



# R K COLLEGE OF ENGINEERING

(Approved by AICTE, New Delhi & Affiliated to JNTUK, Kakinada & SBTET, Amaravati )  
(An ISO 9001:2015 Certified Institution)

Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



## INDEX

S.No	Description	Page No's.
1	Geo Tag Photos of POs, PSOs, PEOs	1-13
2	Geo Tag Photos of COs Displayed in the Department Notice Boards	14-16
3	Screenshots of POs, PEOs, PSOs and COs Uploaded in the College Website	17-31
4	Program Outcomes(POs), Program Specific Outcomes, Program Educational Objectives(PEOs) and Course Outcomes(COs) of all the courses	32-150



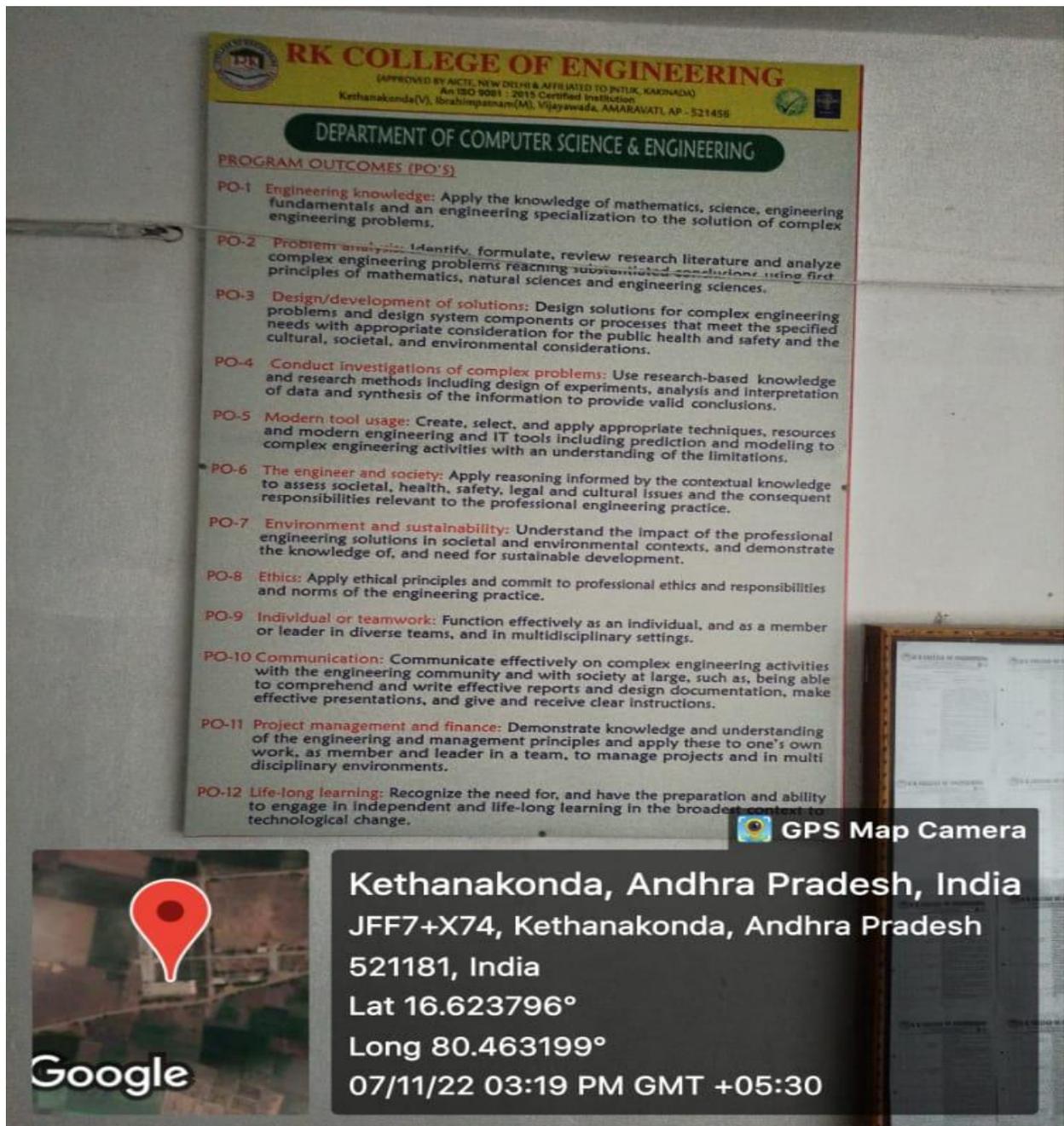
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## 1. Geo Tag Photos of POs, PSOs, and PEOs



Department of CSE- Program Outcomes



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**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**

**PROGRAM OUTCOMES (PO'S)**

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

**GPS Map Camera**

Kethanakonda, Andhra Pradesh, India  
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Department of ECE- Program Outcomes



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**DEPARTMENT OF MECHANICAL ENGINEERING**

**PROGRAM OUTCOMES (PO'S)**

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GPS Map Camera



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**Kethanakonda, Andhra Pradesh, India**  
**JFF7+X74, Kethanakonda, Andhra Pradesh 521181, India**  
**Lat 16.62432°**  
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Department of Mechanical Engineering - Program Outcomes



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**DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING**

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Kethanakonda, Andhra Pradesh, India  
JFF7+X74, Kethanakonda, Andhra Pradesh 521181, India  
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Department of EEE- Program Outcomes



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**DEPARTMENT OF CIVIL ENGINEERING**

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JFF7+X74, Kethanakonda, Andhra Pradesh 521181, India  
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Department of CIVIL Engineering - Program Outcomes



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**DEPARTMENT OF FRESHMEN ENGINEERING**

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Vijayawada, Andhra Pradesh, India  
20-6-72, 3rd Ln, Ramalingeswarapet, Ayodhya Nagar,  
Vijayawada, Andhra Pradesh 520003, India  
Lat 16.528352°  
Long 80.630411°  
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**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

**PROGRAMME EDUCATIONAL OBJECTIVES (PEO'S)**  
Engineering graduates will be able to :

- PEO1.** Engage in designing, implementing, operating and maintain systems in the field of computer science and engineering and allied engineering industries.
- PEO2.** Solve the problems of social relevance applying the knowledge of computer science and engineering and pursue higher education and research
- PEO3.** Work effectively as individuals and as team members in multidisciplinary projects
- PEO4.** Engage in lifelong learning, career enhancement and adopt to changing professional and societal needs

**PROGRAMME SPECIFIC OUTCOMES (PSO'S)**  
Engineering graduates will be able to :

- PSO1.** Analyze and develop computer programs in the areas related to system software, multimedia, web design and networking for efficient design of computer based system of varying complexity basic engineering sciences and Computer fundamentals.
- PSO2.** To apply standard practices and strategies in software project development using open ended programming environments to deliver a quality product for business success.
- PSO3.** Implement and design various models in real time systems.

**GPS Map Camera**

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521181, India  
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Long 80.463197°  
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Department of CSE – PEOs & PSOs



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**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

**PROGRAMME EDUCATIONAL OBJECTIVES (PEO'S)**  
Engineering graduates will be able to :

- PE01.** Engage in designing, implementing, operating and maintain systems in the field of computer science and engineering and allied engineering industries.
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Department of CSE – PEOs & PSOs



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**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**

**PROGRAMME SPECIFIC OUTCOMES (PSO'S)**  
Engineering graduates will be able to :

- PSO1.** The ability to absorb and apply fundamental knowledge of core Electronics and Communication Engineering subjects in the analysis, design, and development of various types of integrated electronic systems as well as to interpret and synthesize the experimental data leading to valid conclusions.
- PSO2.** Excellent adaptability to changing work environment, good interpersonal skills as a leader in a team in appreciation of professional ethics and societal responsibilities.
- PSO3.** An ability to make use of a required technical knowledge to get employed in the field of electronics and communication and also to become successful entrepreneur.

**PROGRAMME EDUCATIONAL OBJECTIVES (PEO'S)**  
Engineering graduates will be able to :

- PEO1.** Graduates apply their knowledge of Mathematics of science to identify, analyze and solve problems in its field of electronics and develop sophisticated communication systems and embedded systems.
- PEO2.** Graduates exhibit innovative ideas and management skills to meet the day to day technical challenges.
- PEO3.** Graduates embody a commitment to professional ethics, diversity and social awareness in their professional career.
- PEO4.** Graduates exhibit a desire for the long learning through technical training and professional activities.

**MULAPADU, Andhra Pradesh, India**  
JFC9+76Q, MULAPADU, Andhra Pradesh 521181, India  
Lat 16.620044°  
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Department of ECE – PEOs & PSOs



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Department of Mechanical Engineering – PEOs & PSOs



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Department ofEEE – PEOs & PSOs



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**DEPARTMENT OF CIVIL ENGINEERING**

**PROGRAM EDUCATION OBJECTIVES (PEO'S)**  
Engineering graduates will be able to :

- PEO1.** To make graduates of the Civil Engineering program capable of contributing towards Nation's development by providing sustainable solutions to a wide range of diverse and complicated Civil Engineering problems in different application sectors including physical infrastructure.
- PEO2.** To transform graduates of the Civil Engineering program into successful professionals in designing and executing national standard products and services in the field of Civil Engineering, becoming entrepreneurs, and pursuing further education and research.
- PEO3.** To enable graduates of the Civil Engineering Program for adapting to dynamic changes in the technological scenarios and handle broader social challenges with a rational and flexible decision-making style.

**PROGRAM SPECIFIC OUTCOMES (PSO'S)**  
Engineering graduates will be able to :

- PSO1.** Capability to manage large infrastructure projects ensuring safe and cost-effective execution of projects having knowledge of fast track construction and project management.
- PSO2.** Ability to use building software packages to calculate safe loads and stresses for designing structural members to ensure safety and service ability.
- PSO3.** Ability to provide innovative solutions for traffic safety and efficiency through intelligent transportation systems, and mitigate the environmental impact of construction by adopting green building concepts.

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JFF7+X74, Kethanakonda, Andhra Pradesh 521181, India  
Lat 16.623797°  
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Department of CIVIL ENGINEERING – PEOs & PSOs



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**DEPARTMENT OF FRESHMEN ENGINEERING**

**PROGRAM EDUCATIONAL OBJECTIVES (PEO'S)**

Engineering graduates will be able to:

- PEO1. To prepare students to work in any organization or become an entrepreneur.
- PEO2. To involve in academic and research oriented projects and build team spirit.
- PEO3. To associate with professional bodies to improve knowledge and communication skills
- PEO4. The graduates will exhibit leadership skills and enhance their abilities through lifelong learning.
- PEO5. The graduates will carry out their profession with ethics, integrity, competency and social responsibility.
- PEO6. To provide the suitable environment to bring out creativity and innovativeness.

**PROGRAM SPECIFIC OUTCOMES (PSO'S)**

Engineering graduates will be able to:

- PSO1. Develop the ability to understand, demonstrate, identify, analyze and apply the skills and knowledge gained from foundational courses of humanities, sciences and engineering, and relate these fundamentals with core subjects in the relevant field.
- PSO2. Understanding basic skills and principles of engineering by developing and engaging them in life-long learning with effective skills inculcating quality of reasoning, logic, analysis and communication.
- PSO3. Cultivate the ability to work in teams and learn by participating in Technical Events and Social Welfare Programs and develop the attitude for working productively as an individual and cross disciplinary teams to become better citizens in a global and multicultural world.

**GPS Map Camera**

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JFF7+X74, Kethanakonda,  
Andhra Pradesh 521181, India  
Lat 16.62396°  
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Department of Freshmen Engineering – PEOs & PSOs

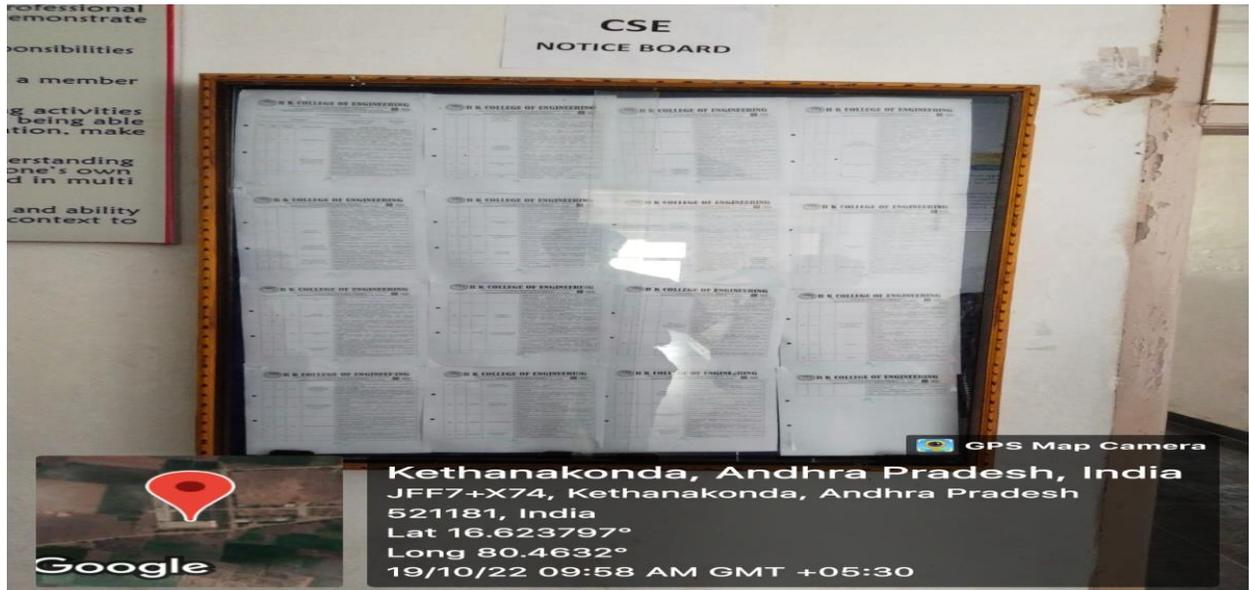


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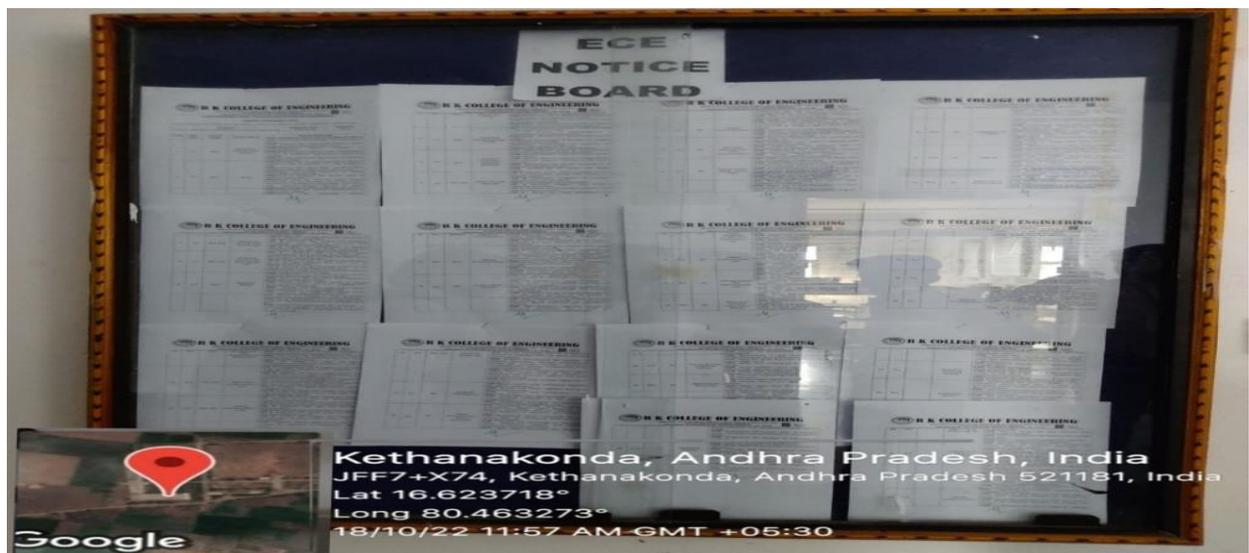
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## 2. Geo Tag Photos of COs Displayed in the Department Notice Boards



COs Displayed in the CSE Department Notice Board



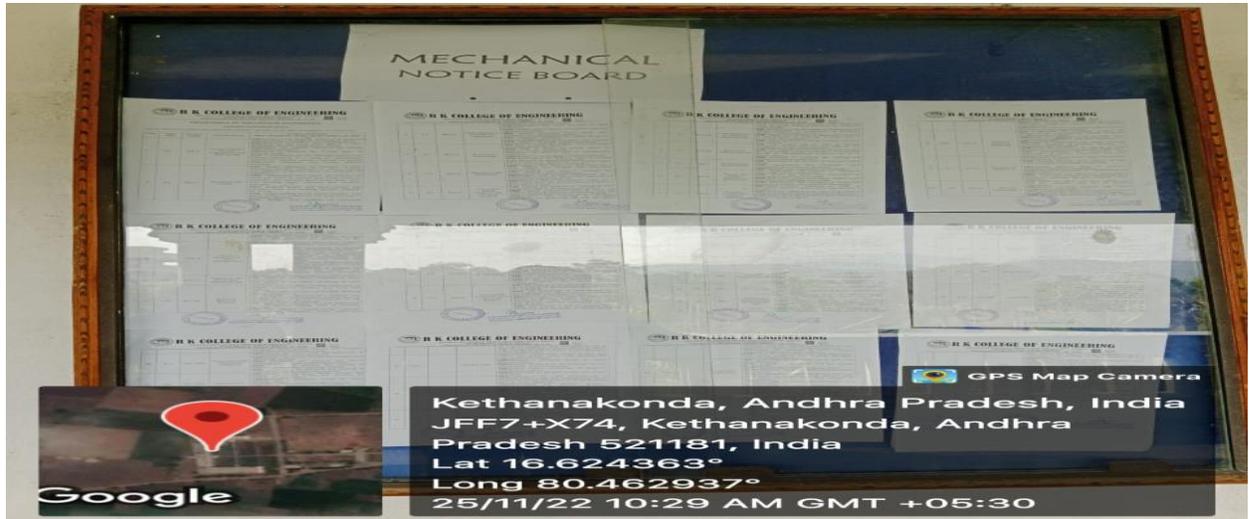
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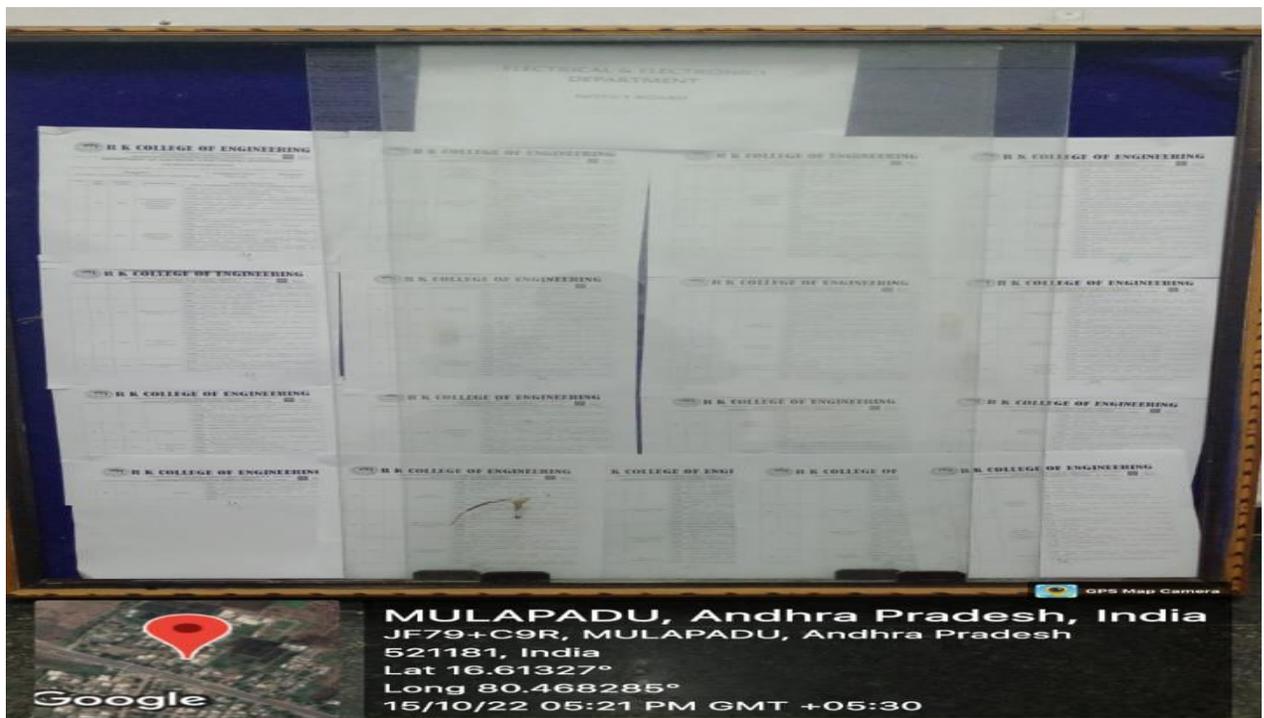
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COs Displayed in the Mechanical Department Notice Board



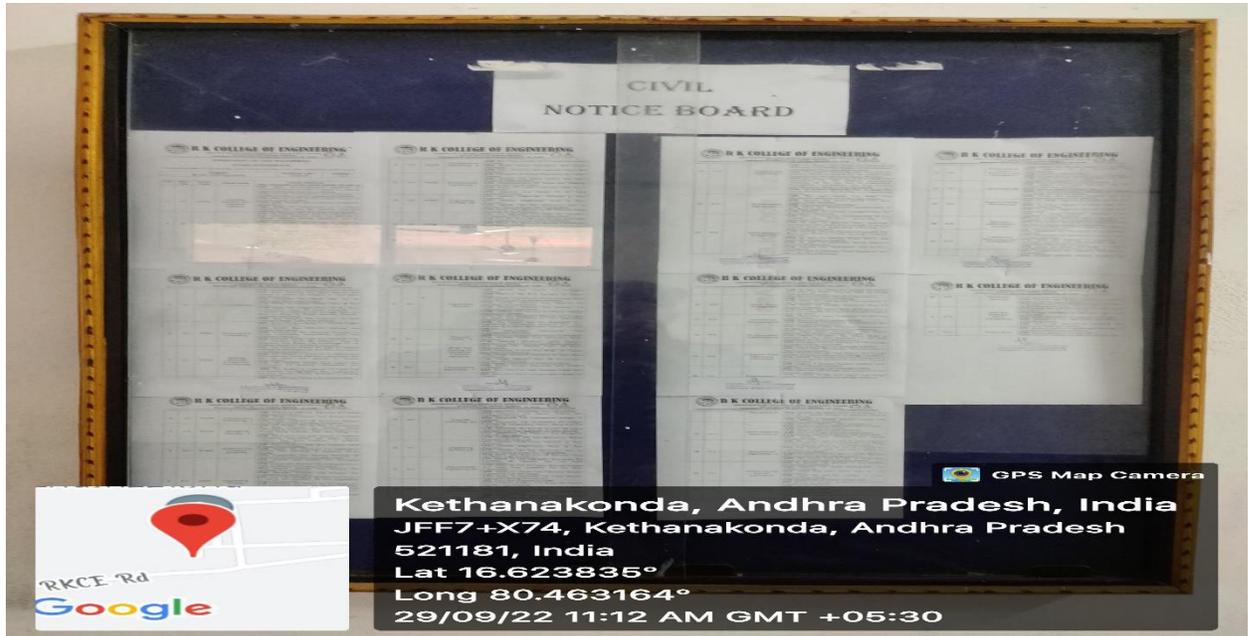
COs Displayed in the EEE Department Notice Board



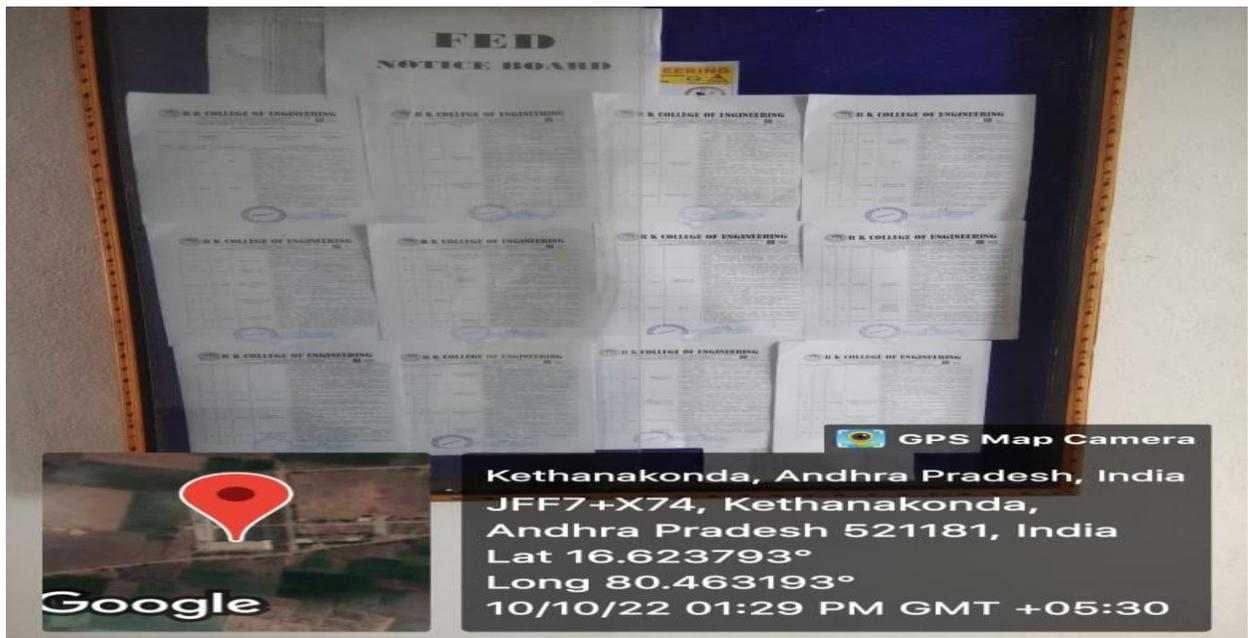
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COs Displayed in the Freshmen Engineering Department Notice Board



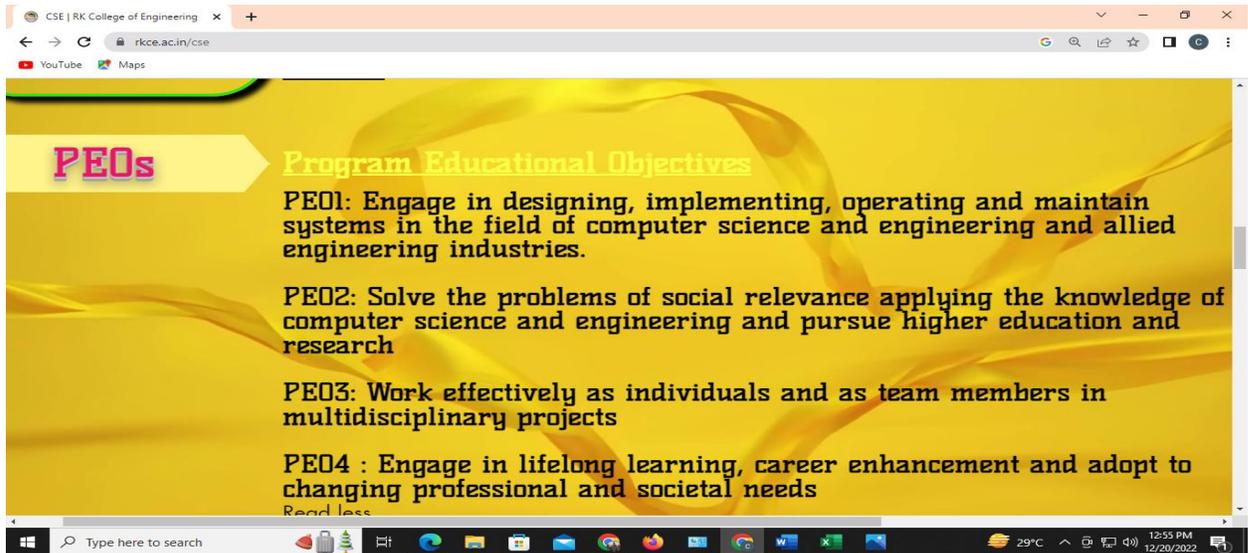
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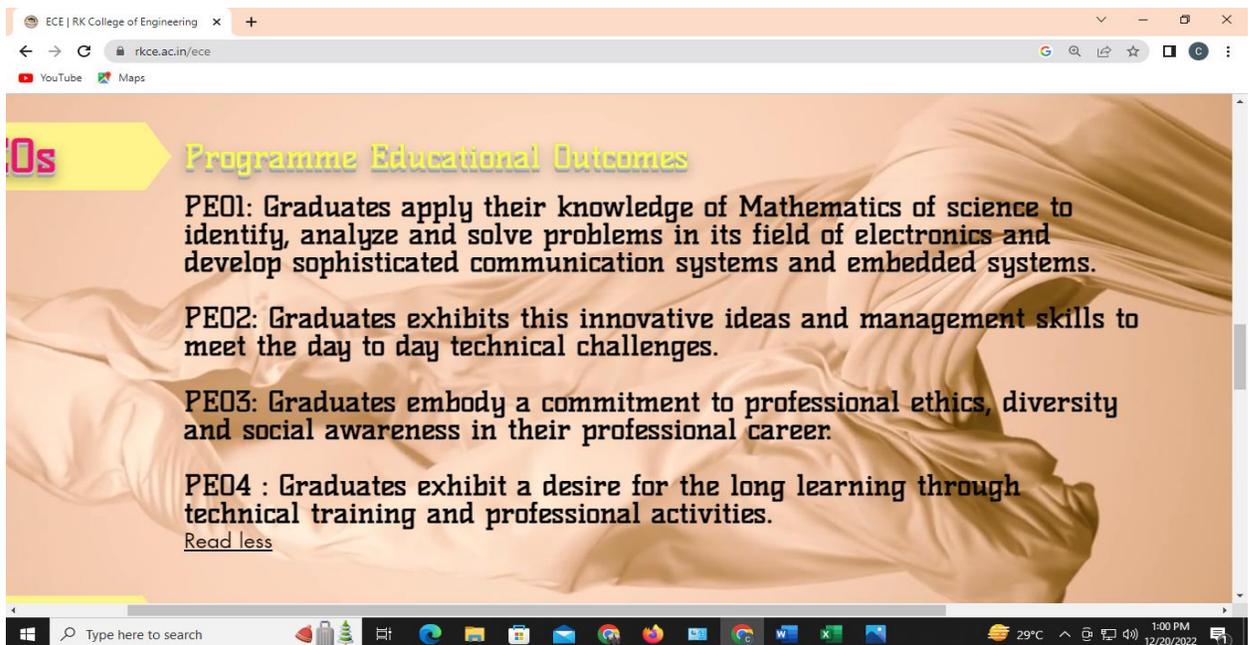
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## 3. Screenshots of POs, PEOs, PSOs and COs uploaded in the college website.



