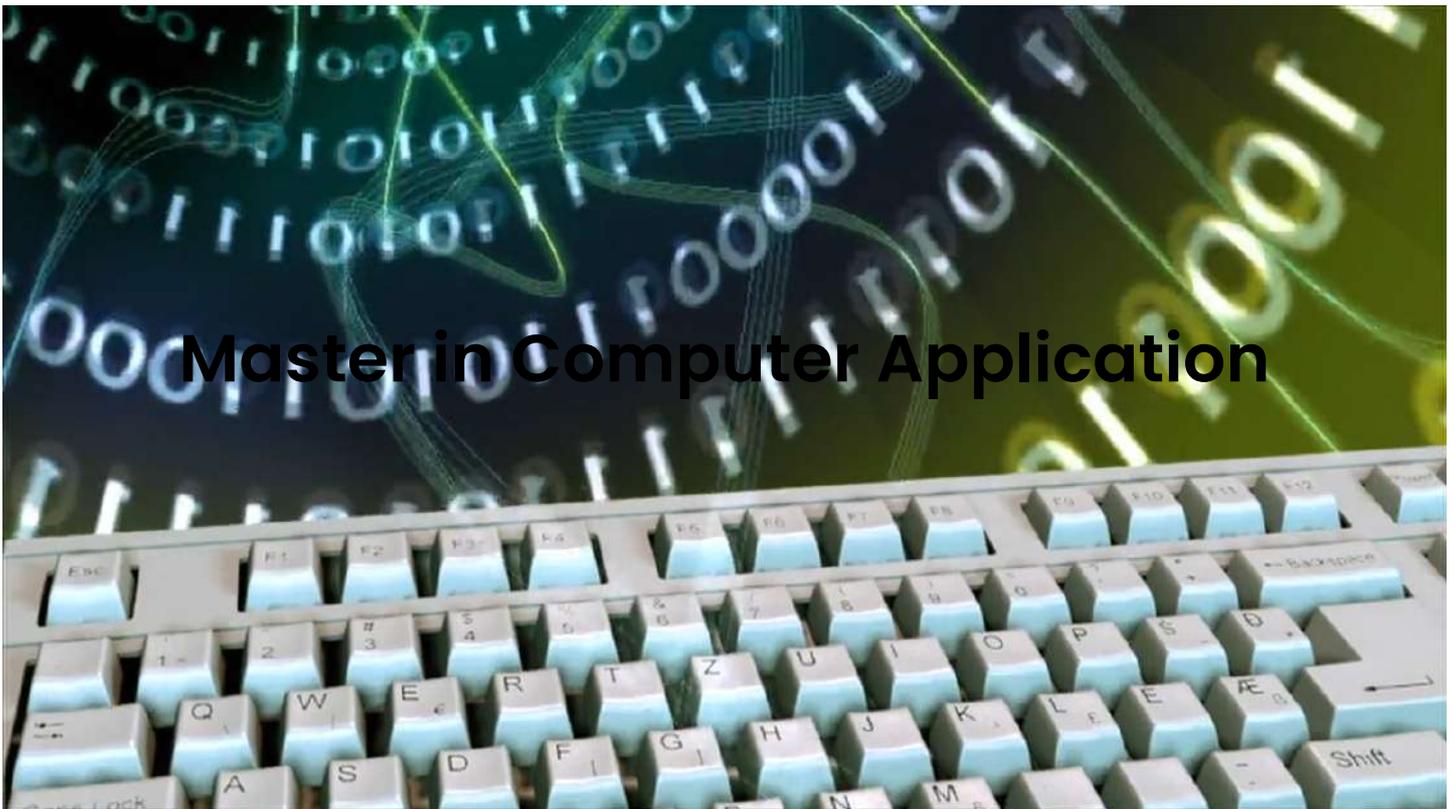


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Programed Educational Objectives (PEOs)

Preparation:To strive for overall personality development of students so as to nurture not only quintessential technocrats but also responsible citizens and to steer the organization towards becoming a pace setting centre of excellence.