CSE Department PEOs in the website



ECE Department PEOs in the website



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Mechanical Engineering | RK Coll

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## Programme Educational Outcomes

1. Apply technical knowledge and skills to find solutions in the field of core and allied areas of mechanical engineering.
2. Work with ethics without compromise in the profession.
3. Show the sense of responsibility as a professional member of society.
4. Work efficiently as an individual and as well as with team members in multidisciplinary projects.

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## Programme Outcomes

PO1: Engineering knowledge: ...  
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MECH Department PEOs in the website

EEE | RK College of Engineering

rkce.ac.in/eee

PEOs

## Programme Educational Objectives

PEO1: The students will have fundamental and broad knowledge in Electrical Sciences relating to industrial applications and research to design, analyze and synthesize information from various sources and think differently to provide solutions to their discipline.

PEO2: The students will entrepreneurs, employees of reputed organizations, pursue higher studies and research for developing advanced skills in Electrical and Electronics Engineering

PEO3: The students will exhibit technical and intellectual competency and will be amenable for life-long learning.

PEO4 : The students will demonstrate technical knowledge and ethical values for professional development to meet the societal needs. The students will be able to work in multi-disciplinary environment by providing solutions to real time problems.

PEO5 : The students will be able to work in multi-disciplinary environment by providing solutions to real time problems.  
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EEE Department PEOs in the website



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Civil Engineering | RK College of E x +

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YouTube Maps

## PEOs

### Programme Educational Objectives

**PEO1:** To make graduates of the Civil Engineering program capable of contributing towards Nation's development by providing sustainable solutions to a wide range of diverse and complicated Civil Engineering problems in different application sectors including physical infrastructure.

**PEO2:** To transform graduates of the Civil Engineering program into successful professionals in designing and executing national standard products and services in the field of Civil Engineering, becoming entrepreneurs, and pursuing further education and research.

**PEO3:** To enable graduates of the Civil Engineering Program for adapting to dynamic changes in the technological scenarios and handle broader social challenges with a rational and flexible decision-making style.

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CIVIL ENGINEERING Department PEOs in the website

Freshman Department | RK Collg x +

rkce.ac.in/freshman

YouTube Maps

## PEOs

### Program Educational Objectives

**PEO1:** To prepare students to work in any organization or become an entrepreneur.

**PEO2:** To involve in academic and research oriented projects and build team spirit.

**PEO3:** To associate with professional bodies to improve knowledge and communication skills

**PEO4:** The graduates will exhibit leadership skills and enhance their abilities through lifelong learning.

**PEO5:** The graduates will carry out their profession with ethics, integrity, competency and social responsibility.

**PEO6:** To provide the suitable environment to bring out creativity and innovativeness.

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FRESHMEN ENGINEERING Department PEOs in the website



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**POs** Program Outcomes

**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 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 & 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 & Finance:**

POs in the CSE Department Website Page



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**PSOs** Programme Specific Outcomes

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**PO9: Individual & 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 & Finance:**  
Plan, manage, execute, and close projects, and understand the importance of, and the need for, financial acumen.

POs in the ECE Department Website Page



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**POs** **Programme Outcomes**

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**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 & Finance:**  
Demonstrate knowledge and understanding of the engineering and

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**PO11 : Project Management & Finance:**

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**POs**

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**PO11: Project Management & Finance:**  
Demonstrate knowledge and understanding of the engineering and

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**PO11: Project Management & Finance:**  
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POs in the Freshmen Engineering Department Website Page



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**PSOs** **Program Specific Outcomes**

**PS01 :**  
Analyze and develop computer programs in the areas related to system software, multimedia, web design and networking for efficient design of computer based system of varying complexity basic engineering sciences and Computer fundamentals.

**PS02 :**  
To apply standard practices and strategies in software project development using open ended programming environments to deliver a quality product for business success.

**PS03 :**  
Implement and design various models in real time systems.

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CSE Department PSOs in the website

**PSOs** **Programme Specific Outcomes**

**PS01**  
The ability to absorb and apply fundamental knowledge of core Electronics and Communication Engineering subjects in the analysis, design, and development of various types of integrated electronic systems as well as to interpret and synthesize the experimental data leading to valid conclusions.

**PS02**  
Excellent adaptability to changing work environment, good interpersonal skills as a leader in a team in appreciation of professional ethics and societal responsibilities.

**PS03**  
An ability to make use of a quired technical knowledge to get employed in the field of electronics and communication and also to become successful entrepreneur.

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**PSOs** **Programme Specific Outcomes**

PS01: Apply the principles of mechanical sciences to design and develop various mechanical systems.

**PEOs** PS02: Apply the principles of manufacturing technology, scientific management towards improvement of quality and optimization of various engineering systems.

**POs** PS03: Apply the basic principles of mechanical engineering to evaluate various performances relating to transmission of motion, energy, and power.  
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**Programme Educational Outcomes**

1. Apply technical knowledge and skills to find solutions in the field of ...  
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**Programme Outcomes**

Mechanical Engineering Department PSOs in the website

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**PSOs** **Programme Specific Outcomes**

PS01: Identify, analyze and solve real-life problems by applying the knowledge in Electrical and Electronics Engineering.

PS02: Design and develop electrical systems and intelligent tools to excel in the field of Electrical and Electronics engineering with an aspire to become a brand name in industry and society.

PS03: Find solutions to global issues faced by the society through engineering and technology innovations by upholding professional ethics and social values.  
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**POs** **Programme Outcomes**

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Civil Engineering | RK College of E...  
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**PSOs**

**PE01: To make graduates of the Civil Engineering program capable of ...**  
[Read more](#)

**Programme Specific Outcomes**

**PS01: Capability to manage large infrastructure projects ensuring safe and cost-effective execution of projects having knowledge of fast track construction and project management.**

**PS02: Ability to use building software packages to calculate safe loads and stresses for designing structural members to ensure safety and serviceability.**

**PS03: Ability to provide innovative solutions for traffic safety and efficiency through intelligent transportation systems, and mitigate the environmental impact of construction by adopting green building concepts.**  
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Freshman Department | RK Coll...  
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**PSOs**

**Program Specific Outcomes**

**PS01: Develop the ability to understand, demonstrate, identify, analyze and apply the skills and knowledge gained from foundational courses of humanities, sciences and engineering, and relate these fundamentals with core subjects in the relevant field.**

**PS02: Understanding basic skills and principles of engineering by developing and engaging them in life-long learning with effective skills inculcating quality of reasoning, logic, analysis and communication.**

**PS03: Cultivate the ability to work in teams and learn by participating in Technical Events and Social Welfare Programs and develop the attitude for working productively as an individual and in cross disciplinary teams to become better citizens in multicultural world.**  
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FRESHMEN Engineering Department PSOs in the website



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**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**COURSE OUTCOMES (COs)**

Course Outcomes (COs) describe what students can able to do after completion of the course.

S.No	Year-Sem	Course Code	Course Name	Course Outcomes
1	II-I	BS	Mathematic-III	After completion of the course student can able to CO1: Interpret the physical meaning of different operators such as gradient, curl and divergence (L5) CO2: Estimate the work done against a field, circulation and flux using vector calculus (L5) CO3: Apply the Laplace transform for solving differential equations (L3) Find or compute the Fourier series of periodic signals (L3) CO4: Know and be able to apply integral expressions for the forwards and inverse Fourier

CSE Department COs in the website

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**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**

**COURSE OUTCOMES (COs)**

Course Outcomes (COs) describe what students can able to do after completion of the course.

S.No	Year-Sem	Course Code	Course Name	Course Outcomes
1	II-I	PCC	Electronic Devices And Circuits	After completion of the course student can able to CO1: Understand the principles of semiconductor Physics. CO2: Analyze and create application of special purpose diodes, and electronic circuits CO3: Understand carrier transport in semiconductors. CO4: Analyze and evaluate the mathematical models of MOS&BJT transistors for circuits and

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**DEPARTMENT OF MECHANICAL ENGINEERING**

**COURSE OUTCOMES (COs)**

Course Outcomes (COs) describe what students can able to do after completion of the course.

S.No	Year-Sem	Course Code	Course Name	Course Outcomes After completion of the course student can able to
1	II-I	BSE-5	Vector Calculus, Fourier Transforms And PDE (M-III)	CO1: Interpret the physical meaning of different operators such as gradient, curl and divergence CO2: Estimate the work done against a field, circulation and flux using vector calculus CO3: Apply the Laplace transform for solving differential equations CO4: Find or compute the Fourier series of periodic signals CO5: I expressions for the forwards and inverse Fourier transform to a range of non-periodic

Mechanical Engineering Department COs in the website

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**DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING**

**COURSE OUTCOMES (COs)**

Course Outcomes (COs) describe what students can able to do after completion of the course.

S.No	Year-Sem	Course Code	Course Name	Course Outcomes After completion of the course student can able to
1	II-I	BSC	Mathematics-Iv (Complex Variables And Statistical Methods)	CO1: apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic (L3) CO2: find the differentiation and integration of complex functions used in engineering problems (L5) CO3: make use of the Cauchy residue theorem to evaluate certain integrals (L3) CO4: apply discrete and continuous probability distributions (L3)

EEE Department COs in the website



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**DEPARTMENT OF CIVIL ENGINEERING**

COURSE OUTCOMES (COs)

Course Outcomes (COs) describe what students can able to do after completion of the course.

S.No	Year-Sem	Course Code	Course Name	Course Outcomes
1	II-I	BSC301	Mathematics -III	After completion of the course student can able to CO1: interpret the physical meaning of different operators such as gradient, curl and divergence CO2: estimate the work done against a field, circulation and flux using vector calculus CO3: apply the Laplace transform for solving differential equations CO4: find or compute the Fourier series of periodic signals CO5: know and be able to apply integral expressions for the forward and inverse

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**DEPARTMENT OF FRESHMEN ENGINEERING**

COURSE OUTCOMES (COs)

Course Outcomes (COs) describe what students can able to do after completion of the course.

S.No	Year-Sem	Course Code	Course Name	Course Outcomes
1	I-I	B51101	M-I	After completion of the course student can able to CO1: Utilize mean value theorems to real life problems CO2: Solve the differential equations related to various engineering fields CO3: Familiarize with functions of several variables which is useful in optimization CO4: Apply double integration techniques in evaluating areas bounded by region CO5: Students will also learn important parts of

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FRESHMEN Department COs in the website



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## 4. Program Outcomes (POs), Program Specific Outcomes, Program Educational Objectives (PEOs) and Course Outcomes (COs) of all the courses: -

### PROGRAM OUTCOMES (POs):

Program Outcomes (POs) – Describes what students are expected to know and be able to do by the time of graduation. The program outcomes are:

PO1	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
PO2	<b>Problem analysis:</b> Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
PO3	<b>Design/development of solutions:</b> 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	<b>Conduct investigations of complex problems:</b> 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	<b>Modern tool usage:</b> 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	<b>The engineer and society:</b> 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	<b>Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	<b>Individual or teamwork:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	<b>Communication:</b> 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	<b>Project management and finance:</b> Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as member and leader in a team, to manage projects and in multidisciplinary environments.



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PO12	<b>Life-long learning:</b> Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context to technological change
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## PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

Program Educational Objectives (PEOs) describe the career and professional accomplishments that programs are preparing graduates to attain within a few years of graduation.

The B.Tech. in Computer Science and Engineering (CSE) program has the following Program Educational Objectives.

PEO1	Engage in designing, implementing, operating and maintain systems in the field of computer science and engineering and allied engineering industries.
PEO2	Solve the problems of social relevance applying the knowledge of computer science and engineering and pursue higher education and research
PEO3	Work effectively as individuals and as team members in multidisciplinary projects
PEO4	Engage in lifelong learning, career enhancement and adopt to changing professional and societal needs

The B.Tech. in Electronics and Communications Engineering (ECE) program has the following Program Educational Objectives.

PEO1	Graduates apply their knowledge of Mathematics of science to identify, analyze and solve problems in its field of electronics and develop sophisticated communication systems and embedded systems.
PEO2	Graduates exhibits this innovative ideas and management skills to meet the day to day technical challenges.
PEO3	Graduates embody a commitment to professional ethics, diversity and social awareness in their professional career.
PEO4	Graduates exhibit a desire for the long learning through technical training and professional activities.



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The B.Tech. in Mechanical Engineering (MECH) program has the following Program Educational Objectives.

PEO1	Apply technical knowledge and skills to find solutions in the field of core and allied areas of mechanical engineering.
PEO2	Work with ethics without compromise in the profession.
PEO3	Show the sense of responsibility as a professional member of society.
PEO4	Work efficiently as an individual and as well as with team members in multidisciplinary projects.

The B.Tech. in Electrical and Electronics Engineering (EEE) program has the following Program Educational Objectives.

PEO1	The students will have fundamental and broad knowledge in Electrical Sciences relating to industrial applications and research to design, analyze and synthesize information from various sources and think differently to provide solutions to their discipline.
PEO2	The students will entrepreneurs, employees of reputed organizations, pursue higher studies and research for developing advanced skills in Electrical and Electronics Engineering
PEO3	The students will exhibit technical and intellectual competency and will be amenable for life-long learning
PEO4	The students will demonstrate technical knowledge and ethical values for professional development to meet the societal needs
PEO5	The students will be able to work in multi-disciplinary environment by providing solutions to real time problems.

The B.Tech. in Civil Engineering (CE) program has the following Program Educational Objectives.

PEO1	To make graduates of the Civil Engineering program capable of contributing towards Nation's development by providing sustainable solutions to a wide range of diverse and complicated Civil Engineering problems in different application sectors including physical infrastructure.
PEO2	To transform graduates of the Civil Engineering program into successful professionals in designing and executing national standard products and services in the field of Civil Engineering, becoming entrepreneurs, and pursuing further education and research.
PEO3	To enable graduates of the Civil Engineering Program for adapting to dynamic changes in the technological scenarios and handle broader social challenges with a rational and flexible decision-making style.



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Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



The B.Tech. in Freshmen Engineering (FE) program has the following Program Educational Objectives.

PEO1	To prepare students to work in any organization or become an entrepreneur.
PEO2	To involve in academic and research oriented projects and build team spirit.
PEO3	To associate with professional bodies to improve knowledge and communication skills
PEO4	The graduates will exhibit leadership skills and enhance their abilities through lifelong learning.
PEO5	The graduates will carry out their profession with ethics, integrity, competency and social responsibility.
PEO6	To provide the suitable environment to bring out creativity and innovativeness.

## PROGRAM SPECIFIC OBJECTIVES (PSOs):

Program Specific Outcomes (PSOs) describes that what students can able to do after completion of the program.

The B.Tech. in Computer Science Engineering (CSE) program has the following Program Specific Objectives.

PSO1	Analyze and develop computer programs in the areas related to system software, multimedia, web design and networking for efficient design of computer based system of varying complexity basic engineering sciences and Computer fundamentals.
PSO2	To apply standard practices and strategies in software project development using open ended programming environments to deliver a quality product for business success.
PSO3	Implement and design various models in real time systems.

The B.Tech. in Electronics and Communication Engineering(ECE) program has the following Program Specific Objectives.

PSO1	The ability to absorb and apply fundamental knowledge of core Electronics and Communication Engineering subjects in the analysis, design, and development of various types of integrated electronic systems as well as to interpret and synthesize the experimental data leading to valid conclusions.
PSO2	Excellent adaptability to changing work environment, good interpersonal skills as a leader in a team in appreciation of professional ethics and societal responsibilities.
PSO3	An ability to make use of a quired technical knowledge to get employed in the field of electronics and communication and also to become successful entrepreneur.



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The B.Tech. in Mechanical Engineering (MECH) program has the following Program Specific Objectives.

PSO1	Apply the principles of mechanical sciences to design and develop various mechanical systems.
PSO2	Apply the principles of manufacturing technology, scientific management towards improvement of quality and optimization of various engineering systems.
PSO3	Apply the basic principles of mechanical engineering to evaluate various performances relating to transmission of motion, energy, and power

The B.Tech. in Electrical and Electronics Engineering (EEE) program has the following Program Specific Objectives.

PSO1	Identify, analyze and solve real-life problems by applying the knowledge in Electrical and Electronics Engineering.
PSO2	Design and develop electrical systems and intelligent tools to excel in the field of Electrical and Electronics engineering with an aspire to become a brand name in industry and society.
PSO3	Find solutions to global issues faced by the society through engineering and technology innovations by upholding professional ethics and social values.

The B.Tech. in Civil Engineering (CE) program has the following Program Specific Objectives.

PSO-1	Capability to manage large infrastructure projects ensuring safe and cost-effective execution of projects having knowledge of fast track construction and project management.
PSO-2	Ability to use building software packages to calculate safe loads and stresses for designing structural members to ensure safety and serviceability.
PSO-3	Ability to provide innovative solutions for traffic safety and efficiency through intelligent transportation systems, and mitigate the environmental impact of construction by adopting green building concepts.



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## COURSE OUTCOMES (COs):

Course Outcomes (COs) describe what students can able to do after completion of the course.

**Program :**  
**B. Tech. - Computer Science and Engineering**

S.No	Year-Sem	Course Code	Course Name	Course Outcomes After completion of the course student can able to
1	II-I	BS	Mathematic-III	<b>CO1:</b> Interpret the physical meaning of different operators such as gradient, curl and divergence (L5)
				<b>CO2:</b> Estimate the work done against a field, circulation and flux using vector calculus (L5)
				<b>CO3:</b> Apply the Laplace transform for solving differential equations (L3) Find or compute the Fourier series of periodic signals (L3)
				<b>CO4:</b> Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3)
				<b>CO5:</b> Identify solution methods for partial differential equations that model physical processes (L3)
2	II-I	CS	Object Oriented Programming Through C++	<b>CO1:</b> Classify object-oriented programming and procedural programming
				<b>CO2:</b> Implement the concept of polymorphism through operator overloading that enhances reusability
				<b>CO3:</b> Analyze binding, polymorphism and virtual functions.
				<b>CO4:</b> Apply Exception Handling Techniques for resolving run-time errors and use of templates to provide generic programming
				<b>CO5:</b> Demonstrate the concept of template library and Containers, Associative Containers, Algorithms, Iterators, Vectors, Lists, Maps
3	II-I	CS	Operating System	<b>CO1:</b> Describe various generations of Operating System and functions of Operating System
				<b>CO2:</b> Describe the concept of program, process and thread and analyze various CPU Scheduling Algorithms and compare their performance
				<b>CO3:</b> Solve Inter Process Communication problems using Mathematical Equations by various methods



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				<p><b>CO4:</b> Compare various Memory Management Schemes especially paging and Segmentation in Operating System and apply various Page Replacement Techniques</p> <p><b>CO5:</b> Outline File Systems in Operating System like UNIX/Linux and Windows</p>
4	II-I	CS	Software Engineering	<p><b>CO1:</b> Ability to transform an Object-Oriented Design into high quality, executable code</p> <p><b>CO2:</b> Skills to design, implement, and execute test cases at the Unit and Integration level</p> <p><b>CO3:</b> Compare conventional and agile software methods</p> <p><b>CO4:</b> Analyze software reliability and quality management</p> <p><b>CO5:</b> Apply software maintenance activities and re-usability of software</p>
5	II-I	CS	Mathematical Foundation Of Computer Science	<p><b>CO1:</b> Demonstrate skills in solving mathematical problems</p> <p><b>CO2:</b> Comprehend mathematical principles and logic</p> <p><b>CO3:</b> Demonstrate knowledge of mathematical modeling and proficiency in using mathematical software</p> <p><b>CO4:</b> Manipulate and analyze data numerically and/or graphically using appropriate Software</p> <p><b>CO5:</b> Communicate effectively mathematical ideas/results verbally or in writing</p>
6	II-I	CS	Object Oriented Programming Through C++ Lab	<p><b>CO1:</b> Implement and test the concepts of Classes &amp; Objects, friend functions.</p> <p><b>CO2:</b> Implement and constructors &amp; destructors in program design of a few example exercises</p> <p><b>CO3:</b> Design &amp; implement a few forms of inheritance through few exercises.</p> <p><b>CO4:</b> Test the performance of Polymorphism and Generic Programming through a few exercises.</p>
7	II-I	CS	Operating System Lab	<p><b>CO1:</b> To use Unix utilities and perform basic shell control of the utilities</p> <p><b>CO2:</b> To use the Unix file system and file access control</p> <p><b>CO3:</b> To use of an operating system to develop software</p> <p><b>CO4:</b> Solve problems using bash for shell scripting</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



8	II-I	CS	Software Engineering Lab	CO1: By the end of this lab the student is able to elicit, analyze and specify software requirements through a productive working relationship with various stakeholders of the project
				CO2: prepare SRS document, design document, test cases and software configuration management and risk management related document
				CO3: develop function oriented and object-oriented software design using tools like rational rose.
				CO4: use modern engineering tools necessary for software project management, estimations, time management, software reuse and generate test cases for software testing
9	II-I	MC	Constitution Of India	CO1: Understand historical background of the Constitution making and its importance for building a democratic India.
				CO2: Understand the functioning of three wings of the government ie., executive, legislative and judiciary
				CO3: Understand the value of the fundamental rights and duties for becoming good citizen of India.
				CO4: Analyze the decentralization of power between central, state and local self-government.
10	II-II	BS	Probability And Statistics	CO1: Classify the concepts of data science and its importance (L4) or (L2)
				CO2: Interpret the association of characteristics and through correlation and regression tools (L4)
				CO3: Apply discrete and continuous probability distributions (L3)
				CO4: Design the components of a classical hypothesis test (L6)
				CO5: Infer the statistical inferential methods based on small and large sampling tests (L4)
11	II-II	CS	Database Management Systems	CO1: Describe a relational database and object-oriented database
				CO2: Create, maintain and manipulate a relational database using SQL
				CO3: Describe ER model and normalization for database design
				CO4: Examine issues in data storage and query processing and can formulate appropriate solutions



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				CO5: Outline the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage
12	II-II	CS	Formal Languages And Automata Theory	CO1: Classify machines by their power to recognize languages
				CO2: Summarize language classes & grammars relationship among them with the help of Chomsky hierarchy
				CO3: Employ finite state machines to solve problems in computing
				CO4: Illustrate deterministic and non-deterministic machines.
				CO5: Quote the hierarchy of problems arising in the computer science.
13	II-II	ES	Java Programming	CO1: Able to realize the concept of Object Oriented Programming & Java Programming Constructs
				CO2: Able to describe the basic concepts of Java such as operators, classes, objects, inheritance, packages, Enumeration and various keywords
				CO3: Apply the concept of exception handling and Input/ Output operations
				CO4: Able to design the applications of Java & Java applet
				CO5: Able to Analyze & Design the concept of Event Handling and Abstract Window Toolkit
14	II-II	HS	Managerial Economics And Financial Accountancy	CO1: The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product
				CO2: The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs
				CO3: The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units
				CO4: The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis
				CO5: The Learner can able to evaluate various investment project proposals with the help of capital



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				budgeting techniques for decision making
15	II-II	CS	Database Management Systems Lab	<b>CO1:</b> Utilize SQL to execute queries for creating database and performing data manipulation operations
				<b>CO2:</b> Examine integrity constraints to build efficient databases
				<b>CO3:</b> Apply Queries using Advanced Concepts of SQL
				<b>CO4:</b> Build PL/SQL programs including stored procedures, functions, cursors and triggers
16	II-II	CS	R Programming Lab	<b>CO1:</b> Access online resources for R and import new function packages into the R workspace
				<b>CO2:</b> Import, review, manipulate and summarize data-sets in R
				<b>CO3:</b> Explore data-sets to create testable hypotheses and identify appropriate statistical tests and Perform appropriate statistical tests using R
				<b>CO4:</b> Create and edit visualizations with R
17	II-II	ES	Java Programming Lab	<b>CO1:</b> Evaluate default value of all primitive data type, Operations, Expressions, Control flow, Strings
				<b>CO2:</b> Determine Class, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism
				<b>CO3:</b> Illustrating simple inheritance, multi-level inheritance, Exception handling mechanism
				<b>CO4:</b> Construct Threads, Event Handling, implement packages, developing applets
18	III-I		Social Relevant Project	<b>CO1:</b> Use scientific reasoning to gather, evaluate, and interpret ideas
				<b>CO2:</b> Analyze and design solutions to solve the ideas
				<b>CO3:</b> Use one or more creative tools to complete the projects
19	III-I	CS3101	Data Warehousing And Mining	<b>CO1:</b> Design a Data warehouse system and perform business analysis with OLAP tools.
				<b>CO2:</b> Apply suitable pre-processing and visualization techniques for data analysis.
				<b>CO3:</b> Apply frequent pattern and association rule mining techniques for data analysis.
				<b>CO4:</b> Apply appropriate classification techniques for data analysis.
				<b>CO5:</b> Apply appropriate clustering techniques for



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				data analysis.
20	III-I	CS3102	Computer Networks	CO1: Illustrate the OSI and TCP/IP reference model
				CO2: Analyze MAC layer protocols and LAN technologies
				CO3: Design applications using internet protocols
				CO4: Implement routing and congestion control algorithms
				CO5: Develop application layer protocols
21	III-I	CS3103	Compiler Design	CO1: Design, develop, and implement a compiler for any language
				CO2: Use LEX and YACC tools for developing a scanner and a parser
				CO3: Design and implement LL and LR parsers
				CO4: Design algorithms to perform code optimization in order to improve the performance of a program in terms of space and time complexity
				CO5: Apply algorithms to generate machine code
22	III-I	CS3104	Artificial Intelligence	CO1: Outline problems that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem.
				CO2: Apply the language/framework of different AI methods for a given problem.
				CO3: Implement basic AI algorithms- standard search algorithms or dynamic programming.
				CO4: Design and carry out an empirical evaluation of different algorithms on problem formalization, and state the conclusions that the evaluation supports.
				CO5: Understanding the different types of Expert systems and applications.
23	III-I	PE3101	Software Testing Methodologies	CO1: Identify and understand various software testing problems, apply software testing knowledge and engineering methods and solve these problems by designing and selecting software test models, criteria, strategies, and methods.
				CO2: Design and conduct a software test process for a software project.
				CO3: Use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects.
				CO4: Basic understanding and knowledge of



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				contemporary issues in software testing, such as component-based, web based and object oriented software testing problems. <b>CO5:</b> Analyze the needs of software test automation.
24	III-I	CS3105	Computer Networks Lab	<b>CO1:</b> Apply the basics of Physical layer in real time applications. <b>CO2:</b> Apply data link layer concepts, design issues, and protocols. <b>CO3:</b> Implement different types of routing algorithms in network. <b>CO4:</b> Apply Network layer routing protocols and IP addressing. <b>CO5:</b> Implement the functions of Application layer and Presentation layer paradigms and Protocols.
25	III-I	CS3106	AI Tools & Technics Lab	<b>CO1:</b> Identify problems that are amenable to solution by AI methods <b>CO2:</b> Identify appropriate AI methods to solve a given problem <b>CO3:</b> Use language/framework of different AI methods for solving problems. <b>CO4:</b> Implement basic AI algorithms. <b>CO5:</b> Design and carry out an empirical evaluation of different algorithms on problem formalization, and state the conclusions that the evaluation supports.
26	III-I	CS3107	Data Mining Lab	<b>CO1:</b> Extend the functionality of R by using add-on packages. <b>CO2:</b> Examine data from files and other sources and perform various data manipulation tasks on them. <b>CO3:</b> Construct Code statistical functions in R. <b>CO4:</b> Choose R Graphics and Tables to visualize results of various statistical operations on data <b>CO5:</b> Apply the knowledge of R gained to data Analytics for real life applications
27	III-I	MC3101	Employability Skills-II	<b>CO1:</b> Recite the corporate etiquette. <b>CO2:</b> Make presentations effectively with appropriate body language. <b>CO3:</b> Be composed with positive attitude <b>CO4:</b> Apply their core competencies to succeed in professional and personal life



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



28	III-II	CS3201	Web Technologies	CO1: Illustrate the basic concepts of HTML and CSS & apply those concepts to design static web pages.
				CO2: Identify and understand various concepts related to dynamic web pages and validate them using JavaScript.
				CO3: Outline the concepts of Extensible markup language & AJAX.
				CO4: Develop web Applications using Scripting Languages & Frameworks.
				CO5: Create and deploy secure, usable database driven web applications using PHP and RUBY.
29	III-II	CS3202	Distributed Systems	CO1: Elucidate the foundations and issues of distributed systems.
				CO2: Illustrate the various synchronization issues and global state for distributed systems.
				CO3: Illustrate the Mutual Exclusion and Deadlock detection algorithms in distributed systems.
				CO4: Describe the agreement protocols and fault tolerance mechanisms in distributed systems.
				CO5: Describe the features of peer-to-peer and distributed shared memory systems.
30	III-II	CS3203	Design And Analysis Of Algorithms	CO1: Describe asymptotic notation used for denoting performance of algorithms.
				CO2: Solve problems using divide and conquer, greedy algorithmic approaches.
				CO3: Solve problems using dynamic programming algorithmic approaches.
				CO4: Solve problems using backtracking and branch and bound algorithmic approaches
				CO5: Demonstrate an understanding of NP-Completeness theory and lower bound theory.
31	III-II	HS3201	Managerial Economics And Financial Accountancy	CO1: The Learner is equipped with the knowledge of estimating the Demand and demand elastic ties for a product
				CO2: knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.
				CO3: The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business



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				Units. <b>CO4:</b> The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis <b>CO5:</b> The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.
32	III-II	CS320 4	Web Technologies Lab	<b>CO1:</b> Analyze and apply the role of languages like HTML, CSS, XML. <b>CO2:</b> Review JavaScript, PHP and protocols in the workings of the web and web applications. <b>CO3:</b> Apply Web Application Terminologies, Internet Tools, E – Commerce and other web services. <b>CO4:</b> Develop and Analyze dynamic Web Applications using PHP & MySql. <b>CO5:</b> How Install & Use Frameworks
33	IV-I		Cryptography And Network Security	<b>CO1:</b> Classify various Security attacks, Services, Mechanisms and Mathematics of Cryptography <b>CO2:</b> Relate Mathematics of Symmetric Key Cryptography and Apply the Symmetric key Cryptography like DES, AES. <b>CO3:</b> Relate Mathematics of Asymmetric Key Cryptography and Apply the Asymmetric key cryptography <b>CO4:</b> Make use of Data Integrity, Digital Signature Schemes & Key Management for verifying the authenticity of digital messages <b>CO5:</b> Select protocols like PGP,S/MIME in Application layer and SSL,TLS in Transport layer to Secure the Network during data transmission <b>CO6:</b> Select Internet protocol security (IPsec) at the Network Layer to provide security for Internet Protocol
34	IV-I		Software Architecture And Design	<b>CO1:</b> Understand the structures, types of models, and views of software Architectures. <b>CO2:</b> Illustrate the documentation and reconstruction of software architecture. <b>CO3:</b> Analyze and evaluate given software architectures and patterns. <b>CO4:</b> Demonstrate system architectures for a given



# R K COLLEGE OF ENGINEERING

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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



			Patterns	scenario <b>CO5:</b> Describe creational, structural, and behavioral design patterns. <b>CO6:</b> Implement various case studies for utilization of design patterns.
35	IV-I		Web Technologies	<b>CO1:</b> Illustrate the HTML tags and cascading style sheet formats for developing static web content. <b>CO2:</b> Explain the development of dynamic web content using JavaScript <b>CO3:</b> Develop the web applications with help of XML and AJAX <b>CO4:</b> Build web content by integrating PHP and database <b>CO5:</b> Interpret the PERL basic functions and its usage in web applications <b>CO6:</b> Apply ruby programming principles and ruby on rails for developing web applications and other solutions
36	IV-I		Managerial Economics And Financial Analysis	<b>CO1:</b> Learn the concepts of Managerial Economics and utilize the demand forecasting methods to predict demand of a product. <b>CO2:</b> Make use of Production function & economies of scale and assess the BEP of their own business. <b>CO3:</b> Understand the concepts of competitive market situations. <b>CO4:</b> Classify the types of business organizations and identify the stages of business cycles to improve the organizations. <b>CO5:</b> Analyze accounting concepts to prevent loss for the organization. <b>CO6:</b> Identify the sources of raising capital for business undertaking.
37	IV-I		Mobile Computing (Elective-1)	<b>CO1:</b> Illustrate GSM architecture and data services in GSM <b>CO2:</b> Summarize different medium access control mechanisms <b>CO3:</b> Elaborate Packet Delivery and Handover Management in mobile network layer <b>CO4:</b> Analyze TCP/IP protocols in mobile transport layer <b>CO5:</b> Survey of Mobile Adhoc network protocols



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				for distinguishing them from infrastructure-based networks.
				<b>CO6:</b> Analyze the principles of mobile networks by relating them to future generation networks
38	IV-I	Software Project Management (Elective-2)		<b>CO1:</b> Apply skills necessary to manage software project
				<b>CO2:</b> Implementation of Project Management skills and techniques
				<b>CO3:</b> Demonstrate theoretical and practical aspects of managing software projects
				<b>CO4:</b> Conduct project planning activities that accurately forecast project costs, timelines, and quality. Implement processes for successful resource, communication, and risk and change management
				<b>CO5:</b> Conduct project closure activities and obtain formal project acceptance.
				<b>CO6:</b> Demonstrate effective organizational leadership and change skills for managing projects, project teams, and stakeholders.
39	IV-I	Software Architecture & Design Patterns Lab		<b>CO1:</b> Specify, configure, and analyze various industrial strength software development tools like Rational rose and CORBA-IDL.
				<b>CO2:</b> Design, Deploy, and communicate different software architectures
				<b>CO3:</b> Implement an architecture pertaining to specific cases.
				<b>CO4:</b> Understand creational, behavioral, and structural design patterns.
				<b>CO5:</b> Design suitable requirement specific design patterns.
40	IV-I	Web Technologies Lab		<b>CO1:</b> Apply and make use of HTML, CSS to develop the web applications.
				<b>CO2:</b> Build the web application for data storage and transmission over net using XML.
				<b>CO3:</b> Construct basic operations and GUI applications using Ruby language
				<b>CO4:</b> Develop operations on data and database using PERL
				<b>CO5:</b> Construct usage of cookies and database applications using PHP script
41	IV-II	Distributed		<b>CO1:</b> Outline the important characteristics of



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			Systems	<p>Distributed Systems and salient features of Distributed Systems</p> <p><b>CO2:</b> Make use of Inter process communication mechanisms with TCP and UDP protocols in Distributed systems</p> <p><b>CO3:</b> Apply RMI and RPC for Remote Invocation in Distributed systems for Distributed Objects.</p> <p><b>CO4:</b> Illustrate the Operating systems facilities at the nodes of a Distributed Systems</p> <p><b>CO5:</b> Examine the different file management systems of Distributed nature and to choose appropriate algorithm for process coordination and agreement.</p> <p><b>CO6:</b> Distinguish various protocols for transaction and replication in distributed systems.</p>
42	IV-II		Management Science	<p><b>CO1:</b> Appraise the practices of management concepts in the business environment and evaluate various types of organization structures.</p> <p><b>CO2:</b> Identify the production management practices and distinguish the different stock levels of an organization.</p> <p><b>CO3:</b> Prepare an appropriate marketing mix and determine the recruitment process in global competitive environment.</p> <p><b>CO4:</b> Evaluate the project process on the basis of costs and time.</p> <p><b>CO5:</b> Recognize and analyze the strategies of the firm and can re discover the SWOT of themselves.</p> <p><b>CO6:</b> Understand and develop the contemporary management practices such as MIS, MRP, TQM,ERP, BPO and assess the changing business environment.</p>
44	IV-II		Machine Learning	<p><b>CO1:</b> Outline the characteristics of machine learning that make it useful to real-world Problems</p> <p><b>CO2:</b> Make use of Regression, Unsupervised and descriptive learning to handle more than two classes and Concept learning in classification</p> <p><b>CO3:</b> Understand various Tree models and Rule models techniques in machine learning</p> <p><b>CO4:</b> Apply linear models and Distance based models to solve real world problems</p> <p><b>CO5:</b> Identify Probabilistic models for categorical data and Construct model using ensembles</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				Techniques
				<b>CO6:</b> Understand the concept behind neural networks for learning non-linear functions and Build model using neural networks algorithms
44	IV-II		Concurrent And Parallel Programming	<b>CO1:</b> Compare parallel programs and sequential programs
				<b>CO2:</b> Classify parallel computing platforms.
				<b>CO3:</b> List the parallel algorithm models.
				<b>CO4:</b> Write shared memory parallel programs with open MP
				<b>CO5:</b> Develop distributed memory parallel programs using MPI
				<b>CO6:</b> Design the parallel algorithm for Matrix and Graph related problems
45	IV-II		Seminar	<b>CO1:</b> Outline the important concepts to gain factual knowledge.
				<b>CO2:</b> Organise the presentation and disseminate ideas effectively with good communication skills.
				<b>CO3:</b> Develop self-learning & time management skills to engage in continuous learning
				<b>CO4:</b> Synthesize and reflect on to show the depth of knowledge in a compelling, well-structured and professional behavior
				<b>CO5:</b> Develop writing skills with clarity of thought and expression.
46	IV-II		Project	<b>CO1:</b> Demonstrate the technical knowledge to identify problems in the field of Computer Science and Engineering and its allied areas.
				<b>CO2:</b> Analyze and formulate technical projects with a comprehensive and systematic approach.
				<b>CO3:</b> Identify the modern tools to implement technical projects
				<b>CO4:</b> Design engineering solutions for solving complex engineering problems.
				<b>CO5:</b> Develop effective communication skills, professional behavior and team work.

**Program :**

B.Tech – Electronics And Communication Engineering



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



S.No	Year-Sem	Course Code	Course Name	Course Outcomes After completion of the course student can able to
1	II-I	PCC	Electronic Devices And Circuits	<b>CO1:</b> Understand the principles of semiconductor Physics.
				<b>CO2:</b> Analyze and create application of special purpose diodes, and electronic circuits
				<b>CO3:</b> Understand carrier transport in semiconductors.
				<b>CO4:</b> Analyze and evaluate the mathematical models of MOS&BJT transistors for circuits and systems.
				<b>CO5:</b> Analyze and create application of transistor amplifier models
2	II-I	BSC	M-III	<b>CO1:</b> Interpret the physical meaning of different operators such as gradient, curl and divergence (L5)
				<b>CO2:</b> Estimate the work done against a field, circulation and flux using vector calculus (L5)
				<b>CO3:</b> Apply the Laplace transform for solving differential equations (L3)
				<b>CO4:</b> Find or compute the Fourier series of periodic signals (L3)
				<b>CO5:</b> Know and be able to apply integral expressions for the forwards and inverse Fourier transform to arrange of non-periodic wave forms (L3) Identify solution methods for partial differential equations that model physical process
3	II-I	PCC	Signals and systems	<b>CO1:</b> Differentiate the various classifications of signals and systems
				<b>CO2:</b> Analyze the frequency domain representation of signals using Fourier concepts
				<b>CO3:</b> Classify the systems based on their properties and determine the response LTI systems
				<b>CO4:</b> Know a sampling process and various types of sampling techniques
				<b>CO5:</b> Apply laplace and z-transforms to analyze signals and systems(continuous and discrete)
4	II-I	PCC	Switching theory and logic design	<b>CO1:</b> Classify different number system and apply to generates various codes Use the concept of Boolean algebra in minimization of switching functions



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				<p><b>CO2:</b> Design different types of combinational logic circuits</p> <p><b>CO3:</b> Apply knowledge of flip-flops in designing of registers and counters</p> <p><b>CO4:</b> Design methodology for synchronus and asynchronous sequential circuits</p> <p><b>CO5:</b> Design algorithms for state machines</p>
5	II-I	PCC	Random Variables Stochastic Processes	<p><b>CO1:</b> Mathematically model her and phenomena and solve simple probabilistic problems</p> <p><b>CO2:</b> Identify different types of random variables expectations</p> <p><b>CO3:</b> Identify different types of random variables and compute statistical averages of the random variables.</p> <p><b>CO4:</b> Characterize the random processes in the time and frequency domains.</p> <p><b>CO5:</b> Analyze the LTI systems with random inputs.</p>
6	II-I	PCC Lab	OOPS Through Java Lab	<p><b>CO1:</b> Identify classes, objects, members of a class and the relationship amongthemneeded for aspecificproblem.</p> <p><b>CO2:</b> Implement programs to distinguish different forms of inheritance.</p> <p><b>CO3:</b> Create packages and to reuse them .</p> <p><b>CO4:</b> Develop programs using Exception Handling mechanism.</p> <p><b>CO5:</b> Developmultithreaded applicationusingsynchronizationconcept.</p> <p><b>CO6:</b> DesignGUIbased applicationsusingSwings andAWT.</p>
7	II-I	PCC Lab	Electronic Devices And Circuits Lab	<p><b>CO1:</b> Measure Voltage, frequency and phase ofany wave form using CRO</p> <p><b>CO2:</b> Generate sine, square and triangular waveforms with required frequency and amplitude using function generator</p> <p><b>CO3:</b> Analyze the characteristics of different electronic devices such as diodes, transistors etc. and simple circuits like rectifiers, amplifiers etc.,</p>
8	II-I	PCC Lab	Switching	<p><b>CO1:</b> StudentsAble to design simple combinational circuit by using basic logic gates.</p> <p><b>CO2:</b> Students are able to design full adder circuit and verify its functional table.</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



			Theory And Logic Design Lab	<p><b>CO3:</b> Students are able to verify functional tables of (i.) JK Edge Triggered Flip- Flop (ii.) JK Master Slave Flip Flop</p> <p><b>CO4:</b> Students are able to design a four-bit ring counter using D- Flip Flops/JK Flip-Flops.</p> <p><b>CO5:</b> Able to design a four-bit Johnson's Counter using D-Flip Flops/JK Flip-Flops.</p>
9	II-II	PCC	Digital IC Design	<p><b>CO1:</b> Understand the structure of commercially available digital integrated circuit families.</p> <p><b>CO2:</b> Learn the IEEE Standard 1076 Hardware Description Language (VHDL).</p> <p><b>CO3:</b> Model complex digital systems at several levels of abstractions, behavioral, structural, and rapid system prototyping.</p> <p><b>CO4:</b> Analyze and design basic digital circuits with combinatorial circuits using VHDL.</p> <p><b>CO5:</b> Analyze and design basic digital circuits with sequential logic circuits using VHDL.</p>
10	II-II	BSC/PC	Electronic Circuit Analysis	<p><b>CO1:</b> Design and analysis of small signal high frequency transistor amplifier using BJT and FET.</p> <p><b>CO2:</b> Design and analysis of multi stage amplifiers using BJT and FET and Differential amplifier using BJT</p> <p><b>CO3:</b> Derive the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillators and their amplitude and frequency stability concept.</p> <p><b>CO4:</b> Know the classification of the power and tuned amplifiers and their analysis with performance comparison.</p> <p><b>CO5:</b> Know the classification of the feedback amplifiers and their analysis with performance comparison.</p>
11	II-II	PCC	Analog Communications	<p><b>CO1:</b> Understand the basic concepts of the analog communication systems</p> <p><b>CO2:</b> Evaluate modulation index, bandwidth and power requirements for various analog modulation schemes including AM, FM and PM</p> <p><b>CO3:</b> Understand and Analyze various analog continuous wave modulation and demodulation techniques including AM, FM and PM</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				<p><b>CO4:</b> Analyze various analog pulse modulation and demodulation techniques including AM, FM and PM</p> <p><b>CO5:</b> Understand the influence of noise over Analog Modulation schemes through random process and noise theory and applications of Analog communication techniques.</p>
12	II-II	ESC	Linear control Systems	<p><b>CO1:</b> This course introduces the concepts of feedback and its advantages to various control systems</p> <p><b>CO2:</b> The performance metrics to design the control system in time-domain and frequency domain are introduced</p> <p><b>CO3:</b> Control systems for various applications can be designed using time-domain and frequency domain analysis.</p> <p><b>CO4:</b> In addition to the conventional approach, the state space approach for the analysis of control systems is also introduced.</p>
13	II-II	HSS	Management And Organizational Behaviour	<p><b>CO1:</b> After completion of the Course the student will acquire the knowledge on management functions, global leadership and organizational structure.</p> <p><b>CO2:</b> Will familiarize with the concepts of functional management that is HRM and Marketing of new product developments.</p> <p><b>CO3:</b> The learner is able to think in strategically through contemporary management practices.</p> <p><b>CO4:</b> The learner can develop positive attitude through personality development and can equip with motivational theories.</p> <p><b>CO5:</b> The student can attain the group performance and grievance handling in managing the organizational culture.</p>
				<p><b>CO1:</b> Comprehend the fundamentals of multi stage amplifiers, feedback power amplifiers and oscillator circuits.</p> <p><b>CO2:</b> Analyze the circuit design process and simulate the common base, common emitter and common collector amplifier circuits.</p> <p><b>CO3:</b> Acquaint with the design and simulate the</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



14	II-II	PCC Lab	Electronic Circuit Analysis Lab	RC coupled and Cascade amplifier circuits
				<b>CO4:</b> Discriminate the design and simulate the RC coupled and Cascade amplifier circuits
				<b>CO5:</b> Interpret to design and simulate various oscillator circuits
15	II-II	PCC Lab	Analog Communications Lab	<b>CO6:</b> Create the design and simulate the cascade, class A power amplifier circuits, and single tuned voltage amplifier circuits
				<b>CO1:</b> Analyze the concepts, write and simulate the concepts of AM and AM Demodulation process in Communication
				<b>CO2:</b> Know the origin and simulation of FM and FM- Demodulation process in communication
				<b>CO3:</b> Acquaint with AM and FM basic functionalities
				<b>CO4:</b> Discriminate the AM and FM functionalities
				<b>CO5:</b> Interpret with various angle modulation and demodulation systems
16	II-II	PCC Lab	Digital IC Design Lab	<b>CO6:</b> Create the writing and simulation environments in PWM, PPM, Mixer and ring modulation
				<b>CO1:</b> Students should enable to describe and explain the operation of fundamental digital gates
				<b>CO2:</b> Get the knowledge and use of hardware descriptive language (VHDL) for system modeling and simulation.
				<b>CO3:</b> Students Can Analyze the operation of medium complexity standard combinational circuits like encoder, decoder, multiplexer, multiplexers and develop corresponding VHDL code in one of the models.
17	III-I	PC	Linear IC Applications	<b>CO4:</b> Students can design complex digital systems at several level of abstractions, behavioral and structural, synthesis and rapid system prototyping
				<b>CO5:</b> Students can design complex digital system such as ALU.
				<b>CO1:</b> Design circuits using operational amplifiers for various applications
				<b>CO2:</b> Analyze and design amplifiers and active filters using Op-amp.
				<b>CO3:</b> Diagnose and trouble-shoot linear electronic



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				circuits.
				<b>CO4:</b> Understand the gain-bandwidth concept and frequency response of the amplifier configurations
				<b>CO5:</b> Understand thoroughly the operational amplifiers with linear integrated circuits.
18	III-I	PC	Micro Processors and Micro Controllers	<p><b>CO1:</b> Understand about basic Computing Architectures, 8086 – MicroProcessor Pin Diagram, Architecture, Interrupt Structure and Timing Diagrams in Maximum and Minimum mode.</p> <p><b>CO2:</b> Understand about Instruction Set and various tools for developing 8086 Assembly Language Program.</p> <p><b>CO3:</b> Acquire the knowledge on interfacing various peripherals, configure and develop programs to interface peripherals.</p> <p><b>CO4:</b> 8051 Micro Controller Pin Diagram, Architecture and able to write 8051 Assembly Language Program for interfacing concepts.</p> <p><b>CO5:</b> Able to develop programs efficiently on ARM Cortex Processors and debug.</p>
19	III-I	PC	Digital Communications	<p><b>CO1:</b> Design a coded communication system.</p> <p><b>CO2:</b> Analyze the performance of a Digital Communication System for probability of error and are able to design a digital communication system.</p> <p><b>CO3:</b> Analyze various error techniques.</p> <p><b>CO4:</b> Analyze various source coding techniques.</p> <p><b>CO5:</b> Compute and analyze Block codes, cyclic codes and convolution codes</p>
20	III-I	PC	Electronic Measurement and Instrumentation	<p><b>CO1:</b> Select the instrument to be used based on the requirements.</p> <p><b>CO2:</b> Understand and analyze different signal generators and analyzers.</p> <p><b>CO3:</b> Understand the different types of Oscilloscopes for different applications</p> <p><b>CO4:</b> Understand and analyze the concepts Bridge circuits in measuring equipment</p> <p><b>CO5:</b> Design different transducers for measurement of different parameters.</p>
				<b>CO1:</b> Understand the architecture of FPGAs, tools used in modeling of digital design



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



21	III-I	PE	Digital System Design Using HDL	<b>CO2:</b> Understanding and practice the operators and data types and different modeling concepts of design of hardware circuits in very log.
				<b>CO3:</b> Analyze and design basic digital circuits with combinatorial logic circuits using Verilog HDL.
				<b>CO4:</b> Analyze and design basic digital circuits with sequential logic circuits using Verilog HDL.
				<b>CO5:</b> Design real time applications such as vending machine and washing machines etc..
22	III-I	LC	Linear Integrated Circuits and Applications Lab	<b>CO1:</b> Design and analyse the various linear applications of op-amp
				<b>CO2:</b> Design and analyse the various non-linear applications of op-amp
				<b>CO3:</b> Design and analyse filter circuits using op-amp
				<b>CO4:</b> Design and analyse oscillators and multivibrator circuits using op-amp
				<b>CO5:</b> Design and analyse the various applications of 555 timer.
<b>CO6:</b> Analyse the performance of oscillators and multivibrators using PSPICE				
23	III-I	LC	Digital Communications Lab	<b>CO1:</b> Students will able to understand basic theories of Digital Communication system in practical.
				<b>CO2:</b> Can able to design and implement different modulation and demodulation techniques.
				<b>CO3:</b> Students Can measure the bandwidth of various modulation techniques and observes the output waveform
				<b>CO4:</b> Emphasize on sampling modeling, techniques, signal constellations
				<b>CO5:</b> Can able to perform channel coding.
24	III-I	LC	Microprocessor and Microcontrollers Lab	<b>CO1:</b> Students can develop Assembly Language Program by using MASM/TASM software.
				<b>CO2:</b> Design and implement programs on 8086 microprocessor.
				<b>CO3:</b> Design interfacing circuits and implement corresponding programs on 8086 microprocessor.
				<b>CO4:</b> Design and implement 8051 microcontroller-based systems.
				<b>CO5:</b> Able to develop Assembly Language



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				Program for ARM Cortex M3 Processor using KEIL MDK ARM.
25	III-II	PC	Wired And Wireless Transmission Devices	<b>CO1:</b> Design and analyze wire antennas, loop antennas, reflector antennas, lens antennas, horn antennas and micro strip antennas
				<b>CO2:</b> Quantify the fields radiated by various types of antennas
				<b>CO3:</b> Design and analyze antenna arrays
				<b>CO4:</b> Analyze antenna measurements to assess antenna's performance
				<b>CO5:</b> Identify the characteristics of radio wave propagation
26	III-II	PC	Very Large Scale Integrated Circuits	<b>CO1:</b> Demonstrate a clear understanding of CMOS fabrication flow and technology scaling.
				<b>CO2:</b> Apply the design Rules and draw layout of a given logic circuit.
				<b>CO3:</b> Design basic building blocks in Analog IC design.
				<b>CO4:</b> Design MOSFET based logic circuits using various logic styles like static and dynamic CMOS
				<b>CO5:</b> Design FPGA Architectures and Analyze the behaviour of static and dynamic logic circuits.
27	III/II	PC	Digital Signal Processing	<b>CO1:</b> Formulate engineering problems in terms of DSP operations
				<b>CO2:</b> Analyze digital signals and systems
				<b>CO3:</b> Analyze discrete time signals in frequency domain
				<b>CO4:</b> Design digital filters and implement with different structures
				<b>CO5:</b> Understand the key architectural
28	III-II	PE	Cellular And Mobile Communications	<b>CO1:</b> Identify the limitations of conventional mobile telephone systems; understand the concepts of cellular systems.
				<b>CO2:</b> Understand the different types of interferences and design of antenna system
				<b>CO3:</b> Understand the frequency management, channel assignment strategies and antennas
				<b>CO4:</b> Understand the concepts of handoff and architectures of various cellular systems.