Core Competence :To equip the students with the fundamentals of Data Structures, Database management system, Computer Oriented Optimization techniques and Programming methodology. To teach the students about the collection, analysis, organization of data and enhance their ability to convert it into useful information. Also to make the students understand management of information systems along with an understanding of the principles of management and of business systems.

Breadth:To develop the ability in students to analyze data, apply technical concepts and synthesize both for robust software designs.

Professionalism:To inculcate the value systems, leadership and team work, skills, bring holistic development of personality and to promote entrepreneurial thinking among students.

Learning environment:To provide students with encouraging environment that builds rigor and stimulated innovative thinking for a successful professional career.

Programme Outcomes (POs)

- a. An ability to apply knowledge of mathematics, computing and management in the field of computer software.
- b. An ability to identify, formulate, design and solve intricate computing problems, as well as to analyze and interpret data.
- c. Able to develop algorithms, and implement them in various programming languages.
- d. An ability to create and use techniques, expertise and modern computing tools necessary to solve complex computing problems
- e. An ability to effectively communicate technical information and complex problems through improved communication and interpersonal skills
- f. Graduates will develop an attitude of continuous learning.
- g. Graduates will demonstrate knowledge of values and professional ethics in their activities
- h. Graduates will develop confidence to face challenges in their career.

Course Outcomes (<https://mitra.ac.in/uploads/dept-pdf/COs-Department-of-Civil-Engineering-converted.pdf>)

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**Vidarbha Youth Welfare Society's
Prof. Ram Meghe Institute of Technology & Research Badnera, Amravati (M.S.) 444701**



**Practical Record
Semester-VIII**

Subject: - Embedded System Lab (8KS06)

Sant Gadge Baba Amravati University Amravati

**Department of
Computer Science & Engineering**

Phone: (0721) - 2580402/2681246

Fax No. 0721 – 2681337

Website: www.mitra.ac.in

2020-2021

**Vidarbha Youth Welfare Society's
Prof Ram Meghe Institute of Technology & Research
Badnera, Amravati (M.S.) 444701**

**Vidarbha Youth Welfare Society's
Prof Ram Meghe Institute of Technology & Research
Badnera, Amravati (M.S.) 444701**



CERTIFICATE

This is to certify that Mr/Miss _____
EnrolmentNo. _____ Roll No. _____ Section _____ of B.E.

Fourth year Semester VIII, Department of Computer Science & Engineering has satisfactorily completed the practical work of the subject **Embedded System Lab** prescribed by Sant Gadge Baba Amravati University, Amravati during the academic term 2020-2021.

Signature of the faculty

Head of Department

Date:

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	h. Quiz/Objective type question/Viva-voce	

1. Mission & Vision statement of the Institute:

VISION

To become a pace-setting
centre of excellence believing in three
universal values namely
Synergy, Trust and Passion,
with zeal to serve the Nation
in the global scenario

MISSION

To dedicate ourselves
to the highest standard of technical education
& research in core & emerging engineering
disciplines and strive for the overall personality
development of students so as to nurture
not only quintessential technocrats
but also responsible citizens

Mission and Vision of the Department

Vision

*To ensure that the world saves time and other depletable resources and free it from complexity
by providing efficient computing services.*

Mission

*To dedicate ourselves to the highest standard by providing knowledge, skills and wisdom to the
incumbent by imparting value based education to enable them to solve complex system by simple
algorithms and to make them innovative, research oriented to serve the global society, while
imbibing highest ethical values.*

2. Programme Educational Objectives (PEOs)

PEO1. Preparation: To prepare students for successful careers in software industry that meet the needs of Indian and multinational companies or to excel in Higher studies.

PEO2. Core competence: To develop the ability among students to synthesize data and technical concepts for software design and development.

PEO3. Breadth: To inculcate in students professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach and an ability to relate engineering issues to broader social context.

PEO4. Professionalism: To provide students with a sound foundation in the mathematical, scientific and computer engineering fundamentals required to solve engineering problems and also pursue higher studies.

PEO5. Learning Environment: To promote student with an academic environment aware of excellence, leadership, written ethical codes and guidelines and the life-long learning needed for a successful professional career.