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				<p><b>CO5:</b> Understand the concepts of GSM, GPRS LTE,Wi-MAX and 3G,4G and 5G</p>
29	III-II	OE	Power Electronics	<p><b>CO1:</b> Explain the characteristics of various power semiconductor devices and understand the gate driver circuits.</p>
				<p><b>CO2:</b> Explain the operation of single-phase full wave converters and perform harmonic analysis.</p>
				<p><b>CO3:</b> Explain the operation of three phase full-wave converters and perform harmonic analysis.</p>
				<p><b>CO4:</b> Analyze the operation of different types of DC- DC converters.</p>
				<p><b>CO5:</b> Explain the operation of inverters and application of PWM techniques for voltage control and harmonic mitigation.</p>
30	III-II	PC	INTERNET OF THINGS	<p><b>CO1:</b> Understand about Design Principles, Business Process, Architecture of IOT system and its role in Cloud.</p>
				<p><b>CO2:</b> Understand about Mini Computers usage to develop IOT Services and Embedded Processor(Cortex- M0).</p>
				<p><b>CO3:</b> Understand about various IOT Protocols for Communication Purpose, Bluetooth Low Energy Architecture.</p>
				<p><b>CO4:</b> Understand about Solution Framework for IOT Applications.</p>
				<p><b>CO5:</b> Able to Design Real Time IOT-based applications.</p>
31	III-II	LC	VLSI Lab	<p><b>CO1:</b> Demonstrate a clear understanding in hardware design language Verilog HDL.</p>
				<p><b>CO2:</b> Able to model a combinational circuit using hardware description language Verilog HDL and validate its functionality.</p>
				<p><b>CO3:</b> Able to model a Sequential circuit using hardware description language Verilog HDL and validate its functionality.</p>
				<p><b>CO4:</b> Able to implement 8-bit synchronous up down counter on FPGA.</p>
				<p><b>CO5:</b> Able to implement 4-bit sequence detector through Mealy and Moore state machines.</p>
				<p><b>CO1:</b> Students Can Verify Linear and Circular Convolution for two Discrete Time Signals by using</p>



# R K COLLEGE OF ENGINEERING

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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



32	III-II	LC	Digital Signal Processing Lab	MATLAB.
				CO2: Able to design FIR Filter (LP/HP) using windowing technique.
				CO3: Able to implement IIR Filter (LP/HP) on DSP Processors.
				CO4: Able to implement N-point DFT Algorithm.
				CO5: Able to implement FFT Algorithm.
33	IV-I		Radar Systems	CO1: Derive the radar range equation and to solve some analytical problems.
				CO2: Understand the different types of radars and its applications.
				CO3: Understand the concept of tracking and different tracking techniques.
				CO4: Understand the concept of tracking and different tracking techniques.
				CO5: Understand the various components of radar receiver and its performance.
34	IV-I		Digital Image processing	CO1: Perform image manipulations and different digital image processing technique
				CO2: Perform basic operations like – Enhancement, segmentation, compression
				CO3: Analyze pseudo and full color image processing techniques.
				CO4: Apply various morphological operators on images.
				CO5: Perform Image transforms and restoration techniques on image.
35	IV-I		Computer Networks	CO1: understand OSI and TCP/IP models
				CO2: analyze mac layer protocols and LAN technologies
				CO3: design applications using internet protocols
				CO4: understand routing and congestion control algorithms
				CO5: understand how internet works
36	IV-I		Optical Communications	CO1: Choose necessary components required in modern optical communications systems
				CO2: Design and build optical fiber experiments in the laboratory, and learn how to calculate electromagnetic modes in waveguides, the amount of light lost going through an optical system, dispersion of optical fibers.



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				<p><b>CO3:</b> Understand and Analyze various analog continuous wave modulation and demodulation techniques including AM, FM and PM..</p> <p><b>CO4:</b> USE different types of photo detectors and optical test equipment to analyze optical fiber and light wave systems</p> <p><b>CO5:</b> Choose the optical cables for better communication with minimum losses Design, build, and demonstrate optical fiber experiments in the laboratory</p>
37	IV-I		Electronic Switching Systems	<p><b>CO1:</b> Evaluate the time and space parameters of a switched signal</p> <p><b>CO2:</b> Establish the digital signal path in time and space, between two terminals</p> <p><b>CO3:</b> Evaluate the inherent facilities within the system to test some of the SLIC, CODEC and digital switch functions.</p> <p><b>CO4:</b> Investigate the traffic capacity of the system.</p> <p><b>CO5:</b> Evaluate methods of collecting traffic data.</p>
38	IV-I		Embedded System	<p><b>CO1:</b> Understand the basic concepts of an embedded system and able to know an embedded system design approach to perform a specific function.</p> <p><b>CO2:</b> The hardware components required for an embedded system and the design approach of an embedded hardware.</p> <p><b>CO3:</b> The various embedded firmware design approaches on embedded environment.</p> <p><b>CO4:</b> Understand how to integrate hardware and firmware of an embedded system using real time operating system</p> <p><b>CO5:</b> The various embedded firmware design approaches on embedded environment.</p>
39	IV-I		Micro Wave Engineering & Optical Lab	<p><b>CO1:</b> Verify the characteristics of Reflex Klystron.</p> <p><b>CO2:</b> Analyze various parameters of Waveguide Components.</p> <p><b>CO3:</b> Estimate the power measurements of RF Components such as directional Couplers.</p> <p><b>CO4:</b> Demonstrate characteristics of various optical sources.</p> <p><b>CO5:</b> Measure data Rate, Numerical Aperture and</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				Losses in Optical Link.
40	IV-I		Digital Signal Processing Lab	<b>CO1:</b> Students Can Verify Linear and Circular Convolution for two Discrete Time Signals by using MATLAB.
				<b>CO2:</b> Able to design FIR Filter (LP/HP) using windowing technique.
				<b>CO3:</b> Able to implement IIR Filter(LP/HP) on DSP Processors.
				<b>CO4:</b> Able to implement N-point DFT Algorithm.
				<b>CO5:</b> Able to implement FFT Algorithm.
41	IV-II		Cellular And Mobile Communications	<b>CO1:</b> Identify the limitations of conventional mobile telephone systems; understand the concepts of cellularsystems.
				<b>CO2:</b> Understand the different types of interferences and design of antenna system
				<b>CO3:</b> Understand the frequency management,channel assignment strategies and antennas
				<b>CO4:</b> Understand the concepts of handoff and architectures of various cellularsystems.
				<b>CO5:</b> Understand the concepts of GSM, GPRS LTE,Wi-MAX and 3G,4G and 5G
42	IV-II		Electronic Measurement and Instrumentation	<b>CO1:</b> Select the instrument to be used based on the requirements.
				<b>CO2:</b> Understand and analyze different signal generators and analyzers.
				<b>CO3:</b> Understand the different types of Oscilloscopes for different applications
				<b>CO4:</b> Understand and analyze the concepts Bridge circuits in measuring equipment
				<b>CO5:</b> Design different transducers for measurement of different parameters.
				<b>CO6:</b> Understand the Measurement of physical parameters like force,pressure etc.,
43	IV-II		Satellite Communication	<b>CO1:</b> Understand the concepts, applications of satellite communication
				<b>CO2:</b> Derive the expression for G/T ratio and to solve some analytical problems on satellite link design.
				<b>CO3:</b> Derive the expression for G/T ratio and to solve some analytical problems on satellite link



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				design. <b>CO4:</b> Understand the various types of multiple access techniques and architecture of earth station design. <b>CO5:</b> Understand the various types of multiple access techniques and architecture of earth station design. <b>CO6:</b> Understand the concepts of GPS and its architecture.
44	IV-II		Operating Systems	<b>CO1:</b> Design various Scheduling algorithms <b>CO2:</b> Apply the principles of concurrency <b>CO3:</b> Design deadlock, prevention and avoidance algorithms <b>CO4:</b> Compare and contrast various memory management schemes. <b>CO5:</b> Design and Implement a prototype file systems.
45	IV-II		project	<b>CO1:</b> Analyze new problems, identify and define the appropriate requirements for its solutions. <b>CO2:</b> Understand of the impact of engineering solutions. <b>CO3:</b> Understand team work to complete a common goal

**Program**  
 B. Tech. - Mechanical Engineering

S.No	Year-Sem	Course Code	Course Name	Course Outcomes After completion of the course student can able to
1	II-I	BSE-5	Vector Calculus, Fourier Transforms And PDE (M-III)	<b>CO1:</b> Interpret the physical meaning of different operators such as gradient, curl and divergence <b>CO2:</b> Estimate the work done against a field, circulation and flux using vector calculus <b>CO3:</b> Apply the Laplace transform for solving differential equations <b>CO4:</b> Find or compute the Fourier series of periodic signals <b>CO5:</b> I expressions for the forwards and inverse Fourier transform to a range of non-periodic



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				waveforms. Identify solution methods for partial differential equations that model physical processes
2	II-I	PCC-1	Mechanics Of Solids	<b>CO1:</b> Model & Analyze the behavior of basic structural members subjected to various loading and support conditions based on principles of equilibrium
				<b>CO2:</b> Understand then apply the concept of stress and strain to analyze and design structural members and machine parts under axial, shear and bending loads, moment and tensional moment.
				<b>CO3:</b> Analyze beams and draw correct and complete shear and bending moment diagrams for beams.
				<b>CO4:</b> understanding of the loads, stresses, and strains acting on a structure and their relations in the elastic behavior.
				<b>CO5:</b> Design and analysis of Industrial components like pressure vessels.
3	II-I	PCC-2	Fluid Mechanics & Hydraulic Machines	<b>CO1:</b> Understand The basic concepts of fluid properties
				<b>CO2:</b> Explain The mechanics of fluids in static and dynamic conditions.
				<b>CO3:</b> Explain Boundary layer theory, flow separation and dimensional analysis.
				<b>CO4:</b> Calculate Hydrodynamic forces of jet on vanes in different positions.
				<b>CO5:</b> Explain Working Principles and Evaluate performance of hydraulic pump and turbines.
4	II-I	PCC-3	Production Technology	<b>CO1:</b> Able to design the patterns and core boxes for metal casting processes
				<b>CO2:</b> Able to design the gating system for different metallic components
				<b>CO3:</b> Know the different types of manufacturing processes
				<b>CO4:</b> Be able to use forging, extrusion processes
				<b>CO5:</b> Learn about the different types of welding processes used for special fabrication
5	II-I	PCC-4	Kinematics Of Machinery	<b>CO1:</b> Conceive a mechanism for a given plane motion with single degree of freedom.



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				<p><b>CO2:</b> Suggest and analyze a mechanism for a given straight line motion and automobile steering motion.</p> <p><b>CO3:</b> Analyze the motion (velocity and acceleration) of a plane mechanism.</p> <p><b>CO4:</b> Suggest and analyze mechanisms for a prescribed intermittent motion like opening and closing of IC engine valves etc.</p> <p><b>CO5:</b> Select a power transmission system for a given application and analyze motion of different transmission systems</p>
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6	II-I	PCC-L1	Computer Aided Engineering Drawing Practice	CO1: Student get exposed on working of sheet metal with help of development of surfaces
				CO2: Student understands how to know the hidden details of machine components with the help of sections and interpenetrations of solids.
				CO3: Student shall be exposed to modeling commands for generating 2D and 3D objects using computer aided drafting tools which are useful to create machine elements for computer aided analysis.
7	II-I	PCC-L2	Fluid Mechanics & Hydraulic Machines Lab	CO1: Understand the principles of kinematics with specific emphasis on application of continuity equation, stream function etc.
				CO2: Apply the principles of Bernoulli's equation in measurement of discharge in pipes, and in other pipe flow problems.
				CO3: Understand the working principle of pumps and turbines.
8	II-I	PCC-L3	Production Technology Lab	CO1: The student will be able to develop simplified manufacturing processes with the aim of reduction of cost and manpower.
				CO2: The student will be able to identify/control the appropriate process parameters, and possible defects of manufacturing processes so as to remove them.
				CO3: Operate arc welding, gas welding and resistance welding equipment
9	II-I	SOC-1	Drafting And Modeling Lab	CO1: Understand the benefits of computer aided design
				CO2: Understand the computer aided manufacturing of machine elements.
				CO3: Students learn modeling 3d Drawings
10	II-I	MC-3	Essence Of Indian Traditional Knowledge	CO1; Understand the concept of Traditional knowledge and its importance
				CO2: Know the need and importance of protecting traditional knowledge
				CO3: Know the various enactments related to the protection of traditional knowledge
				CO4: Understand the concepts of Intellectual property to protect the traditional knowledge



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11	II-II	BSC-6	Complex Variables And Statistical Methods	CO1: Apply various functions in order to determine whether a given continuous function is analytic
				CO2: Find the differentiation and integration of complex functions used in engineering problems
				CO3: Make use of the Cauchy residue theorem to evaluate certain integrals
				CO4: Apply discrete and continuous probability distributions. design the components of a classical hypothesis test
				CO5: Infer the statistical inferential methods based on small and large sampling tests
12	II-II	ESC-6	Materials Science & Metallurgy	CO1: Understand the crystalline structure of different metals and study the stability of phases in different alloy systems.
				CO2: Study the behavior of ferrous and non-ferrous metals and alloys and their application in different domains
				CO3: Able to understand the effect of heat treatment, addition of alloying elements on properties of ferrous metals
				CO4: Grasp the methods of making of metal powders and applications of powder metallurgy
				CO5: Comprehend the properties and applications of ceramic, composites and other advanced methods.
13	II-II	PCC-5	Dynamics Of Machinery	CO1: Illustrate frictional losses, torque transmission of mechanical systems
				CO2: Analyze dynamic force analysis of slider crank mechanism and design of flywheel.
				CO3: Explain different types of governors involved in dynamics of Machinery
				CO4: Understand balancing of reciprocating and rotary masses
				CO5: Determine the Vibrations developed in beams with concentrated and distributed loads. Dunkerly's methods, Raleigh's method, torsion vibrations.
14	II-II	PCC-6	Thermal	CO1: Derive the actual cycle from fuel-air cycle and air- standard cycle for all practical



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			Engineering - I	<p>applications.</p> <p><b>CO2:</b> Explain working principle and various components of IC engine</p> <p><b>CO3:</b> Explain combustion phenomenon of CI and SI engines and their impact on engine variables.</p> <p><b>CO4:</b> Analyze the performance of an IC engine based on the performance parameters.</p> <p><b>CO5:</b> Explain the cycles and systems of a gas turbine and determine the efficiency of gas turbine.</p>
15	II-II	HSC-2	Industrial Engineering And Management	<p><b>CO1:</b> Design and conduct experiments, analyze, interpret data and synthesize valid conclusions</p> <p><b>CO2:</b> Design a system, component, or process, and synthesize solutions to achieve desired needs</p> <p><b>CO3:</b> Use the techniques, skills, and modern engineering tools necessary for engineering practice with appropriate considerations for public health and safety, cultural, societal, and environmental constraints</p> <p><b>CO4:</b> Function effectively within multi-disciplinary teams and understand the fundamental precepts of effective project management</p> <p><b>CO5:</b> Evaluate the valuation of building for different specifications and create new technologies to develop concrete estimating methods.</p>
16	II-II	ESC-L4	Mechanics Of Solids And Metallurgy Lab	<p><b>CO1:</b> Study of the Micro Structures of Cast Irons.</p> <p><b>CO2:</b> Study of the Micro Structures of Non-Ferrous alloys.</p> <p><b>CO3:</b> Study of the Micro structures of Heat treated steels.</p>
17	II-II	PCC-L6	Machine Drawing Practice	<p><b>CO1:</b> Draw and represent standard dimensions of different mechanical fasteners and joints and Couplings.</p> <p><b>CO2:</b> Draw different types of bearings showing different components.</p> <p><b>CO3:</b> Assemble components of a machine part and draw the sectional assembly drawing showing the dimensions of all the components of the assembly as per bill of materials</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				CO4; Select and represent fits and geometrical form of different mating parts in assembly drawings. CO5: To prepare manufacturing drawings indicating fits, tolerances, surface finish and surface treatment requirements.
18	II-II	PCC-L7	Theory Of Machines Lab	CO1: To study the static and dynamic balancing using rigid blocks. CO2: To study simple and compound screw jack and determine the mechanical advantage , velocity ratio and efficiency CO3: To study various types of gears- Spur, Helical, Worm and Bevel Gears
19	II-II	SOC-2	Python Programming Lab	CO1: Solve the different methods for linear, non-linear and differential equations CO2: Learn the PYTHON Programming language CO3: Familiar with the strings and matrices in PYTHON CO4: Write the Program scripts and functions in PYTHON to solve the methods
20	III-I	PCC-ME	Mechanical Measurements & Metrology	CO1: To gain fundamental knowledge of machining processes CO2: To understand the principles of lathe, shaping, slotting and planning machines. CO3: To demonstrate the principles of drilling, milling and boring processes. CO4: To understand the concepts of finishing processes and the system of limits and fits. CO5: To gain knowledge about the concepts of surface roughness and optical measuring instruments
21	III-I	HSIMS	Managerial Economics And Financial Analysis	CO1: The Learner is equipped with the knowledge of estimating the Demand and demand elasticity's for a product. CO2: The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs. CO3: The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				and also to have the knowledge of different Business Units
				<b>CO4:</b> The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis.
				<b>CO5:</b> The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.
22	III-I	PCC-ME	IC Engines And Gas Turbines	<b>CO1:</b> Derive the actual cycle from fuel-air cycle and air- standard cycle for all practical applications.
				<b>CO2:</b> Explain working principle and various components of IC engine
				<b>CO3:</b> Explain in depth a combustion phenomenon of CI and SI engines and their impact on engine variables.
				<b>CO4:</b> Analyze the performance of an IC engine based on the performance parameters.
				<b>CO5:</b> Explain the cycles and systems of a gas turbine and determine the efficiency of gas turbine.
23	III-I	PCC	Thermal Engineering Lab	<b>CO1:</b> Identify the various fuel characterizations through experimental testing.
				<b>CO2:</b> Analyze the performance characteristics of an internal combustion engines
				<b>CO3:</b> Evaluate the performance parameters of refrigeration systems
				<b>CO4:</b> Analyze the air compressor characteristics
24	III-I	PCC	Theory Of Machines Lab	<b>CO1:</b> The student can identify different areas of Theory of Machines.
				<b>CO2:</b> Can find the applications of all the areas in day-to-day life.
				<b>CO3:</b> Analyze Influence of Inertia Upon Velocity & Acceleration
25	III-I	PCC	Mechanical Measurements	<b>CO1:</b> Demonstrate and use different length measuring instruments like vernier calipers and micrometers
				<b>CO2:</b> Explain different angle measuring instrument like universal bevel protractor, sine bar



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



			& Metrology Lab	CO3: Formulate some unknown quantity or parameter of engineering interest
26	III-I	PROJ-3101	Socially Relevant Project	CO1: Learn Water Conservation Related Works
				CO2: Understand Teaching Rural Kids (SarvaSiksha Abhiyan)
				CO3: LEARN E- policing & cyber solution
27	III-II	PCC	Operations Research	CO1: Formulate the resource management problems and identify appropriate methods to solve them
				CO2: Apply LPP, transportation and assignment models to optimize the industrial resources
				CO3: Solve decision theory problems through the application of game theory
				CO4: Apply the replacement and queuing models to increase the efficiency of the system
				CO5: Model the project management problems through CPM and PERT
28	III-II	PCC	Heat Transfer	CO1: Compute rate of heat transfer for 1D, steady state composite systems without heat generation.
				CO2: Analyze the system with heat generation, variable thermal conductivity, fins and 1D transient conduction heat transfer problems.
				CO3: Develop the empirical equations for forced convection problems by using Buckingham's pi theorem.
				CO4: Compute the rate of heat transfer for natural convection systems and design and analysis of heat exchangers.
				CO5: Solve the heat transfer systems with phase change and radiation.
29	III-II	PCC-ME	CAD/CAM	CO1: Understand the basic fundamentals of computer aided design and manufacturing, various types of Transformations involved in CAD
				CO2: To understand the different geometric modeling techniques like solid modeling, surface modeling, feature based modeling etc. and to visualize how the components look like before its manufacturing or fabrication
				CO3: To learn the part programming, importance of group technology, computer aided process



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				<p>planning, computer aided quality control</p> <p><b>CO4:</b> Explain the process involved in the Flexible manufacturing system, tool management system</p> <p><b>CO5:</b> Determine the process involved in the computer aided quality control and computer integrated manufacturing systems</p>
30	III-II	PEC-ME1	Unconventional Machining Processes	<p><b>CO1:</b> Explain the types, needs and application of unconventional machining process</p> <p><b>CO2:</b> Discuss the various mechanical energy-based machining methods</p> <p><b>CO3:</b> Distinguish the chemical and electro chemical energy-based machining processes.</p> <p><b>CO4:</b> Explain the principle and working of thermal energy-based machining methods.</p> <p><b>CO5:</b> Understand the principle and working of laser beam, plasma machining processes.</p>
31	III-II	PEC-ME2	Mechatronics	<p><b>CO1:</b> Explain mechatronics design process and outline appropriate sensors and actuators for engineering applications</p> <p><b>CO2:</b> Develop a simulation model for simple physical systems</p> <p><b>CO3:</b> Write simple microcontroller programs</p> <p><b>CO4:</b> Explain linearization of nonlinear systems and elements of data acquisition</p> <p><b>CO5:</b> Explain various applications of design of mechatronic systems</p>
32	III-II	PCC	Simulation Of Mechanical Systems Lab	<p><b>CO1:</b> Understand Mechanical System with Translational Friction</p> <p><b>CO2:</b> Understand Mechanical System with Translational Hard stop</p> <p><b>CO3:</b> Understand Mechanical Rotational System with stick-slip motion</p>
33	III-II	PCC	Heat Transfer Lab	<p><b>CO:</b> The student should be able to evaluate the amount of heat exchange for plane</p> <p><b>CO2:</b> Evaluate cylindrical &amp; spherical geometries</p> <p><b>CO3:</b> to compare the performance of extended surfaces and heat exchangers</p>
34	III-II	PCC	CAD/CAM Lab	<p><b>CO1:</b> The student will be able to appreciate the utility of the modeling tools in creating 2D and 3D</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				<p>drawings.</p> <p><b>CO2:</b> Use of these tools for any engineering and real time applications</p> <p><b>CO3:</b> Acquire knowledge on utilizing these tools for a better project in their curriculum as well as they will be prepared to handle industry problems with confidence when it matters to use these tools in their Employment</p>
35	IV-I		Mechatronics	<p><b>CO1:</b> Explain mechatronics design process and outline appropriate sensors and actuators for engineering applications</p> <p><b>CO2:</b> Develop a simulation model for simple physical systems</p> <p><b>CO4:</b> Explain linearization of nonlinear systems and elements of data acquisition</p> <p><b>CO5:</b> Explain various applications of design of mechatronic systems</p> <p><b>CO6:</b> Knowledge on dynamic models and process controllers</p>
36	IV-I		CAD/CAM	<p><b>CO1:</b> Understand the basic fundamentals of computer aided design and manufacturing and to learn 2d &amp; 3d transformations of the basic entities like line, circle, ellipse etc.</p> <p><b>CO2:</b> Understand the different geometric modeling techniques like solid modeling, surface modeling, feature based modeling etc.</p> <p><b>CO3:</b> Learn the part programming, importance of group technology, computer aided process planning and computer aided quality control.</p> <p><b>CO4:</b> Describe the use of group technology and Capp for the product development</p> <p><b>CO5:</b> Study the fundamentals and types of inspection methods and equipment</p> <p><b>CO6:</b> Learn the overall configuration and elements of computer integrated</p>
37	IV-I		Finite Element Methods	<p><b>CO1:</b> Apply direct stiffness, Rayleigh-Ritz to solve engineering problems and outline the requirements for convergence.</p> <p><b>CO2:</b> Understand the concepts of Nodes and elements and formulate simple problems into</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				<p>finite elements.</p> <p><b>CO3:</b> Formulate and solve two-dimensional structural problem involving beam and truss.</p> <p><b>CO4:</b> Understand the application of 2D structural problems using CST element and analyze the axis-symmetric problems with triangular elements.</p> <p><b>CO5:</b> Apply FEA software to solve complex structural problems for stress analysis</p> <p><b>CO6:</b> Solve 1D heat conduction and convection heat transfer problems and evaluate the Eigen values and Eigenvectors</p>
38	IV-I		Power Plant Engineering	<p><b>CO1:</b> Knowledge On the steam power plant and their different parts.</p> <p><b>CO2:</b> Understand the diesel and gas turbine power plants.</p> <p><b>CO3:</b> Learn nuclear and hydro power plants.</p> <p><b>CO4:</b> Understand the power plant instrumentation and control</p> <p><b>CO5:</b> Understand the principle of operation and performance of respective prime movers along with their economics and their impact on environment.</p> <p><b>CO6:</b> Knowledge on power plants economics and demand load Factor</p>
39	IV-I		Additive Manufacturing	<p><b>CO1:</b> Knowledge on rapid prototyping and its applications</p> <p><b>CO2:</b> Learn about SOLID-BASED RAPID PROTOTYPING SYSTEMS and its specifications</p> <p><b>CO3:</b> Understand the Selective laser sintering (SLS) and perform the case studies on POWDER BASED RAPID PROTOTYPING SYSTEMS</p> <p><b>CO4:</b> Introduction about rapid tooling (RT) manufacturing of products</p> <p><b>CO5:</b> Perform RAPID PROTOTYPING SOFTWARE'S to improve the manufacturing</p> <p><b>CO6:</b> Analyze the applications of rapid prototyping in day-to-day life</p>
40	IV-I		Advanced Materials	<p><b>CO1:</b> Understand the mechanics of different materials.</p>



# R K COLLEGE OF ENGINEERING

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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				<p><b>CO2:</b> Understand the manufacturing processes of different composite materials.</p> <p><b>CO3:</b> Enhance practical exposure on different manufacturing methods</p> <p><b>CO4:</b> Impart practical exposure on relationship of compliance and stiffness matrix to engineering elastic constants</p> <p><b>CO5:</b> Know the basic concepts of functionally graded materials &amp; shape memory alloy with preparation and properties</p> <p><b>CO6:</b> Study the properties and applications of Nano materials in comparison with the bulk materials.</p>
41	IV-I		CAD/CAM LAB	<p><b>CO1:</b> The student will be able to appreciate the utility of the modeling tools in creating 2D and 3D drawings.</p> <p><b>CO2:</b> Use of these tools for any engineering and real time applications</p> <p><b>CO3:</b> Acquire knowledge on utilizing these tools for a better project in their curriculum as well as they will be prepared to handle industry problems with confidence when it matters to use these tools in their Employment</p>
42	IV-I		Mechatronics Lab	<p><b>CO1:</b> Develop PLC programs for control of traffic lights, water level, lifts and conveyor belts.</p> <p><b>CO2:</b> Simulate and analyze PID controllers for a physical system using MATLAB.</p> <p><b>CO3:</b> Develop pneumatic and hydraulic circuits using Automaton studio.</p>
43	IV-II		Production Planning And Control	<p><b>CO1:</b> Demonstrate the knowledge on basics of production planning and control like objectives and functions, elements</p> <p><b>CO2:</b> Understand the concept and importance of different techniques of fore casting for established and new products.</p> <p><b>CO3:</b> Knowledge of inventory management - functions, costs of inventory and different systems and analysis.</p> <p><b>CO4:</b> Acquire the concept of routing and scheduling and it's sheets, factors affecting</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				<p>procedures, bill of material</p> <p><b>CO5:</b> understand the scheduling policies-techniques and it's standard methods, line balancing and types of planning</p> <p><b>CO6:</b> Understand the Dispatching, activities of dispatcher, follow-up, applications of computer in PPC</p>
44	IV-II		Unconventional Machining Processes	<p><b>CO1:</b> Knowledge about need of nontraditional machining methods and classifications, comparison with traditional machining methods. Study of ultrasonic machining, elements, and mrr process parameters.</p> <p><b>CO2:</b> Study and applications of abrasive jet machining, mechanism of material removal, mrr.</p> <p><b>CO3:</b> Understand electrochemical machining, electrochemical grinding, electrochemical honing and debarring</p> <p><b>CO4:</b> Understand thermal metal removal process by electric discharge machining, electric discharge grinding, mechanism of metal removal, selection of tool electrodes and dielectric fluids.</p> <p><b>CO5:</b> Understand basic principle and theory electron beam machining and laser beam machining, process parameters, efficiency, accuracy and applications.</p> <p><b>CO6:</b> Understand the plasma arc machining, metal removal mechanism, process parameters, efficiency, accuracy and applications, magnetic abrasives finishing, abrasives flow finishing, electro stream drilling.</p>
45	IV-II		Automobile Engineering	<p><b>CO1:</b> Explain about the layout of automobile and different types of automobile engine</p> <p><b>CO2:</b> Knowledge on the Concept of transmission system (clutch, gear box) and different types of wheels and tyres.</p> <p><b>CO3:</b> Basic knowledge of steering geometry and mechanism.</p> <p><b>CO4:</b> Explain about working principle of suspension system. Braking system, electrical systems</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				<p><b>CO5:</b> Gaining the knowledge of engine specifications and safety.</p> <p><b>CO6:</b> Explain about engine emission mechanism , types of pollutants and should know the vehicle trouble shooting</p>
46	IV-II		Non-Destructive Evaluation	<p><b>CO1:</b> Write the theory based understanding of techniques and methods of NDT. Explain about radiography test</p> <p><b>CO2:</b> Describe principles of wave propagation and explain about the ultrasonic test</p> <p><b>CO3:</b> Demonstrate the working principle of liquid penetrate test</p> <p><b>CO4:</b> Explain about principle, working, applications of magnetic practical test</p> <p><b>CO5:</b> Demonstrate the working principle, applications of eddy current test.</p> <p><b>CO6:</b> Apply methods knowledge of NDT to evaluate products of railways, automobiles, aircrafts, and chemical industries.</p>
47	IV-II		Seminar	<p><b>CO1:</b> Argumentative Skills and Critical Thinking</p> <p><b>CO2:</b> Engaging with Big Questions.</p> <p><b>CO3:</b> Questioning, Presentation Skills</p>
48	IV-II		Project	<p><b>CO1:</b> Demonstrate a sound technical knowledge of their selected project topic.</p> <p><b>CO2:</b> Design engineering solutions to complex problems utilizing a systems approach</p> <p><b>CO3:</b> Communicate with engineers and the community at large in written and oral forms.</p>

**Program:**  
**B. Tech. - Electrical & Electronics Engineering**

S.No	Year-Sem	Course Code	Course Name	Course Outcomes After completion of the course student can able to
1	II-I	BSC	Mathematics-Iv (Complex Variables And Statistical	<p><b>CO1:</b> apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic (L3)</p> <p><b>CO2:</b> find the differentiation and integration of</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



			Methods)	<p>complex functions used in engineering problems (L5)</p> <p><b>CO3:</b> make use of the Cauchy residue theorem to evaluate certain integrals (L3)</p> <p><b>CO4:</b> apply discrete and continuous probability distributions (L3)</p> <p><b>CO5:</b> design the components of a classical hypothesis test (L6)</p> <p><b>CO6:</b> infer the statistical inferential methods based on small and large sampling tests (L4)</p>
2	II-I	PCC	Electronic Devices And Circuits	<p><b>CO1:</b> Understand the basic concepts of semiconductor physics.</p> <p><b>CO2:</b> Understand the formation of p-n junction and how it can be used as a p-n junction as diode in different modes of operation.</p> <p><b>CO3:</b> Know the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons.</p> <p><b>CO4:</b> Understand the construction, principle of operation of transistors, BJT and FET with their V-I characteristics in different configurations.</p> <p><b>CO5:</b> Know the need of transistor biasing, various biasing techniques for BJT and FET and stabilization concepts with necessary expressions.</p> <p><b>CO6:</b> Perform the analysis of small signal low frequency transistor amplifier circuits using BJT and FET in different configurations.</p>
3	II-I	PCC	Electrical Circuit Analysis - II	<p><b>CO1:</b> Understand the concepts of balanced and unbalanced three-phase circuits.</p> <p><b>CO2:</b> Know the transient behavior of electrical networks with DC excitations.</p> <p><b>CO3:</b> Learn the transient behavior of electrical networks with AC excitations.</p> <p><b>CO4:</b> Estimate various parameters of a two port network.</p> <p><b>CO5:</b> Understand the significance of filters in electrical networks</p>
4	II-I	PCC	Dc Machines And Transformers	<p><b>CO1:</b> Assimilate the concepts of electromechanical energy conversion.</p> <p><b>CO2:</b> Mitigate the ill-effects of armature reaction and improve commutation in dc machines.</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				<p><b>CO3:</b> Understand the torque production mechanism and control the speed of dc motors.</p> <p><b>CO4:</b> Analyze the performance of single phase transformers.</p> <p><b>CO5:</b> Predetermine regulation, losses and efficiency of single phase transformers.</p> <p><b>CO6:</b> Parallel transformers, control voltages with tap changing methods and achieve three-phase to two-phase transformation.</p>
5	II-I	PCC	Electro Magnetic Fields	<p><b>CO1:</b> Compute electric fields and potentials using Gauss law or solve Laplace's or Poisson's equations for various electric charge distributions.</p> <p><b>CO2:</b> Calculate the capacitance and energy stored in dielectrics.</p> <p><b>CO3:</b> Calculate the magnetic field intensity due to current carrying conductor and understanding the application of Ampere's law, Maxwell's second and third law.</p> <p><b>CO4:</b> Estimate self and mutual inductances and the energy stored in the magnetic field.</p> <p><b>CO5:</b> Understand the concepts of displacement current and Pointing theorem and Pointing vector</p>
6	II-I	PCC	Electrical Circuits Lab	<p><b>CO1:</b> Apply various theorems</p> <p><b>CO2:</b> Determination of self and mutual inductances</p> <p><b>CO3:</b> Two port parameters of a given electric circuits</p> <p><b>CO4:</b> Draw locus diagrams</p> <p><b>CO5:</b> Draw Waveforms and pharos diagrams for lagging and leading networks</p>
7	II-I	PCC	Dc Machines And Transformers Lab	<p><b>CO1:</b> Determine and predetermine the performance of DC machines and Transformers.</p> <p><b>CO2:</b> Control the speed of DC motor.</p> <p><b>CO3:</b> Obtain three phase to two phase transformation.</p>
8	II-I	PCC	Electronic Devices And Circuits Lab	<p><b>CO1:</b> Analyze the characteristics of diodes, transistors and other devices</p> <p><b>CO2:</b> Design and implement the rectifier circuits, SCR and UJT in the hardware circuits.</p> <p><b>CO3:</b> Design the biasing and amplifiers of BJT and FET amplifiers</p> <p><b>CO4:</b> Measure electrical quantities using CRO in the</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				experimentation.
9	II-I	SC	Design Of Electrical Circuits Using Engineering Software Tools	CO1: Write the MATLAB programs to simulate the electrical circuit problems
				CO2: Simulate various circuits for electrical parameters
				CO3: Simulate various wave form for determination of wave form parameters
				CO4: Simulate RLC series and parallel resonance circuits for resonant parameters
				CO5: Simulate magnetic circuits for determination of self and mutual inductances
10	II-II	MC	Professional Ethics & Human Values	CO1: Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field
				CO2: Identify the multiple ethical interests at stake in a real-world situation or practice.
				CO3: Articulate what makes a particular course of action ethically defensible
				CO4: Assess their own ethical values and the social context of problems
				CO5: Identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective presentation of data, and the treatment of human subjects
				CO6: Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work
				CO7: Integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research
11	II-II	ESC	Python Programming	CO1: Develop essential programming skills in computer programming concepts like data types, containers
				CO2: Apply the basics of programming in the Python language
				CO3: Solve coding tasks related conditional execution, loops
				CO4: Solve coding tasks related to the fundamental notions in object- oriented programming



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				CO5: Solve coding tasks related to the techniques used in object-oriented programming
12	II-II	PCC	Digital Electronics	CO1: Classify different number systems and apply to generate various codes.
				CO2: Use the concept of Boolean algebra in minimization of switching functions
				CO3: Design different types of combinational logic circuits.
				CO4: Apply knowledge of flip-flops in designing of Registers and counters
				CO5: The operation and design methodology for synchronous sequential circuits and algorithmic state machines.
13	II-II	PCC	Power Systems - I	CO1: Identify the different components of thermal power plants.
				CO2: Identify the different components of nuclear Power plants.
				CO3: Identify the different components of air and gas insulated substations.
				CO4: Identify single core and three core cables with different insulating materials.
				CO5: Analyze the different economic factors of power generation and tariffs.
14	II-II	PCC	Induction And Synchronous Machines	CO1: Explain the operation and performance of three phase induction motor.
				CO2: Analyze the torque-speed relation, performance of induction motor and induction generator.
				CO3: Implement the starting of single phase induction motors.
				CO4: Develop winding design and predetermine the regulation of synchronous generators.
				CO5: Explain hunting phenomenon, implement methods of starting and correction of power factor with synchronous motor.
15	II-II	HSMC	Managerial Economics & Financial Analysis	CO1: The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product.
				CO2: The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				<p><b>CO3:</b> The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units.</p> <p><b>CO4:</b> The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis.</p> <p><b>CO5:</b> The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.</p>
16	II-II	ESC	Python Programming Lab	<p><b>CO1:</b> Write, Test and Debug Python Programs</p> <p><b>CO2:</b> Use Conditionals and Loops for Python Programs</p> <p><b>CO3:</b> Use functions and represent Compound data using Lists, Tuples and Dictionaries</p> <p><b>CO4:</b> Use various applications using python</p>
17	II-II	PCC	Induction And Synchronous Machines Lab	<p><b>CO1:</b> Assess the performance of single phase and three phase induction motors.</p> <p><b>CO2:</b> Control the speed of three phase induction motor.</p> <p><b>CO3:</b> Predetermine the regulation of three-phase alternator by various methods.</p> <p><b>CO4:</b> Find the <math>X_d/X_q</math> ratio of alternator and asses the performance of three-phase synchronous motor.</p>
18	II-II	PCC	Digital Electronics Lab	<p><b>CO1:</b> Learn the basics of gates, filp-flops and counters.</p> <p><b>CO2:</b> Construct basic combinational circuits and verify their functionalities</p> <p><b>CO3:</b> Apply the design procedures to design basic sequential circuits</p> <p><b>CO4:</b> To understand the basic digital circuits and to verify their operation</p> <p><b>CO5:</b> Apply Boolean laws to simplify the digital circuits.</p>
18	II-II	PCC	Skill Oriented Course IOT Applications Of Electrical Engineering	<p><b>CO1:</b> Apply various technologies of Internet of Things to real time applications.</p> <p><b>CO2:</b> Apply various communication technologies used in the Internet of Things.</p> <p><b>CO3:</b> Connect the devices using web and internet</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				in the IoT environment. <b>CO4:</b> Implement IoT to study Smart Home, Smart city, etc.
19	III-I		Power Systems-II	<b>CO1:</b> Understand parameters of various types of transmission lines during different operating conditions. <b>CO2:</b> Understand the performance of short and medium transmission lines. <b>CO3:</b> Understand travelling waves on transmission lines. <b>CO4:</b> Understand various factors related to charged transmission lines. <b>CO5:</b> Understand sag/tension of transmission lines and performance of line insulators.
20	III-I		Power Electronics	<b>CO1:</b> Explain the characteristics of various power semiconductor devices and analyze the static and dynamic characteristics of SCR's. <b>CO2:</b> Design firing circuits for SCR. <b>CO3:</b> Explain the operation of single phase full-wave converters and analyze harmonics in the input current. <b>CO4:</b> Explain the operation of three phase full-wave converters. <b>CO5:</b> Analyze the operation of different types of DC-DC converters. Explain the operation of inverters and application of PWM techniques for voltage control and harmonic mitigation. Analyze the operation of AC-AC regulators.
21	III-I		Linear IC Applications	<b>CO1:</b> Design circuits using operational amplifiers for various applications. <b>CO2:</b> Analyze and design amplifiers and active filters using Op-amp. <b>CO3:</b> Diagnose and trouble-shoot linear electronic circuits. <b>CO4:</b> Understand the gain-bandwidth concept and frequency response of the amplifier configurations. <b>CO5:</b> Understand thoroughly the operational amplifiers with linear integrated circuits.
22	III-I		Digital Signal Processing	<b>CO1:</b> Understand the concepts of signal processing & transforms. <b>CO2:</b> Appraise the Fast Fourier algorithm.



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				CO3: Design FIR and IIR filters.
				CO4: Appreciate the concepts of MultiMate signal processing.
23	III-I		Microprocessors And Microcontrollers	CO1: Understand the Microprocessor capability in general and explore the evaluation of microprocessors.
				CO2: Understand the addressing modes of Microprocessors
				CO3: Understand the Microcontroller capability.
				CO4: Program Microprocessors and Microcontrollers.
				CO5: Interface Microprocessors and Microcontrollers with other electronic devices. Develop cyber physical systems
24	III-I		Electrical Machines – II Laboratory	CO1: Assess the performance of single phase and three phase induction motors.
				CO2: Control the speed of three phase induction motor.
				CO3: Predetermine the regulation of three-phase alternator by various methods.
				CO4: Find the $X_d/X_q$ ratio of alternator and asses the performance of three-phase synchronous motor.
25	III-I		Control Systems Laboratory	CO1: Analyze the performance and working Magnetic amplifier, D.C and A.C. servo motors and synchros.
				CO2: Design P,PI,PD and PID controllers
				CO3: Design lag, lead and lag-lead compensators
				CO4: Control the temperature using PID controller
				CO5: Determine the transfer function of D.C Motor
				CO6: Control the performance of D.C and A.C Servo Motor.
				CO7: Test the controllability and observability.
CO8: Judge the stability in time and frequency domain.				
26	III-I		Electrical Measurements & Instrumentation Laboratory	CO1: Measure the electrical parameters voltage, current, power, energy and electrical characteristics of resistance, inductance and capacitance.
				CO2: Known the characteristics of transducers.
				CO 3: Measure the strains, frequency and phase difference.



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



27	III-I	Socially Relevant Projects	CO1: The student(s) are be able to provide a solutions the technological problems of society
			CO2: The student(s) is able suggest technological changes which suits current needs of society
			CO3: The student(s) are able to explain new technologies available for problems of the society.
29	III-II	Electric Drives	CO1: Explain the fundamentals of electric drive and different electric braking methods.
			CO2: Analyze the operation of three phase converter fed dc motors and four quadrant operations of dc motors using dual converters.
			CO3: Describe the converter control of dc motors in various quadrants of operation
			CO4: Know the concept of speed control of induction motor by using AC voltage controllers and voltage source inverters.
			CO5: Differentiate the stator side control and rotor side control of three phase induction motor; explain the speed control mechanism of synchronous motors.
30	III-II	Power System Analysis	CO1: Draw impedance diagram for a power system network and to understand per unit quantities.
			CO2: Form a Ybus and Zbus for a power system networks.
			CO3: Understand the load flow solution of a power system using different methods.
			CO4: Find the fault currents for all types faults to provide data for the design of protective devices.
			CO5: Find the sequence components of currents for unbalanced power system network.
			CO6: Analyze the steady state, transient and dynamic stability concepts of a power system.
31	III-II	Data Structures	CO1: Data structures concepts with arrays, stacks, queues.
			CO2: Linked lists for stacks, queues and for other applications.
			CO3: Traversal methods in the Trees.
			CO4: Various algorithms available for the graphs.
			CO5: Sorting and searching in the data retrieval applications.
32	III-II	Digital Control	CO1: Learn the advantages of discrete time control



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



			Systems	<p>systems and the “know how” of various associated accessories.</p> <p><b>CO2:</b> Understand z-transformations and their role in the mathematical analysis of different systems (like Laplace transforms in analog systems).</p> <p><b>CO3:</b> learn the stability criterion for digital systems and</p> <p><b>CO4:</b> Methods adopted for testing the same are explained.</p> <p><b>CO5:</b> Understand the conventional and state space methods of design are also introduced.</p>
33	III-II		Digital IC Applications	<p><b>CO1:</b> Understand the structure of commercially available digital integrated circuit families.</p> <p><b>CO2:</b> Learn the IEEE Standard 1076 Hardware Description Language (VHDL).</p> <p><b>CO3:</b> Model complex digital systems at several levels of abstractions, behavioral, structural, simulation, synthesis and rapid system prototyping.</p> <p><b>CO4:</b> Analyze basic digital circuits with combinatorial and sequential logic circuits using VHDL.</p> <p><b>CO5:</b> Design basic digital circuits with combinatorial and sequential logic circuits using VHDL.</p>
34	III-II		Internet Of Things Applications To Electrical Engineering	<p><b>CO1:</b> Know the various fundamentals, architectures and technologies of Internet of Things.</p> <p><b>CO2:</b> Understand various communication technologies used in the Internet of Things.</p> <p><b>CO3:</b> Understand the various device connectivity methods using web and internet in the IoT environment.</p> <p><b>CO4:</b> Understand various data acquisition methods, data handling using cloud for IoT applications.</p> <p><b>CO5:</b> know the implementation of IoT from the case studies like Smart Home, Smart city, etc.</p>
35	III-II		Power Electronics Laboratory	<p><b>CO1:</b> Study the characteristics of various power electronic devices.</p> <p><b>CO2:</b> Analyze the performance of single-phase and three-phase full-wave bridge converters with both resistive and inductive loads.</p> <p><b>CO3:</b> Understand the operation of single phase AC voltage regulator with resistive and inductive loads.</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				<p><b>CO4:</b> Understand the working of Buck converter, Boost converter.</p> <p><b>CO5:</b> Understand the working of single-phase square wave inverter and PWM inverter</p>
36	III-II		Micro Processors And Micro Controllers Lab	<p><b>CO1:</b> Write assembly language program using 8086 micro based on arithmetic, logical, and shift operations.</p> <p><b>CO2:</b> Interface 8086 with I/O and other devices..</p> <p><b>CO 3:</b> Do parallel and serial communication using 8051 &amp; PIC 18 micro controllers</p>
37	IV-I		Utilization Of Electrical Energy	<p><b>CO1:</b> Able to identify a suitable motor for electric drives and industrial applications.</p> <p><b>CO2:</b> Able to identify most appropriate heating or welding techniques for suitable applications.</p> <p><b>CO3:</b> Able to understand various level of luminosity produced by different illuminating sources.</p> <p><b>CO4:</b> Able to estimate the illumination levels produced by various sources and recommend the most efficient illuminating sources and should be able to design different lighting systems by taking inputs and constraints in view.</p> <p><b>CO5:</b> Able to determine the speed/time characteristics of different types of traction motors.</p> <p><b>CO6:</b> Able to estimate energy consumption levels at various modes of operation.</p>
38	IV-I		Linear IC Applications	<p><b>CO1:</b> Design circuits using operational amplifiers for various applications.</p> <p><b>CO2:</b> Analyze and design amplifiers and active filters using Op-amp.</p> <p><b>CO3:</b> Diagnose and trouble-shoot linear electronic circuits.</p> <p><b>CO4:</b> Understand the gain-bandwidth concept of the amplifier configurations.</p> <p><b>CO5:</b> Understand the frequency response of the amplifier configurations.</p> <p><b>CO6:</b> Understand thoroughly the operational amplifiers with linear integrated circuits.</p>
39	IV-I		Power System Operation And Control	<p><b>CO1:</b> Able to compute optimal scheduling of Generators.</p> <p><b>CO2:</b> Able to understand hydrothermal scheduling.</p>



# R K COLLEGE OF ENGINEERING

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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				<p><b>CO3:</b> Understand the unit commitment problem.</p> <p><b>CO4:</b> Able to understand importance of the frequency.</p> <p><b>CO5:</b> Understand importance of PID controllers in single area and two area systems.</p> <p><b>CO6:</b> Will understand reactive power control and compensation for transmission line.</p>
40	IV-I		Switchgear And Protection	<p><b>CO1:</b> Able to understand the principles of arc interruption for application to high voltage circuit breakers of air, oil, vacuum, SF6 gas type.</p> <p><b>CO2:</b> Ability to understand the working principle and operation of different types of electromagnetic protective relays.</p> <p><b>CO3:</b> Students acquire knowledge of faults and protective schemes for high power generator and transformers.</p> <p><b>CO4:</b> Improves the ability to understand various types of protective schemes used for feeders and bus bar protection.</p> <p><b>CO5:</b> Able to understand different types of static relays and their applications.</p> <p><b>CO6:</b> Able to understand different types of over voltages and protective schemes required for insulation co-ordination.</p>
41	IV-I		Instrumentation (Elective – I)	<p><b>CO1:</b> Able to represent various types of signals.</p> <p><b>CO2:</b> Acquire proper knowledge to use various types of Transducers</p> <p><b>CO3:</b> Able to monitor and measure various parameters such as strain, velocity, temperature, pressure etc.</p> <p><b>CO4:</b> Acquire proper knowledge and working principle of various types of digital voltmeters.</p> <p><b>CO5:</b> Able to measure various parameter like phase and frequency of a signal with the help of CRO.</p> <p><b>CO6:</b> Acquire proper knowledge and able to handle various types of signal analyzers.</p>
42	IV-I		Special Electrical Machines (Elective – II)	<p><b>CO1:</b> Able to represent various types of signals.</p> <p><b>CO2:</b> Acquire proper knowledge to use various types of Transducers</p> <p><b>CO3:</b> Able to monitor and measure various parameters such as strain, velocity, temperature,</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				pressure etc.
				<b>CO4:</b> Acquire proper knowledge and working principle of various types of digital voltmeters.
				<b>CO5:</b> Able to measure various parameter like phase and frequency of a signal with the help of CRO.
				<b>CO6:</b> Acquire proper knowledge and able to handle various types of signal analyzers.
43	IV-I		Electrical Simulation Lab	<b>CO1:</b> Able to simulate integrator circuit, differentiator circuit, and PWM inverter.
				<b>CO2:</b> Able to simulate Boost converter and PWM inverter.
				<b>CO3:</b> Able to simulate Buck converter, full convertor and PWM inverter.
				<b>CO4:</b> Able to simulate integrator full convertor and PWM inverter.
				<b>CO5:</b> Able to simulate transmission line by incorporating line, load and transformer models
				<b>CO6:</b> Able to perform transient analysis of RLC circuit and single machine connected to infinite bus(SMIB).
44	IV-I		Power Systems Lab	<b>CO1:</b> The student is able to determine the parameters of various power system components which are frequently occur in power system studies.
				<b>CO 2:</b> Execute energy management systems functions at load dispatch center.
45	IV-II		Digital Control Systems	<b>CO1:</b> The students learn the advantages of discrete time control systems and the “know how” of various associated accessories.
				<b>CO2:</b> The learner understand z-transformations.
				<b>CO3:</b> The learner understand z-transformations role in the mathematical analysis of different systems (like Laplace transforms in analog systems).
				<b>CO4:</b> The stability criterion for digital systems are explained.
				<b>CO5:</b> The methods adopted for testing digital systems are explained.
				<b>CO6:</b> Finally, the conventional and state space methods of design are also introduced.
46	IV-II		H.V.D.C. Transmission	<b>CO1:</b> Learn different types of HVDC levels and basic concepts
				<b>CO2:</b> Know the operation of converters



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				<p><b>CO3:</b> Acquire control concept of reactive power control and AC/DC load flow.</p> <p><b>CO4:</b> Understand converter faults, protection and harmonic effects</p> <p><b>CO5:</b> Design low pass filters</p> <p><b>CO6:</b> Design high pass filters</p>
47	IV-II		Electrical Distribution Systems	<p><b>CO1:</b> Able to understand various factors of distribution system.</p> <p><b>CO2:</b> Able to design the substation and feeders.</p> <p><b>CO3:</b> Able to determine the voltage drop and power loss</p> <p><b>CO4:</b> Able to understand the protection and its coordination.</p> <p><b>CO5:</b> Able to understand the effect of compensation for pf improvement.</p> <p><b>CO6:</b> Able to understand the effect of voltage control</p>
48	IV-II		Flexible Alternating Current Transmission Systems	<p><b>CO1:</b> Understand power flow control in transmission lines using FACTS controllers.</p> <p><b>CO2:</b> Explain operation and control of voltage source converter.</p> <p><b>CO3:</b> Analyze compensation methods to improve stability and reduce power oscillations in the transmission lines.</p> <p><b>CO4:</b> Explain the method of shunt compensation using static VAR compensators.</p> <p><b>CO5:</b> Understand the methods of compensations using series compensators.</p> <p><b>CO6:</b> Explain operation of Unified Power Flow Controller (UPFC).</p>
49	IV-II		Seminar	<p><b>CO1:</b> Present information on new problems, identify and define the appropriate requirements for its solutions.</p> <p><b>CO2:</b> Present the impact of engineering solutions.</p> <p><b>CO3:</b> Present how to complete a common goal</p>
50	IV-II		Project	<p><b>CO1:</b> Analyze new problems, identify and define the appropriate requirements for its solutions.</p> <p><b>CO2:</b> Understand of the impact of engineering solutions.</p> <p><b>CO3:</b> Understand team work to complete a common goal</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