- **PROGRAM OUTCOMES (POs)**

Engineering Graduate will be able to:

PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. Problem analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. 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.

PO4. 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.

PO5. 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.

PO6. 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.

PO7. 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.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. 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.

PO11. 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.

PO12. 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's)**

PS01: Foundation of Computer System Development: Ability to use knowledge of computer systems and design principles in building the hardware and software components, products in the domain of embedded system, artificial intelligence, databases, networking, web technology and mobile computing.

PS02: Problem Solving Ability: Ability to apply knowledge in various problem domains and implement innovative and suitable solutions to cater to needs of industry, business and e-governance by imbibing highest ethical and economical values.

3.Syllabus, Course outcomes and Mapping of CO's with PO's

Subject Name and Code:	Embedded Systems (8KS02)
Faculty Name:	P. K. Agrawal (pkagrwal@mitra.ac.in) A. U. Chaudhari (auchaudhari@mitra.ac.in) N. A. Deshmukh (nadeshmukh@mitra.ac.in)
Course Type:	Theory + Lab
Compulsory / Elective:	Compulsory
Teaching Methods:	Lecture: 04 Hrs/ week. Laboratory: 02 Hrs/ week (03 Batches)
Subject Credits:	04 Th + 01 Lab (as per given in syllabus). Discussion: Office hour discussion, Quiz.
Course Assessment:	Homework: Consisting of assignments. Exams: 2 Class Tests + 1 Improvement Test Semester end examination by SGBAU
Grading Policy:	20% Assignments, class test and viva-voce 80% Semester end examinations
Prerequisite	Assembly Language Programming Computer Architecture Programming with C
Unit wise Course Content:	Unit 1: Introduction to Embedded System: Embedded Systems Vs General Computing Systems. History, classification, major application areas and purpose of Embedded Systems. Components of Embedded system: General Purpose and Domain Specific Processors, Memories for embedded systems. Unit 2: Components of Embedded system: Sensors & Actuators, Communication Interface, Embedded Firmware and other components. Characteristics of Embedded System, Quality Attributes of Embedded System. Embedded Systems Examples: Washing machine. Automotive application. Unit 3: Introduction to 8051 Microcontroller: 8051 Architecture, 8051 Memory Organization, Registers, Oscillator Unit, Ports, 8051 Interrupt System, Timer units, the Serial Port, 8051 Power Saving Modes.

Unit 4: Programming the 8051 Microcontroller: Addressing modes. 8051 Instruction Set: Data transfer instructions, Arithmetic instructions, Logical instructions, Boolean instructions, and Program Control Transfer instructions. Assembly Language based Embedded Firmware development.

Unit 5: Programming in Embedded C: Review of various constructs in C. Constant declarations, 'volatile' type qualifier, Delay generation and Infinite loops in Embedded C. Coding Interrupt Service Routines, Recursive and Re-entrant Functions, Dynamic memory allocation.

Unit 6: Vx Works Real Time Operating System (RTOS): , Real Time Kernel, Hard/Soft Real time. VxWorks Task Creation, Management and Task Scheduling, Kernel Services, Inter Task Communication, VxWorks Task Synchronization and Mutual Exclusion, Interrupt Handling, Watchdog for task Execution monitoring, Timing and Reference in Vx Works.

Text Book:

Shibu K V "Introduction to Embedded Systems"
McGraw-Hill.

Reference Books:

1. Rajkamal, "Embedded Systems, Architecture, Programming & Design" TMH.
2. Tammy Noergaard "Embedded Systems Architecture" Elsevier Newness Publication.
3. Vahid and Givargis "Embedded System Design" John Wiley & Sons P Ltd.
4. Peter Marwedel "Embedded Systems Design" Springer, Netherland.

**Units covered in the course
and contact hours per unit:**

Unit 1: 8 hrs **Unit 2:** 8 hrs **Unit 3:** 8 Hrs
Unit 4: 8 hrs **Unit 5:** 8 hrs **Unit 6:** 8 Hrs

Course Learning Objective:

K802.1. In this course, Student will learn basics of embedded system hardware with required programming language to make the electronic device to work according to the order.

K802.2. Learn about various hardware which is essential for any general purpose system and its components with having various attributes such as single 7-seg LED and multi-seg LED and development of embedded code for various system with different architecture.

K802.3. Understanding the architecture of embedded system, with its attributes. Assigning the required hardware for the existing system. Understanding the working of Timer, PORTs and other hardware with embedded system.

K802.4. Enabling the hardware to communicate with each other using inter process communication and various methods. Understanding the data transfer between two electronic devices.

K802.5. Introduce the student with programming in embedded 'C', with its advanced features. Enabling the embedded system with its connected devices using programming languages. Student will learn to develop the software for the upliftment of the standalone electronic device.

K802.6. Student will learn the Real Time system which works with the continuous connectivity and the continuous data generation. By monitoring such system such will understand the scheduling of the process and allotment of memory space available.

K806.1 Subject specific skills with ability to interface various components of Embedded kit with 8051 microcontroller.

Upon completion of this course, students will have had an opportunity to learn about the following:

	Course Specific Practical Outcomes	Course Outcomes
1	Understand the basics of Embedded System and its different architecture like Von -Nueman, Harvard architecture.	K802.1, K802.2, K806.1
2	Learn basics of domain specific controller and General Purpose Processor.	K802.1, K802.2, K802.3, K806.1
3	Design & implement the embedded program for output devices such as Single 7 segment display using embedded C programming	K802.1, K802.2, K802.4, K806.1
4	Able to understand the differentiable attribute of General Purpose System and Embedded System.	K802.1, K802.2, K802.4, K806.1
5	Design & implement the embedded programs on the buzzer and the usage of buzzer using embedded C Programming	K802.1, K802.2, K802.4, K806.1

6	Design & implement the program for 16x2 display using embedded C programming.	K802.1, K802.2, K802.5, K806.1
7	Design & implement the program for stepper motor which will rotates in clock wise or anticlockwise direction or in a certain formation	K802.1, K802.2, K802.5, K806.1
8	Able to understand the working of switch for what purpose it is used and where	K802.1, K802.2, K802.5, K806.1
9	Able to understand the requirement of PSW and its functionality in embedded system	K802.1, K802.2, K802.5, K806.1
10	Understand the matrix key terminology using embedded C Programming.	K802.1, K802.2, K802.5, K806.1
11	Understand to demonstrate the working of IR Remote using embedded C programing.	K802.1, K802.2, K802.5, K806.1
12	Able to understand the Delay generation in embedded system using C Programming	K802.1, K802.2, K802.5, K806.1
13	Understand the Hard real time system for the betterment of understanding the real time operating system.	K802.1, K802.2, K802.6, K806.1

Mapping of Course Specific Practical Outcomes with Course Outcomes

Embedded Systems	K802.1, K802.2, K802.3, K802.4, K802.5, K802.6, K806.1
Strong CO'S ($\geq 70\%$)	K802.1, K802.2, K802.5, K806.1
Average CO's (< 70)	K802.4
Somewhat CO's	K802.3

Mapping of Course Outcomes with Program Outcomes

Enter correlation levels 1, 2 or 3 as defined below:

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

Course	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
K802.1	2	2	2	2	3	1	-	2	-	2	1	3
K802.2	2	2	2	2	3	1	-	2	-	2	1	3
K802.3	2	2	3	3	2	3	-	3	-	-	-	3
K802.4	2	2	3	3	2	3	-	3	-	-	-	3
K802.5	2	2	3	3	2	3	-	3	-	-	-	3
K802.6	2	2	3	3	2	3	-	3	-	-	-	3

4. Assessment Format i.e. ACIPV (Guidelines)

Regular Assessment of Experiment during the practical session

(Sample Sheet)

Regular Assessment

Year:-

Branch:-

Assessment Sheet

Rollno.	A (5marks)	C (5marks)	I (5marks)	P (5marks)	V (5marks)	Total (25Marks)

(A-Attendance, C-Competency, I-Innovation, P-Presentation, V-Viva)

Guidelines for Awarding Internal Marks For Practical

Each experiment/practical carries 25 marks. The student shall be evaluated for 25 marks as per the following guidelines. At the end of the semester, internal assessment marks for practical shall be the average of marks scored in all the experiments.