**Program:**  
**B. Tech. - Civil Engineering**

S.No	Year-Sem	Course Code	Course Name	Course Outcomes After completion of the course student can able to
1	II-I	BSC301	Mathematics -III	<b>CO1:</b> interpret the physical meaning of different operators such as gradient, curl and divergence
				<b>CO2:</b> estimate the work done against a field, circulation and flux using vector calculus
				<b>CO3:</b> apply the Laplace transform for solving differential equations
				<b>CO4:</b> find or compute the Fourier series of periodic signals
				<b>CO5:</b> know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms
				<b>CO6:</b> identify solution methods for partial differential equations that model physical processes
2	II-I	PCC301	Strength of materials-I	<b>CO1:</b> The student will be able to understand the basic materials behavior under the influence of different external loading conditions and the support conditions
				<b>CO2:</b> The student will be able to draw the diagrams indicating the variation of the key performance features like bending moment and shear forces
				<b>CO3:</b> The student will have knowledge of bending concepts and calculation of section modulus and for determination of stresses developed in the beams and deflections due to various loading conditions
				<b>CO4:</b> The student will be able to assess stresses across section of the thin and thick cylinders to arrive at optimum sections to withstand the internal pressure using Lamé's equation
3	II-I	PCC302	Fluid Mechanics	<b>CO1:</b> Understand the various properties of fluids and their influence on fluid motion and analyses a



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				<p>variety of problems in fluid statics and dynamics</p> <p><b>CO2:</b> Calculate the forces that act on submerged planes and curves</p> <p><b>CO3:</b> Ability to analyses various types of fluid flows</p> <p><b>CO4:</b> Apply the integral forms of the three fundamental laws of fluid mechanics to turbulent and laminar flow through pipes and ducts in order to predict relevant pressures, velocities and forces.</p> <p><b>CO5:</b> Able Measure the quantities of fluid flowing in pipes, tanks and channels.</p>
4	II-I	PCC302	Surveying and Geometrics	<p><b>CO1:</b> Apply the knowledge to calculate angles, distances and levels</p> <p><b>CO2:</b> Identify data collection methods and prepare field notes</p> <p><b>CO3:</b> Understand the working principles of survey instruments, measurement errors and corrective measures</p> <p><b>CO4:</b> Interpret survey data and compute areas and volumes, levels by different type of equipment and relate the knowledge to the modern equipment and methodologies</p>
5	II-I	PCC303	Highway Engineering	<p><b>CO1:</b> Plan highway network for a given area.</p> <p><b>CO2:</b> Determine Highway alignment and design highway geometrics.</p> <p><b>CO3:</b> Design Intersections and prepare traffic management plans</p> <p><b>CO4:</b> Judge suitability of pavement materials and design flexible and rigid pavements</p>
6	II-I	PCC304	Concrete Technology Lab	<p><b>CO1:</b> Determine consistency and fineness of cement</p> <p><b>CO2:</b> Determine setting times of cement</p> <p><b>CO3:</b> Determine specific gravity and soundness of cement</p> <p><b>CO4:</b> Determine compressive strength of cement</p> <p><b>CO5:</b> Determine workability of cement concrete by compaction factor, slump and Vee – Beetests</p> <p><b>CO6:</b> Determine specific gravity of coarse aggregate and fine aggregate by Sieve analysis.</p> <p><b>CO7:</b> Determine flakiness and elongation index of aggregates</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				CO8: Determine bulking of sand.
				CO9: Understand non-destructive testing procedures on concrete
7	II-I	PCC305	Highway Engineering Lab	CO1: Test aggregates and judge the suitability of materials for the road construction
				CO2: Test the given bitumen samples and judge their suitability for the road construction.
				CO3: Obtain the optimum bitumen content for Bituminous Concrete
				CO4: Determine the traffic volume, speed and parking characteristics.
				CO5: Draw highway cross sections and intersections
8	II-II	PC401	Complex Variables and Statistical Methods	CO1: apply Cauchy-Riemann equations to complex functions in order to determine whether a given continuous function is analytic
				CO2: find the differentiation and integration of complex functions used in engineering problems
				CO3: make use of the Cauchy residue theorem to evaluate certain integrals
				CO4: apply discrete and continuous probability distributions
				CO5: design the components of a classical hypothesis test (L6)
				CO6: infer the statistical inferential methods based on small and large sampling tests
9	II-II	PC402	Strength of Materials -II	CO1: The student will be able to understand the basic concepts of Principal stresses developed in a member when it is subjected to stresses along different axes and design the sections.
				CO2: The student can assess stresses in different engineering applications like shafts, springs, columns and struts subjected to different loading conditions
10	II-II	ES401	Hydraulics and Hydraulic Machinery	CO1: Solve uniform and non-uniform open channel flow problems.
				CO2: Apply the principals of dimensional analysis and similitude in hydraulic model testing.
				CO3: Understand the working principles of various hydraulic machineries and pumps



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



11	II-II	PC403	Environmental Engineering	CO1: Select a source based on quality and quantity and Estimate design population and water demand
				CO2: Design a water treatment plant for a village/city
				CO3: Design a sewer by estimating DWF and Strom water flow and plumbing system for buildings
				CO4: Design a Sewage Treatment Plant for a town/city
12	II-II	PC404	Managerial Economics & Financial Analysis	CO1: The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product
				CO2: The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.
				CO3: The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units.
				CO4: The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis
13	II-II	PC405	Environmental Engineering Lab	CO1: Estimate some important characteristics of water, wastewater and soil in the laboratory
				CO2: Draw some conclusion and decide whether the water is suitable for Drinking/Construction / Agriculture/ Industry.
				CO3: Estimate Chloride, EC and Salinity of Soil and suggest their suitability for Construction/Agriculture
				CO4: Estimation of the strength of the sewage in terms of BOD and COD and Decide whether the water body is polluted or not with reference to the stated parameters in the list of experiments
				CO5: Demonstration of various instruments used in testing of water and soil and study of Drinking



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				water standards, WHO guidelines, Effluent standards and standards for Construction/ Agriculture/ Industry
14	III-I	PC501	Structural Analysis	<b>CO1:</b> Distinguish between the determinate and indeterminate structures.
				<b>CO2:</b> Identify the behavior of structures due to the expected loads, including the moving loads, acting on the structure.
				<b>CO3:</b> Estimate the bending moment and shear forces in beams for different fixity conditions.
				<b>CO4:</b> Analyze the continuous beams using various methods -, three moment method, slope deflection method, energy theorems.
				<b>CO5:</b> Draw the influence line diagrams for various types of moving loads on beams/bridges.
				<b>CO6:</b> Analyze the loads in Pratt and Warren trusses when loads of different types and spans are passing over the truss
15	III-I	PC502	Concrete Technology	<b>CO1:</b> understand basic concepts of concrete.
				<b>CO2:</b> realize importance of quality of concrete
				<b>CO3:</b> familiarize basic ingredients of concrete and their role in concrete and their behaviour in the field
				<b>CO4:</b> test fresh concrete properties and hardened concrete properties.
				<b>CO5:</b> evaluate ingredients of concrete through lab tests. design concrete mix by IS method
				<b>CO6:</b> familiarize basic concepts of special concrete and their production and applications. understand the behavior of concrete in various environments
16	III-I	PC503	Water Resources Engineering - I	<b>CO1:</b> be able to quantify major hydrologic components and apply key concepts to several practical areas of engineering hydrology and related design aspects
				<b>CO2:</b> develop Intensity-Duration-Frequency and Depth-Area Duration curves to design hydraulic structures.
				<b>CO3:</b> ability to develop design storms and carry out frequency analysis .
				<b>CO4:</b> be able to determine storage capacity and life of reservoirs and develop unit hydrograph and



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				synthetic hydrograph.
				<b>CO5:</b> be able to estimate flood magnitude and carry out flood routing.
				<b>CO6:</b> be able to determine aquifer parameters and yield of wells.
				<b>CO7:</b> Ability to develop the hydrological models
17	III-I	PC504	Environmental Engineering - II	<b>CO1:</b> Plan and design the sewerage systems by estimating the flow
				<b>CO2:</b> Estimation of BOD and COD and Suggest a suitable disposal method with respect to effluent standards, and Identify the critical point of pollution in a river for a specific amount of pollutant disposal into the river
				<b>CO3:</b> Analyze sewage and design suitable treatment system for sewage treatment for a village/City.
				<b>CO4:</b> Design of sewage treatment systems like Septic tank soak pit system and FAB reactor for buildings and understanding tertiary treatment of sewage.
				<b>CO5:</b> Design of Plumbing for an apartment, Gated community or Hotels or Individual houses and Select the appropriate appurtenances in the sewerage systems
18	III-I	PE501	Environmental Impact Assessment	<b>CO1:</b> Prepare EMP, EIS and EIA report, estimate cost benefit ratio of a project
				<b>CO2:</b> election of an appropriate EIA methodology
				<b>CO3:</b> Evaluation of impacts on environment
				<b>CO4:</b> Evaluation of risk assessment
				<b>CO5:</b> now the latest acts and guidelines of MoEF& CC
19	III-I	OE501	Waste Water Treatment	<b>CO1:</b> Know the quality and quantity of water for various industries and Advanced water treatment methods
				<b>CO2:</b> Learn the common methods of treatment of wastewaters and Biological treatment methods
				<b>CO3:</b> Study of methods to reduce impacts of disposal of wasters into environment and CETPs.
				<b>CO4:</b> Study of methods of treatment of wastewaters from specific industries like steel plants, refineries, and power plants, that imply



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				biological treatment methods <b>CO5:</b> Study of methods of treatment of wastewaters from industries like Aqua, dairy, sugar plants, and distilleries that imply biological treatment methods
20	III-I	PC506	Concrete Technology Lab	<b>CO1:</b> Determine consistency and fineness of cement <b>CO2:</b> Determine setting times of cement <b>CO3:</b> Determine specific gravity and soundness of cement. <b>CO4:</b> Determine compressive strength of cement <b>CO5:</b> Determine workability of cement concrete by compaction factor, slump and Vee – Beetests <b>CO6:</b> Determine specific gravity of coarse aggregate and fine aggregate by Sieve analysis <b>CO7:</b> Determine flakiness and elongation index of aggregates <b>CO8:</b> Determine bulking of sand. <b>CO9:</b> Understand non-destructive testing procedures on concrete
21	III-II	PC601	Design And Drawing Of Reinforced Concrete Structures	<b>CO1:</b> Work on different types of design methods <b>CO2:</b> Carryout analysis and design of flexural members and detailing <b>CO3:</b> Design structures subjected to shear, bond and torsion • Design different type of compression members and footings <b>CO4:</b> Design different type of compression members and footings
22	III-II	PC602	Water Resources Engineering – II	<b>CO1:</b> be able to estimate irrigation water requirements ability to design irrigation canals and canal network <b>CO2:</b> plan an irrigation system <b>CO3:</b> design irrigation canal structures <b>CO4:</b> plan and design diversion head works <b>CO5:</b> analyses stability of gravity and earth dams <b>CO6:</b> design ogee spillways and energy dissipation work
				<b>CO1:</b> The student must know the definition of the various quantities related to soil mechanics and establish their inter-relationships. <b>CO2:</b> The student should be able to know the



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



23	III-II	PC603	Geotechnical Engineering - I	methods of determination of the various index properties of the soils and classify the soils
				<b>CO3:</b> The student should be able to know the importance of the different engineering properties of the soil such as compaction, permeability, consolidation and shear strength and determine them in the laboratory.
				<b>CO4:</b> The student should be able to apply the above concepts in day-to-day civil engineering practice
24	III-II	HS601	Managerial Economics And Financial Analysis	<b>CO1:</b> The Learner is equipped with the knowledge of estimating the Demand and demand elasticity's for a product.
				<b>CO2:</b> The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs..
				<b>CO3:</b> The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units
				<b>CO4:</b> The Learner is able to prepare Financial Statements and the usage of various accounting tools for Analysis.
25	III-II	PE601	Pre-stressed Concrete	<b>CO1:</b> Understand different methods of prestressing
				<b>CO2:</b> Estimate effective prestress including short and long-term losses
				<b>CO3:</b> Analyze and design prestressed concrete beams under flexure and shear
				<b>CO4:</b> Understand the relevant IS Code provisions for prestressed concrete
26	III-II	OC601	Project Management	<b>CO1:</b> appreciate the importance of construction planning
				<b>CO2:</b> understand the functioning of various earth moving equipment
				<b>CO3:</b> know the methods of production of aggregate products and concreting
				<b>CO4:</b> apply the gained knowledge to project



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				management and construction techniques
27	III-II	PC604	CAD LAB	<b>CO1:</b> Model the geometry of real-world structure Represent the physical model of structural element/structure
				<b>CO2:</b> Perform analysis
				<b>CO3:</b> Interpret from the Post processing results
				<b>CO4:</b> Design the structural elements and a system as per IS Codes
28	III-II	PC605	Environmental Engineering Lab	<b>CO1:</b> Estimate some important characteristics of water, wastewater and soil in the laboratory
				<b>CO2:</b> Draw some conclusion and decide whether the water is suitable for Drinking/Construction / Agriculture/ Industry.
				<b>CO3:</b> Estimate Chloride, EC and Salinity of Soil and suggest their suitability for Construction/Agriculture
				<b>CO4:</b> Estimation of the strength of the sewage in terms of BOD and COD and Decide whether the water body is polluted or not with reference to the stated parameters in the list of experiments
				<b>CO5:</b> Demonstration of various instruments used in testing of water and soil and study of Drinking water standards, WHO guidelines, Effluent standards and standards for Construction/ Agriculture/ Industry
29	IV-I		Environmental Engineering -II	<b>CO1:</b> Plan and design the sewerage systems
				<b>CO2:</b> Select the appropriate appurtenances in the sewerage systems
				<b>CO3:</b> Analyze sewage and suggest and design suitable treatment system for sewage treatment
				<b>CO4:</b> Identify the critical point of pollution in a river for a specific amount of pollutant disposal into the river
				<b>CO5:</b> Suggest a suitable disposal method with respect to effluent standards.
30	IV-I		Water Resources Engineering-II	<b>CO1:</b> Estimate irrigation water requirements
				<b>CO2:</b> Design irrigation canals and canal network
				<b>CO3:</b> Plan an irrigation system
				<b>CO4:</b> Design irrigation canal structures
				<b>CO5:</b> Plan and design diversion head works
				<b>CO6:</b> Analyses stability of gravity and earth dams



# R K COLLEGE OF ENGINEERING

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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				CO7: Design ogee spillways and energy dissipation work
31	IV-I	Geotechnical Engineering – II	CO1: The student must be able to understand the various types of shallow foundations and decide on their location based on soil characteristics.	
			CO2: The student must be able to compute the magnitude of foundation settlement to decide the size of the foundation.	
			CO3: the student must be able to use the field test data and arrive at the bearing capacity.	
			CO4: The student must be able to design Piles based on the principles of bearing capacity	
32	IV-I	Remote Sensing And GIS Applications	CO1: be familiar with ground, air and satellite-based sensor platforms.	
			CO2: interpret the aerial photographs and satellite imageries	
			CO3: create and input spatial data for GIS applications	
			CO4: apply RS and GIS concepts in water resources engineering	
			CO5: applications of various satellite data	
33	IV-I	Air Pollution And Control	CO1: Decide the ambient air quality based on the analysis of air pollutants	
			CO2: Design particulate and gaseous control measures for an industry	
			CO3: Judge the plume behavior in a prevailing environmental condition	
			CO4: Estimate carbon credits for various day to day activity	
34	IV-I	Environmental Impact Assessment And Management	CO1: Prepare EMP, EIS, and EIA report	
			CO2: Identify the risks and impacts of a project	
			CO3: Selection of an appropriate EIA methodology	
			CO4: Evaluation the EIA report	
			CO5: Estimate the cost benefit ratio of a project	
			CO6: Know the role of stakeholder and public hearing in the preparation of EIA	
35	IV-I	GIS & CAD LAB	CO1: work comfortably on GIS software	
			CO2: digitize and create thematic map and extract important features	
			CO3: develop digital elevation model	



# R K COLLEGE OF ENGINEERING

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 (An ISO 9001:2015 Certified Institution)  
 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				<p><b>CO4:</b> use structural analysis software to analyze and design 2D and 3D frames</p> <p><b>CO5:</b> design and analyze retaining wall and simple towers using CADD software</p>
36	IV-I		Irrigation Design And Drawing	<p><b>CO1:</b> To design irrigation structures like Surplus weir</p> <p><b>CO2:</b> To design irrigation structures Tank sluice with a tower head</p> <p><b>CO3:</b> To design irrigation structures Canal drop-Notch type</p> <p><b>CO4:</b> To design irrigation structures Canal regulator and Under tunnel</p>
37	IV-II		Estimation Specification & Contracts	<p><b>CO1:</b> The student should be able to determine the quantities of different components of buildings</p> <p><b>CO2:</b> The student should be in a position to find the cost of various building components.</p> <p><b>CO3:</b> The student should be capable of finalizing the value of structures.</p>
38	IV-II		Construction Technology And Management	<p><b>CO1:</b> appreciate the importance of construction planning</p> <p><b>CO2:</b> understand the functioning of various earth moving equipment</p> <p><b>CO3:</b> know the methods of production of aggregate products and concreting and usage of machinery required for the works</p> <p><b>CO4:</b> apply the gained knowledge to project management and construction techniques</p>
39	IV-II		Prestressed Concrete	<p><b>CO1:</b> Understand the different methods of prestressing</p> <p><b>CO2:</b> Estimate effective prestress including the short- and long-term losses</p> <p><b>CO3:</b> Analyze and design prestressed concrete beams under flexure and shear</p> <p><b>CO4:</b> Understand the relevant IS Codal provisions for prestressed concrete</p>
40	IV-II		Solid And Hazardous Waste Management	<p><b>CO1:</b> Design the collection systems of solid waste of a town</p> <p><b>CO2:</b> Design treatment of municipal solid waste and landfill</p> <p><b>CO3:</b> Know the criteria for selection of landfill</p> <p><b>CO4:</b> Characterize the solid waste and design a</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				composting facility
				CO5: Know the Method of treatment and disposal of Hazardous wastes
41	IV-II		Project Work	CO1: Apply all levels of Engineering knowledge in solving the Engineering problems.
				CO2: Work together with team spirit.
				CO3: Use Civil Engineering software at least one.

**Program:**  
**IB.Tech.**

S.No	Year-Sem	Course Code	Course Name	Course Outcomes After completion of the course student can able to
1	I-I	BS1101	M-I	CO1: Utilize mean value theorems to real life problems
				CO2: Solve the differential equations related to various engineering fields
				CO3: Familiarize with functions of several variables which is useful in optimization
				CO4: Apply double integration techniques in evaluating areas bounded by region
				CO5: Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems
2	I-I	HS1101	English	CO1: understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information
				CO2: ask and answer general questions on familiar topics and introduce oneself/others
				CO3: employ suitable strategies for skimming and scanning to get the generalized of a text and locate specific information
				CO4: recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
				CO5: form sentences using proper grammatical structures and corrector forms
				CO1: The need of coherent sources and the conditions for sustained interference and engineering application so interference



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



3	I-I	BS1108	Engineering Physics	CO2: The basic concepts of LASER light Sources and the concepts to learn the type so lasers
				CO3: The concept of dielectric constant and polarization in dielectric material sand various types of polarization of dielectrics
				CO4: how sound is propagated in buildings and acoustic properties of typically used material sin buildings
				CO5: various crystal systems and different planes in the crystal structure
4	I-I	ES1103	Engineering Drawing	CO1: Understand the use and the application of Drawing instruments and Draw the polygons, curves and various types of scales
				CO2: Understand the Orthographic projections and project the points and lines.
				CO3: Understand and draw the projections of the lines inclined to both the planes.
				CO4: Understand and draw the projections of the planes & solids
5	I-I	ES1101	Programming for Problem Solving Using C	CO1: To write algorithm sand to draw flow charts for solving problems
				CO2: To convert flow charts/algorithms to C Programs, compile and debug programs
				CO3: To use different operators, data types and write programs that use two-way/multi-way selection
				CO4: To use different operators, data types and write programs that use two-way/multi-way selection
				CO5: To decompose a problem into functions and to develop modular reusable code To apply File I/O operations
6	I-I	BS1106	Applied Chemistry	CO1: Analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers.
				CO2: Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and categorize the reasons for corrosion and study methods to control corrosion
				CO3: Synthe size nonmaterial for modern advances of engineering technology. Summarize the preparation of



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				<p>semiconductors; analyze the applications of liquid crystals and superconductors.</p> <p><b>CO4:</b> Analyze the principles of different analytical instruments and their applications. Design models for energy by different natural sources</p> <p><b>CO5:</b> Obtain the knowledge of computational chemistry and molecular machines</p>
7	I-I	ESC1102	Engineering Geology	<p><b>CO1:</b> Identify and classify the geological minerals and Measure the rock strengths of various rocks</p> <p><b>CO2:</b> Classify and measure the earthquake prone areas to practice the hazard zonation</p> <p><b>CO3:</b> Classify, monitor and measure the Landslides and subsidence</p> <p><b>CO4:</b> Prepares, analyses sand inter pert the Engineering Geologic maps</p> <p><b>CO5:</b> Investigate the project site for mega/mini civil engineering projects. Site selection for mega engineering projects like Dams, Tunnels, disposal sites etc.</p>
8	I-I	BS1204	Applied Physics	<p><b>CO1:</b> Explain the need of coherent sources and the conditions for sustained interference Identify the applications of interference in engineering. Analyze the differences between interference and diffraction with applications</p> <p><b>CO2:</b> Explain various types of emission of radiation (L2). Identify the role of laser in engineering applications (L3). Describe the construction and working principles of various types of lasers</p> <p><b>CO3:</b> Describe the dual nature of matter Explain the significance of wave function. Identify the role of Schrodinger's time independent wave equation in studying particle in one-dimensional infinite potential well</p> <p><b>CO4:</b> Explain the concept of dielectric constant and polarization in dielectric materials. Summarize various types of polarization of dielectrics</p> <p><b>CO5:</b> Outline the properties of charge carriers in semiconductors Identify the type of semi conductor using Hall effect</p>
9	I-I	ES1102	Computer Engineering	<p><b>CO1:</b> Assemble and disassemble components of a pc</p> <p><b>CO2:</b> Construct a fully functional virtual machine</p>



# R K COLLEGE OF ENGINEERING

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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



			Workshop	<p><b>CO3:</b> Summarize various Linux operating system commands</p> <p><b>CO4:</b> Recognize characters &amp; extract text from scanned images</p> <p><b>CO5:</b> Create audio files and podcasts</p>
10	I-I	BSC	M-II	<p><b>CO1:</b> Develop the use of matrix algebra techniques that is needed by engineers for practical applications</p> <p><b>CO2:</b> Solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel</p> <p><b>CO3:</b> Evaluate the approximate roots of polynomial and transcendental equations by different algorithms</p> <p><b>CO4:</b> Apply Newton's forward &amp; backward interpolation and Lagrange's formulae for equal and unequal intervals</p> <p><b>CO5:</b> Apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations</p>
11	I-I	ESC1102	Engineering geology Lab	<p><b>CO1:</b> Identify Megascopic minerals &amp; their properties.</p> <p><b>CO2:</b> Identify Mega scopes rocks &amp; their properties</p> <p><b>CO3:</b> Identify the site parameters such as contour, slope &amp; aspect for topography</p> <p><b>CO4:</b> Know the occurrence of materials using the strike &amp; dip problems</p>
12	I-I	ESC1103	Basics of civil Engineering Workshop(Lab )	<p><b>CO1:</b> Identify various components of a building and give lump-sum estimate</p> <p><b>CO2:</b> Determine distances and irregular areas using conventional survey instruments like chain, tape, cross-staff and compass</p> <p><b>CO3:</b> Identify different soils</p> <p><b>CO4:</b> Know various traffic signs &amp; signals</p> <p><b>CO5:</b> Determine center of gravity and moment of inertia of channel and I-sections</p>
13	I-I	HSMC1 102	English Lab	<p><b>CO1:</b> Vowels, Consonants, Pronunciation, Phonetic Transcription</p> <p><b>CO2:</b> Past tense markers, word stress-di-syllabic words, Poly-Syllabic words</p> <p><b>CO3:</b> Rhythm &amp; Intonation</p> <p><b>CO4:</b> Contrastive Stress (Homographs)</p>
14	I-I	BS1109	Engineering Physics Lab	<p><b>CO1:</b> Physics Virtual laboratory curriculum in the form of assignment ensures an engineering graduate to prepare a technical/mini-</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				project/ with scientific temper	experimental	report
15	I-I	ESC1103	Basics Of Civil Engg. Work Shop (Lab)	CO1: Identify various components of a building and give lump-sum estimate.		
				CO2: Determine distances and irregular areas using conventional survey instruments like chain, tape, cross-staff and compass		
				CO3: Identify different soils		
				CO4: Know various traffic signs & signals		
				CO5: Determine center of gravity and moment of inertia of channel and I-sections		
16	I-I		Programming For Problem Solving Laboratory	CO1: Gains Knowledge on various concepts of a C language.		
				CO2: Able to draw flowcharts and write algorithms.		
				CO3: Able design and development of C problem solving skills		
				CO4: Able to design and develop modular programming skills.		
				CO5: Able to trace and debug a program		
17	I-I	BS1107	Applied Chemistry Lab	CO1: The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus, at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.		
18	I-I		Programming For Problem Solving Using C Lab	CO1: Gains Knowledge on various concepts of Ac language.		
				CO2: Able to draw flowcharts and write algorithms.		
				CO3: Able design and development of C problem solving skills.		
				CO4: Able to design and develop modular programming skills.		
				CO5: Able to trace and debug program		
19	I-I	BS1203	Applied Physics Lab	CO1: Physics lab curriculum gives fundamental understanding of design of an instrument with targeted accuracy for physical measurements		



# R K COLLEGE OF ENGINEERING

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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



20	I-I		Electrical Engineering Workshop	CO1: Explain the limitations, tolerances, safety aspects of electrical systems and wiring.
				CO2: Select wires/cables and other accessories used in different types of wiring.
				CO3: Make simple lighting and power circuits.
				CO4: Measure current, voltage and power in a circuit.
21	I-II	BS1102	M-II	CO1: Develop the use of matrix algebra techniques that is needed by engineers for practical applications
				CO2: Solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel
				CO3: Evaluate the approximate roots of polynomial and transcendental equations by different algorithms
				CO4: Apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals
				CO5: Apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations
22	I-II	BSC1210	Engineering Chemistry	CO1: Analyze the different types of composite plastic material and interpret the mechanism of conduction in conducting polymers
				CO2: Utilize the theory of construction of electrodes, batteries and fuel cell signed signing new engineering products and categorize the reasons for corrosion and study methods to control corrosion.
				CO3: Sync the size nanomaterial's for modern advances of engineering technology. Summarize the techniques that detect and measure changes of state of reaction. Illustrate the commonly used industrial materials
				CO4: Differentiate petroleum, petrol, synthetic petrol and have knowledge how they are produced. Study alternate fuel and analyses flue gases.
				CO5: Analyze the suitable methods for purification and treatment of hard water and brackish water.
23	I-II	ES1204	Engineering Mechanics	CO1: The student should be able to draw free body diagrams for FBDs for particle and rigid bodies. In plane and space and problems to solve the unknown forces, orientations and geometric parameters.
				CO2: He should be able to determine centroid for lines, areas and center of gravity for volumes and their



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				<p>composites</p> <p><b>CO3:</b> Heshouldbeabletodetermineareaandmassmovementofinertiaforcompositesections</p> <p><b>CO4:</b> Heshouldbeabletoanalyzemotionofparticlesandrigidbodiesand</p> <p><b>CO5:</b> applytheprinciplesofmotion,workenergyandimpulse-momentum</p>
24	I-II	BS1203	M-III	<p><b>CO1:</b> interpret the physical meaning of different operators such as gradient, curl and divergence</p> <p><b>CO2:</b> estimate the work done against a field, circulation and flux using vector calculus</p> <p><b>CO3:</b> apply the Laplace transform for solving differential equations</p> <p><b>CO4:</b> find or compute the Fourier series of periodic signals</p> <p><b>CO5:</b> know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms identify solution methods for partial differential equations that model physical processes</p>
25	I-II	ES1201	Programming for Problem Solving Using C	<p><b>CO1:</b> Towritealgorithmsandtodrawflowchartsforsolvingproblems</p> <p><b>CO2:</b> Toconvertflowcharts/algorithms to C Programs, compile and debug programs</p> <p><b>CO3:</b> To use different operators, data type sand write programs that use two-way/multi-way selection</p> <p><b>CO4:</b> Tousedifferentoperators,datatypesandwriteprogramthatusetwo-way/multi-wayselection</p> <p><b>CO5:</b> To decompose a problem into functions and to develop modular reusable code To apply File I/O operations</p>
26	I-II	BS1106	Applied Chemistry	<p><b>CO1:</b> Analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers.</p> <p><b>CO2:</b> Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering</p>



# R K COLLEGE OF ENGINEERING

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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				<p>products and categorize the reasons for corrosion and study methods to control corrosion</p> <p><b>CO3:</b> Synthesize nonmaterial for modern advances of engineering technology. Summarize the preparation of semiconductors; analyze the applications of liquid crystals and superconductors.</p> <p><b>CO4:</b> Analyze the principles of different analytical instruments and their applications. Design models for energy by different natural sources</p> <p><b>CO5:</b> Obtain the knowledge of computational chemistry and molecular machines</p>
27	I-II	ESC1203	Building Materials & Concrete technology	<p><b>CO1:</b> Know various engineering properties of building construction materials and suggest their suitability</p> <p><b>CO2:</b> Identify the functional role of ingredients of concrete and apply this knowledge to concrete mix design</p> <p><b>CO3:</b> Acquire and apply fundamental knowledge in the fresh and hardened properties of Concrete</p>
28	I-II	BS1204	Applied Physics	<p><b>CO1:</b> Explain the need of coherent sources and the conditions for sustained interference. Identify the applications of interference in engineering. Analyze the differences between interference and diffraction with applications</p> <p><b>CO2:</b> Explain various types of emission of radiation (L2). Identify the role of laser in engineering applications (L3). Describe the construction and working principles of various types of lasers</p> <p><b>CO3:</b> Describe the dual nature of matter. Explain the significance of wave function. Identify the role of Schrodinger's time independent wave equation in studying particle in one-dimensional infinite potential well</p> <p><b>CO4:</b> Explain the concept of dielectric constant and polarization in dielectric materials. Summarize various types of polarization of dielectrics</p> <p><b>CO5:</b> Outline the properties of charge carriers in semiconductors. Identify the type of semiconductor using Hall effect</p>



# R K COLLEGE OF ENGINEERING

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 (An ISO 9001:2015 Certified Institution)  
 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



29	I-II	CS1201	Data Structures	CO1: data structures concepts with arrays, stacks, queues.
				CO2: linked lists for stacks, queues and for other applications.
				CO3: traversal methods in the Trees
				CO4: various algorithms available for the graphs
				CO5: sorting and searching in the data retrieval applications.
30	I-II	ES1202	Python Programming	CO1: Develop essential programming skills in computer programming concepts like data types, containers
				CO2: Apply the basics of programming in the Python language
				CO3: Solve coding tasks related to conditional execution, loops
				CO4: Solve coding tasks related to the fundamental notion and techniques used in object-oriented programming
31	I-II	ES1206	Basics Electrical & Electronic Engineering	CO1: Analyse various electrical networks.
				CO2: Analyse various electrical networks.
				CO3: Analyse performance of single-phase transformer and acquire proper knowledge and working of 3-phase alternator and 3-phase induction motors
				CO4: Analyse operation of half wave, full wave bridge rectifiers and OP-AMPs.
				CO5: Understanding operations of CE amplifier ND basic concept of feedback amplifier.
32	I-II	ES1207	Computer Aided Engineering Drawing	CO1: Student get exposed to working of sheet metal with help of development of surfaces.
				CO2: Student understand how to know the hidden details of machine component with the help of section and inter penetrations of solids
				CO3: Students shall be exposed to modeling commands for generating 2D and 3D object using computer aided drafting tool which are useful to create machine elements for computer aided analysis.
33	I-II	ES	Computer Organization	CO1: Demonstrate an understanding of the design of the functional units of a digital computer system
				CO2: Recognize and main plastered presentations of numbers stored in digital computer
				CO3: Design and analyze combinational and sequential circuits
				CO4: Identify, compare and assess issues related to ISA,



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				memory, control and I / Of unctio'n's
				<b>CO5:</b> Recall the internal organization of computers, CPU, memory unit and Input / Output sand the relations between its main components
34	I-II	ES1217	Electrical Circuit Analysis I	<b>CO1:</b> Various electrical networks in presence of active and passive elements. And Electrical networks with network topology concepts <b>CO2:</b> Any magnetic circuit with various dot conventions. <b>CO3:</b> Any R, L, C network with sinusoidal excitation <b>CO4:</b> Any R, L, network with variation of any one of the parameters i.e., R, L, C and f. <b>CO5:</b> Electrical networks by using principles of network theorems
35	I-II	ESC	Basic Civil And Mechanical Engineering	<b>CO1:</b> Apply Shear force diagram & Bending moment diagram principles for Cantilever and Simply supported beams. <b>CO2:</b> Apply concepts of Rosette analysis for strain measurements <b>CO3:</b> Analyse the characteristics of common building materials. <b>CO4:</b> Compare the working characteristics of Internal Combustion engines. <b>CO5:</b> Compare the differences between boiler mountings and accessories.
36	I-II	ES1201	Digital Logic Design	<b>CO1:</b> An ability to define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation <b>CO2:</b> An ability to understand the different switching algebra theorems and apply them for logic functions <b>CO3:</b> An ability to define the Karnaugh map for a few variables and perform an algorithmic reduction of logic functions <b>CO4:</b> Students will be able to design various logic gates starting from simple ordinary gates to complex programmable logic devices & arrays <b>CO5:</b> Students will be able to design various sequential circuits starting from flip-flop to registers and counters
37	I-II		Object Oriented Programming	<b>CO1:</b> Show competence in the use of the Java programming language in the development of small to medium- sized application programs that demonstrate



# R K COLLEGE OF ENGINEERING

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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



			Through Java	professionally acceptable coding and performance standard <b>CO2:</b> Illustrate the basic principles of the object-oriented programming <b>CO3:</b> Demonstrate an introductory understanding of graphical user interfaces, multithreaded programming, and event-driven programming.
38	I-II	ES1209	Network Analysis	<b>CO1:</b> gain the knowledge on basic network elements. <b>CO2:</b> will analyze the RLC circuits behavior in detailed <b>CO3:</b> analyze the performance of periodic waveforms <b>CO4:</b> gain the knowledge in characteristics of two port network parameters (Z,Y,ABCD,h&g). <b>CO5:</b> analyze the filter design concepts in real I world applications
39	I-II		Engineering Chemistry	<b>CO1:</b> Analyze the different types of composite plastic material and interpret the mechanism of conduction in conducting polymers <b>CO2:</b> Utilize the theory of construction of electrodes, batteries and fuel cell and design new engineering products and categorize the reasons for corrosion and study methods to control corrosion. <b>CO3:</b> Synthesize nano materials from modern advances of engineering technology. Summarize the techniques that detect and measure changes of state of reaction. Illustrate the commonly used industrial materials <b>CO4:</b> Analyze the principles of different analytical instruments and their applications. Design models for energy by different natural sources <b>CO5:</b> Obtain the knowledge of computational chemistry and molecular machines
40	I-II	ESC1204	Programming For Problem Solving Using C Lab	<b>CO1:</b> Gains Knowledge on various concepts of C language. <b>CO2:</b> Able to draw flowcharts and write algorithms. <b>CO3:</b> Able design and development of C problem solving skills. <b>CO4:</b> Able to design and develop modular programming skills. <b>CO5:</b> Able to trace and debug program
41	I-II	ESC1205	Building Planning And Computer	<b>CO1:</b> Perform basic commands of any suitable CAD software to draw 2D drawings <b>CO2:</b> Interpret the conventions, signs and symbols from



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



			Aided Building Drawing	<p>a given drawing.</p> <p><b>CO3:</b> Prepare line plans of residential and public buildings using principles of planning.</p> <p><b>CO4:</b> Prepare submission and working drawing from the given requirement for Load Bearing and Framed structures</p>
42	I-II	BSC1203	Engineering Chemistry Lab	<p><b>CO1:</b> The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus, at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.</p>
43	I-II	ES1208	Basic Electrical & Electronics Engineering Lab	<p><b>CO1:</b> Compute the efficiency of DC shunt machine without actual loading of the machine.</p> <p><b>CO2:</b> Estimate the efficiency and regulation at different load conditions and power factors for single phase transformer with OC and SC tests.</p> <p><b>CO3:</b> Analyse the performance characteristics and to determine efficiency of DC shunt motor &amp; 3-Phase induction motor</p> <p><b>CO4:</b> Pre-determine the regulation of an alternator by synchronous impedance method.</p> <p><b>CO5:</b> Control the speed of dc shunt motor using Armature voltage and Field flux control methods</p>
44	I-II		Electrical Workshop Lab	<p><b>CO1:</b> Explain the limitations, tolerances, safety aspects of electrical systems and wiring.</p> <p><b>CO2:</b> Select wires/cables and other accessories used in different types of wiring.</p> <p><b>CO3:</b> Make simple lighting and power circuits.</p> <p><b>CO4:</b> Measure current, voltage and power in a circuit.</p>
45	I-II	BS1203	Applied Physics Lab	<p><b>CO1:</b> Physics lab curriculum gives fundamental understanding of design of an instrument with targeted accuracy for physical measurements</p>
46	I-II	ES1203	Python Programming	<p><b>CO1:</b> Develop essential programming skills in computer programming concepts like data types, containers</p> <p><b>CO2:</b> Apply the basics of programming in the Python</p>



# R K COLLEGE OF ENGINEERING

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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				language
				<b>CO3:</b> Solve coding tasks related conditional execution, loops
				<b>CO4:</b> Solve coding tasks related to the fundamental notions and techniques used in object- oriented programming
47	I-II	CS1202	Data Structures Lab	<b>CO1:</b> Use basic data structures such as arrays and linked list.
				<b>CO2:</b> Programs to demonstrate fundamental algorithmic problems including Tree Traversals, Graph traversals, and shortest paths.
				<b>CO3:</b> Use various searching and sorting algorithms
48	I-II	BS1107	Applied Chemistry Lab	<b>CO1:</b> The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.
49	I-II		Computer Organization Lab	<b>CO1:</b> Understand working of logic families and logic gates.
				<b>CO2:</b> Design and implement Combinational and Sequential logic circuits.
				<b>CO3:</b> Solve elementary problems by assembly language programming
				<b>CO4:</b> Implement assembly language program for given task for 8086 microprocessors.
50	I-II	ESC1103	Basic Civil And Mechanical Engineering Lab	<b>CO1:</b> Solve to arrive at finding constant speed and variable speed on IC engines and interpret their performance.
				<b>CO2:</b> Estimate energy distribution by conducting heat balance test on IC engines
				<b>CO3:</b> Explain procedure for standardization of experiments.
				<b>CO4:</b> Determine flow discharge measuring device used in pipes channels and tanks.
				<b>CO5:</b> Determine fluid and flow properties



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**Program:**  
**M.Tech. - Computer Science and Engineering**

S.No	Year-Sem	Course Code	Course Name	Course Outcomes After completion of the course student can able to
1	I-I	MTCSE1 101	Mathematical Foundations Of Computer Science	<b>CO1:</b> To apply the basic rules and theorems of probability theory such as Baye's Theorem, to determine probabilities that help to solve engineering problems and to determine the expectation and variance of a random variable from its distribution
				<b>CO2:</b> Able to perform and analyze of sampling, means, proportions, variances and estimates the maximum likelihood based on population parameters.
				<b>CO3:</b> To learn how to formulate and test hypotheses about sample means, variances and proportions and to draw conclusions based on the results of statistical tests.
				<b>CO4:</b> Design various ciphers using number theory.
				<b>CO5:</b> Apply graph theory for real time problems like network routing problem.
2	I-I	MTCSE1 102	Advanced Data Structures & Algorithms	<b>CO1:</b> Ability to write and analyze algorithms for algorithm correctness and efficiency
				<b>CO2:</b> Master a variety of advanced abstract data type (ADT) and data structures and their Implementation
				<b>CO3:</b> Demonstrate various searching, sorting and hash techniques and be able to apply and solve problems of real life
				<b>CO4:</b> Design and implement variety of data structures including linked lists, binary trees, heaps, graphs and search trees
				<b>CO5:</b> Ability to compare various search trees and find solutions for IT related problems
3	I-I	MTCSE1 103	Big Data Analytics	<b>CO6:</b> Illustrate on big data and its use cases from selected business domains.
				<b>CO7:</b> Interpret and summarize on No SQL, Cassandra
				<b>CO1:</b> Analyze the HADOOP and Map Reduce technologies associated with big data analytics and explore on Big Data applications Using Hive.
				<b>CO2:</b> Make use of Apache Spark, RDDs etc. to work with datasets.
				<b>CO3:</b> Assess real time processing with Spark Streaming



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4	I-I	MTCSE1 103	Digital Image Processing	CO1: Demonstrate the components of image processing
				CO2: Explain various filtration techniques.
				CO3: Apply image compression techniques.
				CO4: Discuss the concepts of wavelet transforms.
				CO5: Analyze the concept of morphological image processing
5	I-I	MTCSE1 103	Advanced Operating Systems	CO1: Illustrate on the fundamental concepts of distributed operating systems, its architecture and distributed mutual exclusion.
				CO2: Analyze on deadlock detection algorithms and agreement protocols.
				CO3: Make use of algorithms for implementing DSM and its scheduling.
				CO4: Apply protection and security in distributed operating systems.
				CO5: Elaborate on concurrency control mechanisms in distributed database systems
6	I-I	MTCSE1 104	Advanced Computer Networks	CO1: Illustrate reference models with layers, protocols and interfaces.
				CO2: Describe the routing algorithms, Sub netting and Addressing of IP V4and IPV6.
				CO3: Describe and Analysis of basic protocols of computer networks, and how they can be used to assist in network design and implementation.
				CO4: Describe the concepts Wireless LANS, WIMAX, IEEE 802.11, Cellular telephony and Satellite networks
				CO5: Describe the emerging trends in networks- MANETS and WSN
7	I-I	MTCSE1 104	Internet Of Things	CO1: Summarize on the term 'internet of things' in different contexts.
				CO2: Analyze various protocols for IoT.
				CO3: Design a PoC of an IoT system using Raspberry Pi/Arduino
				CO4: Apply data analytics and use cloud offerings related to IoT.
				CO5: Analyze applications of IoT in real time scenario
8	I-I	MTCSE1 104	Object Oriented Software Engineering	CO1: Apply the Object-Oriented Software-Development Process to design software
				CO2: Analyze and Specify software requirements through a SRS documents.



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				<p><b>CO3:</b> Design and Plan software solutions to problems using an object-oriented strategy.</p> <p><b>CO4:</b> Model the object-oriented software systems using Unified Modeling Language (UML)</p> <p><b>CO5:</b> Estimate the cost of constructing object-oriented software.</p>
9	I-I	MTCSE1 105	Research Methodology And IPR	<p><b>CO1:</b> Understand the research problem and research process.</p> <p><b>CO2:</b> Understand research ethics</p> <p><b>CO3:</b> Prepare a well-structured research paper and scientific presentations</p> <p><b>CO4:</b> Explore on various IPR components and process of filing.</p> <p><b>CO5:</b> Understand the adequate knowledge on patent and rights</p>
10	I-I	MTCSE1 106	Advanced Data Structures & Algorithms Lab	<p><b>CO1:</b> Identify classes, objects, members of a class and relationships among them needed for a specific problem.</p> <p><b>CO2:</b> Examine algorithms performance using Prior analysis and asymptotic notations.</p> <p><b>CO3:</b> Organize and apply to solve the complex problems using advanced data structures (like arrays, stacks, queues, linked lists, graphs and trees.)</p> <p><b>CO4:</b> Apply and analyze functions of Dictionary</p>
11	I-I	MTCSE1 107	Advanced Computing Lab	<p><b>CO1:</b> The student should have hands on experience in using various sensors like temperature, humidity, smoke, light, etc. and should be able to use control web camera, network, and relays connected to the Pi.</p> <p><b>CO2:</b> Development and use of s IoT technology in Societal and Industrial Applications.</p> <p><b>CO3:</b> Skills to undertake high quality academic and industrial research in Sensors and IoT.</p> <p><b>CO4:</b> To classify Real World IoT Design Constraints, Industrial Automation in IoT.</p>
12	I-II	MTCSE1 201	Machine Learning	<p><b>CO1:</b> Domain Knowledge for Productive use of Machine Learning and Diversity of Data.</p> <p><b>CO2:</b> Demonstrate on Supervised and Computational Learning</p> <p><b>CO3:</b> Analyze on Statistics in learning techniques and Logistic Regression</p>



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				<p><b>CO4:</b> Illustrate on Support Vector Machines and Perceptron Algorithm</p> <p><b>CO5:</b> Design a Multilayer Perceptron Networks and classification of decision tree</p>
13	I-II	MTCSE1 202	Mean Stack Technologies	<p><b>CO1:</b> After the completion of the course, student will be able to</p> <p><b>CO2:</b> Identify the Basic Concepts of Web &amp; Markup Languages</p> <p><b>CO3:</b> Develop web Applications using Scripting Languages &amp; Frameworks.</p> <p><b>CO4:</b> Make use of Express JS and Node JS frameworks</p> <p><b>CO5:</b> Illustrate the uses of web services concepts like restful, react is.</p> <p><b>CO6:</b> Adapt to Deployment Techniques &amp; Working with cloud platform.</p>
14	I-II	MTCSE1 203	Advanced Databases And Mining	<p><b>CO1:</b> Analyze on normalization techniques</p> <p><b>CO2:</b> Elaborate on concurrency control techniques and query optimization</p> <p><b>CO3:</b> Summarize the concepts of data mining, data warehousing and data preprocessing strategies.</p> <p><b>CO4:</b> Apply data mining algorithms</p> <p><b>CO5:</b> Assess various classification &amp; cluster techniques.</p>
15	I-II	MTCSE1 203	Ad Hoc & Sensor Networks	<p><b>CO1:</b> Explain the Fundamental Concepts and applications of ad hoc and wireless sensor networks</p> <p><b>CO2:</b> Discuss the MAC protocol issues of ad hoc networks</p> <p><b>CO3:</b> Enumerate the concept of routing protocols for ad hoc wireless networks with respect to TCP design issues</p> <p><b>CO4:</b> Analyze &amp; Specify the concepts of network architecture and MAC layer protocol for WSN</p> <p><b>CO5:</b> Discuss the WSN routing issues by considering QoS measurements</p>
16	I-II	MTCSE1 203	Soft Computing	<p><b>CO1:</b> Elaborate fuzzy logic and reasoning to handle uncertainty in engineering problems.</p> <p><b>CO2:</b> Make use of genetic algorithms to combinatorial optimization problems.</p> <p><b>CO3:</b> Distinguish artificial intelligence techniques, including search heuristics, knowledge representation, planning and reasoning.</p>



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				<p><b>CO4:</b> Formulate and apply the principles of self-adopting and self-organizing neuro fuzzy inference systems.</p> <p><b>CO5:</b> Evaluate and compare solutions by various soft computing approaches for a given problem</p>
17	I-II	MTCSE1 204	Cloud Computing	<p><b>CO1:</b> Interpret the key dimensions of the challenge of Cloud Computing.</p> <p><b>CO2:</b> Examine the economics, financial, and technological implications for selecting cloud computing for own organization.</p> <p><b>CO3:</b> Assessing the financial, technological, and organizational capacity of employer's for actively initiating and installing cloud-based applications.</p> <p><b>CO4:</b> Evaluate own organizations' needs for capacity building and training in cloud computing-related IT areas.</p> <p><b>CO5:</b> To Illustrate Virtualization for Data-Center Automation.</p>
18	I-II	MTCSE1 204	Principles Of Computer Security	<p><b>CO1:</b> Describe the key security requirements of confidentiality, integrity, and availability, types of security threats and attacks and summarize the functional requirements for computer security.</p> <p><b>CO2:</b> Explain the basic operation of symmetric block encryption algorithms, use of secure hash functions for message authentication, digital signature mechanism.</p> <p><b>CO3:</b> Discuss the issues involved and the approaches for user authentication and explain how access control fits into the broader context that includes authentication, authorization, and audit.</p> <p><b>CO4:</b> Explain the basic concept of a denial-of-service attack, nature of flooding attacks, distributed denial-of-service attacks and describe how computer security vulnerabilities are a result of poor programming practices.</p> <p><b>CO5:</b> List the steps used to secure the base operating system, specific aspects of securing Unix/Linux systems, Windows systems, and security in virtualized systems and describe the security threats and countermeasures for wireless networks.</p>



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19	I-II	MTCSE1 204	High Performance Computing	CO1: Design, formulate, solve and implement high performance versions of standard single threaded algorithms.
				CO2: Demonstrate the architectural features in the GPU and MIC hardware accelerators.
				CO3: Design programs to extract maximum performance in a multicore, shared memory execution environment processor.
				CO4: Analyze Symmetric and Distributed architectures.
				CO5: Develop and deploy large scale parallel programs on tightly coupled parallel systems using the message passing paradigm.
20	I-II	MTCSE1 205	Machine Learning With Python Lab	CO1: Implement procedures for the machine learning algorithms
				CO2: Design Python programs for various Learning algorithms
				CO3: Apply appropriate data sets to the Machine Learning algorithms
				CO4: Identify and apply Machine Learning algorithms to solve real world problems
21	I-II	MTCSE1 206	Mean Stack Technologies Lab	CO1: Identify the Basic Concepts of Web & Markup Languages.
				CO2: Develop web Applications using Scripting Languages & Frameworks
				CO3: Creating & Running Applications using JSP libraries.
				CO4: Creating Our First Controller Working with and Displaying in Angular Js and Nested Forms with ng-form.
				CO5: Working with the Files in React JS and Constructing Elements with Data.
22	I-II	MTCSE1 207	Mini Project with Seminar	CO1: Demonstrate the basic concepts fundamental learning techniques and layers.
				CO2: Classify the Probabilistic Neural Networks.
				CO3: Implement tools on Deep Learning techniques.
23	II-I	MTCSE 2101	Deep Learning	CO2: Discuss the Neural Network training, various random models.
				CO3: Explain different types of deep learning network models.
				CO3: Explain different types of deep learning network models.



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				CO4: Classify the Probabilistic Neural Networks.
				CO5: Implement tools on Deep Learning techniques.
24	II-I	MTCSE 2101	Social Network Analysis	CO1: After the completion of the course, student will be able to
				CO2: Demonstrate social network analysis and measures.
				CO3: Analyze random graph models and navigate social networks data
				CO4: Apply the network topology and Visualization tools.
				CO5: Analyze the experiment with small world models and clustering models.
				CO6: Compare the application driven virtual communities from social network Structure.
25	II-I	MTCSE 2101	Python Programming	CO1: Understand and comprehend the basics of python programming.
				CO2: Demonstrate the principles of structured programming and be able to describe, design, implement, and test structured programs using currently accepted methodology.
				CO3: Explain the use of the built-in data structures list, sets, tuples and dictionary.
				CO4: Make use of functions and its applications.
				CO5: Identify real-world applications using oops, files and exception handling provided by python.
26	II-I	MTCSE 2101	Principles Of Cyber Security	CO1: Apply cyber security architecture principles.
				CO2: Describe risk management processes and practices.
				CO3: Appraise cyber security incidents to apply appropriate response
				CO4: Distinguish system and application security threats and vulnerabilities.
27	II-I	MTCSE 2101	Internet Of Things	CO5: Identify security tools and hardening techniques
				CO1: Summarize on the term 'Internet of Things' in different contexts.
				CO2: Analyze various protocols for IoT.
				CO3: Design a PoC of an IoT system using Raspberry Pi/Arduino
				CO4: Apply data analytics and use cloud offerings related to IoT.
				CO5: Analyze applications of IoT in real time scenario



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28	II-I	MTCSE 2101	Machine Learning	CO1: Domain Knowledge for Productive use of Machine Learning and Diversity of Data.
				CO2: Demonstrate on Supervised and Computational Learning
				CO3: Analyze on Statistics in learning techniques and Logistic Regression
				CO4: Illustrate on Support Vector Machines and Perceptron Algorithm
				CO5: Design a Multilayer Perceptron Networks and classification of decision tree
29	II-I	MTCSE 2101	Digital Forensics	CO1: Understand relevant legislation and codes of ethics
				CO2: Computer forensics and digital detective and various processes, policies and procedures
				CO3: E-discovery, guidelines and standards, E-evidence, tools and environment.
				CO4: Email and web forensics and network forensics
30	II-I	MTCSE 2101	Next Generation Databases	CO1: Explore the relationship between Big Data and NoSQL databases
				CO2: Work with NoSQL databases to analyze the big data for useful business applications.
				CO3: Work with different data models to suit various data representation and storage needs.
31	II-II	MTCSE 2201	(Dissertation) Dissertation Phase – I And Phase – II	CO1: Ability to synthesize knowledge and skills previously gained and applied to an in-depth study and execution of new technical problem.
				CO2: Capable to select from different methodologies, methods and forms of analysis to produce a suitable research design, and justify their design.
				CO3: Ability to present the findings of their technical solution in a written report.
				CO4: Presenting the work in International/ National conference or reputed journals.
32	II-II	MTCSE 2201	Audit 1 And 2: English For Research Paper Writing	CO1: Understand that how to improve your writing skills and level of readability
				CO2: Learn about what to write in each section
				CO3: Understand the skills needed when writing a Title Ensure the good quality of paper at very firsttime submission



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33	II-II	MTCSE 2201	Audit 1 And 2: Disaster Management	CO1: learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
				CO2: critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
				CO3: develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.
				CO4: critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in
34	II-II	MTCSE 2201	Audit 1 And 2: Sanskrit For Technical Knowledge	CO1: Understanding basic Sanskrit language
				CO2: Ancient Sanskrit literature about science & technology can be understood
				CO3: Being a logical language will help to develop logic in students
35	II-II	MTCSE 2201	Audit 1 And 2: Value Education	CO1: Knowledge of self-development
				CO2: Learn the importance of Human values
				CO3: Developing the overall personality
36	II-II	MTCSE 2201	Audit 1 And 2: ConstitutionOf India	CO1: Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
				CO2: Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
				CO3: Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP]
				CO4: Discuss the passage of the Hindu Code Bill of 1956.
37	II-II	MTCSE 2201	Audit 1 And 2: Pedagogy Studies	CO1: What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?
				CO2: What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
				CO3: How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



38	II-II	MTCSE 2201	Audit 1 And 2: Stress Management By Yoga	CO1: Develop healthy mind in a healthy body thus improving social health also
				CO2: Improve efficiency
39	II-II	MTCSE 2201	Audit 1 And 2: Personality Development Through Life Enlightenment Skills	CO1: Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life
				CO2: The person who has studied Geeta will lead the nation and mankind to peace and prosperity
				CO3: Study of Neetishatakam will help in developing versatile personality of students

**Program:**  
**M.Tech – VLSI & ESD**

S.No	Year-Sem	Course Code	Course Name	Course Outcomes After completion of the course student can able to
1	I-I	PC	RTL Simulation and Synthesis with PLDs	CO1: Develop the Verilog HDL to design a digital circuit.
				CO2: Appreciate the analysis of finite state machine of a controlling circuit
				CO3: Verify the functionality of the ASIC Design Flow
				CO4: Understand the Static Timing Analysis and clock issues in digital circuits
				CO5: Verify the functionality of the digital designs using PLDs.
2	I-I	PC	Micro-controllers and Programmable Digital Signal Processors	CO1: Compare and select ARM processor core based SOC with several features/peripherals based on requirements of embedded applications.
				CO2: Select ARM processor core peripherals based on requirements of embedded applications.
				CO3: Develop small applications by utilizing the ARM processor core and DSP processor based platform.
				CO4: Identify and characterize architecture of Programmable DSP Processors
				CO5: Develop small applications by utilizing the ARM processor core and DSP processor based platform.
				CO1: Ability to modify the existing or new DSP architectures suitable for VLSI.