- a. **Attendance (5marks):** These 5 marks will be given to the regularity of a student. If the student is present on the scheduled time, he/she will be awarded 5 marks otherwise will be given 2.5 marks for his attendance.

- b. Competency (5 marks):** Here the basic aim is to check whether the student has developed the skill to write down the code on his own and debug. If a student executes the practical on the scheduled day within the allocated time, he will be awarded full marks. Otherwise, marks will be given according to the level of completion/execution of practical.
- c. Innovation (5 marks):** Here the basic objective is to explore the innovative ideas from the students with respect to the corresponding practical or how innovatively he interprets the aim of the practical. It is expected that the students must be aware about the scope of practical precisely such that in future, they could implement the task in various applications.
- d. Performance/Participation in-group activity (5 marks):** These marks will be given on how a student is actively participating the group. If the student is performing the practical as the part of a group he must participate actively.
- e. Viva-Voce (5 marks):** These 5 marks will be totally based on the performance in viva-voce. There shall be viva-voce on the completion of each practical in the same practical session. The student shall get the record checked before next practical.

Mapping of Guidelines with PO's of the department:

Guidelines for Awarding Internal Marks For Practical	Program Outcomes
Attendance	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO12
Competency	PO1, PO2, PO3, PO4, PO5, PO10, PO12
Innovation	PO1, PO2, PO3, PO4, PO5, PO11, PO12
Performance/Participation in-group activity	PO1, PO2, PO3, PO4, PO5, PO9, PO11, PO12
Viva-Voce	PO1, PO2, PO3, PO4, PO5, PO10, PO12

5. About the Lab manual:

This manual is designed for the Fourth year (VIII Semester) students of Computer Science & Engineering. The aim of the Embedded System Lab is to develop student's programming skills in embedded system for their applications.

This lab manual can be used as instructional book for students, staff and instructors to assist in performing and understanding the practical. In the first part of the manual, practical as per syllabus are described and in the second part of the manual, practical that are beyond the syllabus but expected for university laboratory examination are displayed.

6. List of Practical's

Department of Computer Science & Engineering

Subject:-**Embedded System Lab**
(8KS06) Semester:-VIII

Sr. No	LIST OF PRACTICALS	Page
1.	To study 8051 microcontroller and its peripherals.	
2.	Write and Execute a program for flashing LED's	
3.	Write and execute a program to display numbers with the help of single 7-segment display	
4.	Write and execute a program to display numbers with the help of multiple 7-segment display	
5.	Write and execute a program to turn the buzzer ON and OFF	
6.	Write and execute a program for display the character using the 16 X 2 LCD display	
7.	Write and execute a program for rotating of stepper motor in clockwise and anticlockwise using Full Drive	
8.	Write and execute a program for rotating of stepper motor in clockwise and anticlockwise using Wave Drive	
9	Write and execute a program to demonstrate the Relay function	
10.	Write and execute a program to demonstrate the key technology on matrix	
11.	Write a Program to Demonstrate Switch.	
12.	Write a Program to Demonstrate PWM.	
13.	Write a Program to Demonstrate IR Remote.	
14.	To Study Vx Works Operating System	

Sr.No.	<i>LIST OF EXPERIMENTS</i> <i>(Actual Conducted For the Session)</i>	Date	Page No.	Remark
1.	To study 8051 microcontroller and its peripherals.			
2.	Study and execute a program for control and looping statement and various functionality of Embedded C			
3.	Write and execute a program for flashing LED's			
4.	Write a Program to Demonstrate Single Seven Segment Display.			
5.	Write and execute a program for buzzer with ON and OFF flashing LED's			
6.	Interfacing 4 Switches and 4LEDs with 8051.			
7.	Write and execute a program for rotating of stepper motor in clockwise and anticlockwise Using Full Drive.			
8.	To Study Vx Works Operating System			