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3	I-I	PE	VLSI signal processing	CO2: Understand the concepts of folding and unfolding algorithms and applications.
				CO3: Develop Systolic Array Design Methodology and Systolic Design for Space Representations contain Delays
				CO4: Ability to implement fast convolution algorithms.
				CO5: Low power design aspects of processors for signal processing and wireless applications.
4	I-I	PE	Programming Languages for Embedded Systems	CO1: Write an embedded C application of moderate complexity.
				CO2: Develop Object Oriented Programming and generic programming techniques.
				CO3: Develop and analyze algorithms in C++.
				CO4: Able to write the needs of Overloading and types of Inheritance
5	I-I		Research methodology and IPR	CO5: Differentiate interpreted languages from compiled languages
				CO1: Understand research problem formulation.
				CO2: Analyze research related information
				CO3: Follow research ethics
				CO4: it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
6	I-I	Lab 1	RTL Simulation and Synthesis with PLDs Lab	CO5: Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.
				CO1: Identify, formulate, solve and implement problems in signal processing, communication Systems etc using RTL design tools.
7	I-I	Lab 2	Micro-controllers and Programmable Digital Signal Processors Lab	CO2: Use EDA tools like Cadence, Mentor Graphics and Xilinx.
				CO1: Install, configure and utilize tool sets for developing applications based on ARM processor core SOC and DSP processor.
8	I-I	Aud 1	Value Education Audit Course -	CO2: Develop prototype codes using commonly available on and off chip peripherals on the Cortex M3 and DSP development boards.
				CO1: Knowledge of Self-development.
				CO2: Learn the importance of Human values.
				CO3: Developing the overall personality.



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9	I-II	PC	Analog and Digital CMOS VLSI Design	CO1: Appreciate the trade-offs involved in analog integrated circuit design.
				CO2: Understand and appreciate the importance of noise and distortion in analog circuits.
				CO3: Analyze complex engineering problems critically in the domain of analog IC design for conducting research.
				CO4: Demonstrate advanced knowledge in Static and dynamic characteristics of CMOS, Alternative CMOS Logics, Estimation of Delay and Power, Adders Design.
				CO5: Solve engineering problems for feasible and optimal solutions in the core area of digital ICs.
10	I-II	PC	Real Time Operating Systems	CO1: Illustrate real time programming concepts.
				CO2: Apply RTOS functions to implement embedded applications
				CO3: Analyze the issues in real time operating systems
				CO4: Understand fundamentals of design consideration for embedded applications
				CO5: To Understand Applications Control by RT Linux System
11	I-II	PE	Memory Architectures	CO1: Select architecture and design semiconductor memory circuits and subsystems.
				CO2: Identify various fault models, modes and mechanisms in semiconductor memories and their testing procedures.
				CO3: Identify various fault models in semiconductor memories
				CO4: Identify various fault models and their testing procedures.
				CO5: Know how the state-of-the-art memory chip design
12	I-II	PE	Communication Buses and Interfaces	CO1: Select a particular serial bus suitable for a particular application.
				CO2: Develop APIs for configuration, reading and writing data onto serial bus.
				CO3: Design and develop peripherals that can be interfaced to desired serial bus.
				CO4: Develop USB Transfer Types and Descriptor types and contents
				CO5: Data streaming Serial Communication Protocol - Serial Front Panel Data Port(SFPDP)



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13	I-II	Lab 1	Analog and Digital CMOS VLSI Design Lab	CO1: Analyze VI Characteristics NMOS and PMOS Devices.
				CO2: Analyze Voltage transfer characteristics of CMOS inverter.
				CO3: Demonstrate transient and ac analysis of CMOS inverter.
				CO4: Calculate small signal voltage gain of CS amplifier.
				CO5: Design the layout of a minimum size inverter.
14	I-II	Lab 2	Real Time Operating Systems Lab	CO1: Analyze basic concepts of operating system and their structures.
				CO2: Analyze various issues related to inter process communication like process scheduling, resource management and deadlocks.
				CO3: Interpret the issues and challenges of memory management.
				CO4: Synthesize the concept of I/O management, file system implementation and problems related to security and protection.
15	I-II	MP	Mini Project	CO1: Understand of contemporary / emerging technology for various processes and systems.
				CO2: Share knowledge effectively in oral and written form and formulate documents.
16	I-II	Aud 2	Stress Management by Yoga	CO1: Develop healthy mind in a healthy body thus improving social health also.
				CO2: Improve efficiency.
17	II-I	PE	Hardware Software co-design	CO1: About the Hardware-Software Code sign Methodology.
				CO2: How to select a target architecture and how a prototype is built and how emulation of a prototype is done.
				CO3: Brief view about compilation technologies and compiler development environment.
				CO4: About Design Specification and Verification
				CO5: Understand the importance of system level specification languages and multi-language co-simulation.
				CO1: Students should able to apply the dynamic programming to solve problems of discreet and continuous variables.
				CO2: Students should able to apply the Formulation of



# R K COLLEGE OF ENGINEERING

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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



18	II-I	OE	Operations Research	a LPP
				CO3: Students should able to apply the concept of non-linear programming
				CO4: Students should able to carry out sensitivity analysis
				CO5: Student should able to model the real world problem and simulate it.
19	II-II	Dissertation	Project / Dissertation Phase- II	CO1: Ability to synthesize knowledge and skills previously gained and applied to an in-depth study and execution of new technical problem.
				CO2: Capable to select from different methodologies, methods and forms of analysis to produce a suitable research design, and justify their design.
				CO3: Ability to present the finding of their technical solution in a written report.
				CO4: Presenting the work in International / National conference or reputed journals

**Program**  
M.Tech-Machine Design

S.No	Year-Sem	Course Code	Course Name	Course Outcomes After completion of the course student can able to
1	I-I	MD101	Advanced Mechanics of Solids	CO1: Understand the theory of stress and strain, and their temperature relations.
				CO2: Application of energy methods based on deflections of statically determinate structures.
				CO3: Understand the unsymmetrical bending and curved beam theory.
				CO4: Explain briefly the torsion in different cross section members.
				CO5: Explain the theory of contact stresses with assumptions and expressions.
2	I-I	MD102	Mechanical vibrations and acoustics	CO1: Explain the mathematical modeling of vibrating systems.
				CO2: Explain the multi degree freedom systems.
				CO3: Understand different vibrations and explain governing equations of motion
				CO4: Understand basics of acoustics



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				CO5: Explain the noise measurement and control
3	I-I	MD 1035	Advanced Mechanisms	CO1: Understand the Elements of Mechanisms
				CO2: Explain the Advanced Kinematics of plane motion- I and II
				CO3: Explain the Synthesis-Graphical Methods – I and II
				CO4: Explain Synthesis - Analytical Methods
4	I-I	MD 1043	Design for manufacturing & assembly	CO1: Understand the Design for Manual Assembly
				CO2: Explain the designing process for machining.
				CO3: Explain the designing process for Metal casting and extrusion.
				CO4: Explain the designing process for metal joining.
				CO5: Explain the designing process for automation.
5	I-I	MD105	Machine Dynamics Lab	CO1: Demonstrate methods of balancing of rigid rotors, reciprocating machines, flywheels, planar linkages and instruments.
				CO2: Define the working principle of gyroscope and governors to apply in future projects
				CO3: Get practical knowledge on Cam dynamics used in various industrial applications
6	I-I	MD106	Design Practice Lab-I	CO1: Demonstrate the knowledge of basic machine elements to withstand loads and deformations for a given application, while considering additional specifications
				CO2: Analyze the design of bearings using design charts and custom software and select appropriate bearings for an application using printed and electronic catalog data.
				CO3: Design shafts, brakes and clutches subjected to static or dynamic loads and present their designs orally and in writing.
7	I-I	MD107	Research Methodology And IPR	CO1: Understand the Scope and objectives of research problem
				CO2: Understand the Effective literature studies approaches
				CO3: Understand the Nature of Intellectual Property
				CO4: Understand the Patent information and databases.
				CO5: Understand New Developments in IPR
8	I-I	MD108	Soft skills	CO1: Understand the planning and preparation.
				CO2: Understand Paraphrasing and Plagiarism



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				<p><b>CO3:</b> Explain the review of the Literature</p> <p><b>CO4:</b> Explain Key skills are needed when writing a Title</p> <p><b>CO5:</b> Explain skills are needed when writing the Conclusions</p>
9	I-II	MD201	Advanced Finite Element Methods	<p><b>CO1:</b> Understanding Engineering problems and governing differential equations, finite elements and Formulation Techniques.</p> <p><b>CO2:</b> Apply One-dimensional elements on Bar, trusses, beams and frames, displacements, stresses and temperature effects.</p> <p><b>CO3:</b> Apply Two dimensional problems on CST, LST, four noded and eight noded rectangular elements, Lagrange basis for triangles and rectangles, serendipity interpolation functions.</p> <p><b>CO4:</b> Explain the concepts of sub parametric, super parametric elements, numerical integration, and Requirements for convergence.</p> <p><b>CO5:</b> Analyze Static and dynamic analysis, Eigen value problems, and their solution methods, case studies using commercial finite element packages.</p>
10	I-II	MD202	Advanced Machine Design	<p><b>CO1:</b> Remember the Creative techniques, Material selection in machine design, design for safety and Reliability, concept of product design</p> <p><b>CO2:</b> Understand Static failure theories, Distortion energy theory, Maximum shear stress theory, Coulomb-Mohr's theory, Modified Mohr's theory, Fracture mechanics theory</p> <p><b>CO3:</b> Explain various Fatigue failure theories like cumulative fatigue damage, thermal fatigue, harmful and beneficial residual stresses.</p> <p><b>CO4:</b> Understand Surface geometry, mating surfaces, oil film and their effects, surface fatigue failures, surface fatigue strength.</p> <p><b>CO5:</b> Understand Break-even analysis, Human engineering considerations, Ergonomics, Design of controls, Design of displays</p>
11	I-II	MD 2034	Composite Materials	<p><b>CO1:</b> Remember the Classification of Composites, MMC, Reinforcing fibres- Natural fibres (cellulose, jute, coir etc.), polybenzthiazoles etc.</p>



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				<p><b>CO2:</b> Apply the Fundamental concepts on Particulate fillers-importance of particle shape and size.</p> <p><b>CO3:</b> Explain Fabrication techniques: pultrusion, filament winding, bag moulding, resin transfer moulding, reaction injection moulding.</p> <p><b>CO4:</b> Understand the Basic Properties and microstructure of high-strength fiber materials and matrix materials.</p> <p><b>CO5:</b> Explain Hydrothermal stresses, bending of composite plates, analysis of sandwich plates, buckling analysis of laminated composite plates</p>
12	I/II	MD 2042	Design With Advanced Materials	<p><b>CO1:</b> Knowledge on elasticity in metals and polymers and mechanism of plastic deformation</p> <p><b>CO2:</b> Understand material property charts for material selection and cost basis and service requirements</p> <p><b>CO3:</b> Understand terminology in Modern metallic Materials and super alloys</p> <p><b>CO4:</b> Selection and use of Nonmetallic materials and composites</p> <p><b>CO5:</b> Understand the properties of Smart materials, shape memory alloys</p>
13	I-II	MD205	Computational Mathematics Lab	<p><b>CO1:</b> Utilize MAT LAB programs for verifying properties of limits, derivatives of a function</p> <p><b>CO2:</b> Solve the algebraic and transcendental equations within given range using MAT LAB programs. .</p> <p><b>CO3:</b> Make use of MAT LAB programs for interpolating values of differential equations numerically</p>
14	I-II	MD206	Design Practice Lab-II	<p><b>CO1:</b> Demonstrate the knowledge of basic machine elements to withstand loads and deformations for a given application, while considering additional specifications</p> <p><b>CO2:</b> Analyze the design of bearings using design charts and custom software and select appropriate bearings for an application using printed and electronic catalog data.</p> <p><b>CO3:</b> Design shafts, brakes and clutches subjected to static or dynamic loads and present their designs orally</p>



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				and in writing.
15	I-II	MD207	Value Education	<b>CO1:</b> Values and self-development –Social values and individual attitudes, Work ethics, Indian vision of humanism, Moral and non- moral valuation.
				<b>CO2:</b> Importance of cultivation of values, Sense of duty. Devotion, Self-reliance. Confidence, Concentration.
				<b>CO3:</b> Soul and Scientific attitude, Positive Thinking. Integrity and discipline, Punctuality, Love and Kindness, Avoid fault Thinking, Free from anger, Dignity of labor, Universal brotherhood and religious tolerance, True friendship
				<b>CO4:</b> Happiness Vs. suffering, love for truth, Aware of self-destructive habits, Association and Cooperation.
				<b>CO5:</b> Holy books vs. Blind faith, Self-management and Good health, Science of reincarnation, Equality, Nonviolence, Humility, Honesty, Studying effectively.
16	I-II	Mini Project with Seminar	Mini Project with Seminar	<b>CO1:</b> Demonstrate a sound technical knowledge of their selected mini project topic.
				<b>CO2:</b> Demonstrate the basic knowledge, skills and attitudes of a professional engineer
				<b>CO3:</b> Communicate with various engineers and the community at large
17	II-I	MD 3013	Additive Manufacturing	<b>CO1:</b> Explain the Additive Manufacturing Process
				<b>CO2:</b> Explain the Machines for Rapid Prototyping
				<b>CO3:</b> Explain Applications of Rapid Prototyping in Industrial Product Development
				<b>CO4:</b> Explain the Indirect Methods for the Manufacture of Metal Components.
				<b>CO5:</b> Explain Metal Tools Based on Multilevel AM Processes
18	II-I	MTCSE 2102	Internet of Things	<b>CO1:</b> Summarize on the term 'internet of things' in different contexts.
				<b>CO2:</b> Analyze various protocols for IoT.
				<b>CO3:</b> Design completely a POC of an IOT system using Raspberry Pi/Arduino
				<b>CO4:</b> Apply data analytics and use cloud offerings related to IoT.
				<b>CO5:</b> Analyze applications of IoT in real time scenario



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



19	II-I	Dissertation	Dissertation Phase -I	CO1: will learn to structure a discussion in a coherent and convincing way by synthesizing the material in the context of the research questions.
				CO2: At the end of the course the student's gets exposure to construct and justify research questions related to the topic.
20	II-II	Dissertation	Dissertation Phase -II	CO1: Demonstrate a sound technical knowledge of their selected project topic.
				CO2: Design the engineering solutions to complex problems utilizing a systems approach
				CO3: Communicate with engineer pioneers and the community at large in written an oral forms.

**Program:**  
**M.Tech. - POWER ELECTRONICS AND DRIVES (PE&D)**

S.No	Year-Sem	Course Code	Course Name	Course Outcomes After completion of the course student can able to
1	I-I	PC	Electrical Machines Modeling and Analysis	CO1: Analyze the characteristics of different types of DC motors to design suitable controllers for different applications.
				CO2: Apply the knowledge of reference frame theory for AC machines to model the induction and Synchronous machines.
				CO3: Evaluate the steady state and transient behavior of induction and synchronous machines to propose the suitability of drives for different industrial applications
				CO4: Analyze the behavior of induction machines using voltage and torque equations.
2	I-I	PC	Analysis of Power Electronic Converters	CO1: Describe and analyze the operation of AC-DC converters.
				CO2: Analyze the operation of power factor correction converters.
				CO3: Analyze the operation of three phase inverters with PWM control.
				CO4: Study the principles of operation of multi- level inverters and their applications.
3	I-I	PE	Modern Control Theory	CO1: Formulate and solve the state equations of dynamic systems, analyze controllability and observability.



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				<p><b>CO2:</b> Design a state feedback controller; design an observer.</p> <p><b>CO3:</b> Linearize a nonlinear system model; analyze non-linear systems through describing functions.</p> <p><b>CO4:</b> Determine the stability of a given system; generate a Lyapunov function.</p> <p><b>CO5:</b> Minimize a given functional, design an optimal feedback gain matrix.</p>
4	I-I	PE	HVDC Transmission and Flexible AC Transmission Systems	<p><b>CO1:</b> Compare HVDC and EHVAC transmission systems</p> <p><b>CO2:</b> Analyze converter configurations used in HVDC and evaluate the performance metrics.</p> <p><b>CO3:</b> Understand controllers for controlling the power flow through a dc link and compute filter Parameters.</p> <p><b>CO4:</b> Apply impedance, phase angle and voltage control for real and reactive power flow in ac transmission systems with FACTS controller.</p> <p><b>CO5:</b> Analyze and select a suitable FACTS controller for a given power flow condition.</p>
5	I-I		Research Methodology and IPR	<p><b>CO1:</b> Understand approaches of investigation of solutions for research problem.</p> <p><b>CO2:</b> Understand Effective literature studies approaches.</p> <p><b>CO3:</b> Learn nature of Intellectual Property</p> <p><b>CO4:</b> Know about the Patent Rights.</p> <p><b>CO5:</b> Learn about the New Developments in IPR</p>
6	I-I		Power Electronics Simulation Laboratory	<p><b>CO1:</b> To understand the operation of DC-DC converters by simulation.</p> <p><b>CO2:</b> To understand the operation of AC-DC converters by simulation.</p> <p><b>CO3:</b> To understand the operation of AC voltage regulators by simulation.</p> <p><b>CO4:</b> To understand the operation of DC-AC converters by simulation.</p>
7	I-I		Power Converters Laboratory	<p><b>CO1:</b> Students are able to implement the converter in real time applications.</p> <p><b>CO2:</b> Students are able to implement the inverters in real time applications.</p>
8	I-II	PC	Switched Mode Power	<p><b>CO1:</b> Analyze operation and control of non-isolated and isolated switch mode converters.</p> <p><b>CO2:</b> Design of non-isolated and isolated switch mode</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



			Conversion	converters. <b>CO3:</b> Analyze operation and control of resonant converters. <b>CO4:</b> Feedback design of switch mode converters based on linearized models.
9	I-II	PC	Power Electronic Control of Electrical Drives	<b>CO1:</b> Understand the concepts of scalar and vector control methods for drive systems. <b>CO2:</b> Analyze and design controllers and converters for induction motor, PMSM and BLDC drives. <b>CO3:</b> Select and implement proper control techniques for induction motor and PMSM for specific applications. <b>CO4:</b> Analyze and design control techniques and converters for SRM drives.
10	I-II	PE	Digital Control Systems	<b>CO1:</b> Analyze digital control systems using Z-transforms and Inverse Z-Transforms. <b>CO2:</b> Evaluate the state transition matrix and solve state equation for discrete model for continuous time systems, investigate the controllability and observability. <b>CO3:</b> Determine the stability; design state feedback controller. <b>CO4:</b> Design an observer. <b>CO5:</b> Solve a given optimal control problem.
11	I-II	PE	Micro-controllers	<b>CO1:</b> Design the interfacing circuits for input and output to PIC micro controllers and DSP processors. <b>CO2:</b> Write ALP for DSP processors. <b>CO3:</b> Design PWM controller for power electronic circuits using FPGA.
12	I-II		Electric Drives Simulation Laboratory	<b>CO1:</b> The student should analyze the performance of different electrical machines. <b>CO2:</b> The student should analyze the performance of different electrical drives
13	I-II		Electric Drives Laboratory	<b>CO1:</b> The student should Understand the performance of DC drives. <b>CO2:</b> The student should Understand the performance of AC drives.
14	II-III		Modeling and Simulation of Power	<b>CO1:</b> Understand the back ground activities i.e. numerical solution used in the simulation software. <b>CO2:</b> Can judge or properly choose the required numerical solver to be used for analysis.



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



			Electronic Systems	<b>CO3:</b> Can understand and debug the convergence problems occurring during simulation.
15	II-III		Energy Audit Conservation & Management	<b>CO1:</b> Understand the principle of energy audit and their economic aspects.
				<b>CO2:</b> Recommend energy efficient motors and design good lighting system.
				<b>CO3:</b> Understand advantages to improve the power factor.
				<b>CO4:</b> Evaluate the depreciation of equipment.
16	II-III		Energy Audit Conservation & Management)	<b>CO1:</b> Understand the principle of energy audit and their economic aspects.
				<b>CO2:</b> Recommend energy efficient motors and design good lighting system.
				<b>CO3:</b> Understand advantages to improve the power factor.
				<b>CO4:</b> Evaluate the depreciation of equipment.
17	II-III		Dissertation Phase-I	<b>CO1:</b> The Dissertation shall be related to the major field of his/her PG specialization work.
				<b>CO2:</b> The Dissertation should be one of the major pieces of evidence that students are familiar with or that student wants to be familiar with. It should reflect your specialist subject by means of deep and sustained study.
				<b>CO3:</b> The dissertation work shall be carried out by each candidate independently during the third and fourth semester under the guidance of one of the faculty members of the Department. If Page 18 of 18 the project work is of inter-disciplinary nature, a co-guide shall be taken from the same or any other relevant Department.
				<b>CO4:</b> Dissertation Phase-I includes literature review, required theoretical input, study and comparison of various approaches for the proposed dissertation work.
18	II-IV		Dissertation Phase-II	<b>CO1:</b> Student should carry out the investigation by identifying sources of evidence, accessing those using accepted and rigorous academic methods, and analyzing and interpreting the material gathered by simulation/experimentation.
				<b>CO2:</b> A dissertation phase - II is student's own work & will need to keep up the effort, and the interest, over several months and through several stages.



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				<p><b>CO3:</b> Student need to think carefully about the time necessary to carry-out and complete your project work and the relative writing up.</p> <p><b>CO4:</b> The project should present an orderly and critical exposition of the existing knowledge of the subject and will embody results of original investigations demonstrating the capacity of the candidate to do independent research work.</p> <p><b>CO5:</b> While writing the thesis/dissertation, the candidate will layout clearly the work done by him independently and the sources from which he has obtained other information contained.</p>
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**Program:**  
**Master Of Business Administration**

S.No:	Year - Sem	Course Code	Course Name	Course Outcomes After completion of the course student can able to
1	I-I	C-101	Management and Organizational Behavior	<b>CO1:</b> Students will be able to demonstrate how to make better decisions both individually and in a group
				<b>CO2:</b> Students will be able to demonstrate effective techniques for managing conflict.
				<b>CO3:</b> Students will be able to identify the characteristics of successful teams in order to function effectively as a team members and leaders.
				<b>CO4:</b> Students will be able to apply different motivational theories and methods to increase the productivity and job satisfaction of employees.
2	I-I	C-102	Managerial Economics	<b>CO1:</b> Apply the knowledge of the mechanics of supply and demand to explain working of markets
				<b>CO2:</b> Describe how changes in demand and supply affect markets
				<b>CO3:</b> Understand the choices made by a rational consumer
				<b>CO4:</b> Explain relationships between production and costs
				<b>CO5:</b> Define key characteristics and consequences of different forms of markets
3	I-I	C-103	Accounting for	<b>CO1:</b> Know and apply accounting and finance theory



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			Managers	<p><b>CO2:</b> Explain and apply international accounting standards</p> <p><b>CO3:</b> Critically evaluate financial statement information</p> <p><b>CO4:</b> Evaluate and compare different investments</p>
4	I-I	C-104	Quantitative Analysis for Business Decisions	<p><b>CO1:</b> Understand various quantitative &amp; statistical methods</p> <p><b>CO2:</b> Understand data and draw inference from data</p> <p><b>CO3:</b> Calculate and interpret statistical values by using statistical tool (correlation &amp; regression)</p> <p><b>CO4:</b> Demonstrate an ability to apply various statistical tool to solve business problem</p>
5	I-I	C-105	Legal and Business Environment	<p><b>CO1:</b> Able to appreciate the importance of law and legal institutions in business</p> <p><b>CO2:</b> Able to have a basic understanding of the laws relating to contract, consumer protection, competition, companies and dispute resolution</p> <p><b>CO3:</b> Explain the concept of the various constituents of environment and their impact on businesses.</p> <p><b>CO4:</b> Apply the trade theories , investment theories, exchange rate theories and regional trading bloc theories and their impact on economic welfare.</p> <p><b>CO5:</b> Analyse the principle and he different exchange rate regimes' impact on businesses.</p> <p><b>CO6:</b> Integrate the concept and opening economies of developing countries like India through RTB and multilateral route (WTO)</p>
6	I-I	C-106	Business Communication and Soft skills	<p><b>CO1:</b> To be familiar with the complete course outline/Course Objectives/Learning Outcomes/Evaluation Pattern &amp; Assignments</p> <p><b>CO2:</b> To participate in an online learning environment successfully by developing the implication-based understanding of Paraphrasing, deciphering instructions, interpreting guidelines, discussion boards &amp; Referencing Styles.</p> <p><b>CO3:</b> To demonstrate his/her ability to write error free while making an optimum use of correct Business Vocabulary &amp; Grammar.</p> <p><b>CO4:</b> To distinguish among various levels of organizational communication and communication barriers while developing an understanding of</p>



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				<p>Communication as a process in an organization</p> <p><b>CO5:</b> To draft effective business correspondence with brevity and clarity</p> <p><b>CO6:</b> To stimulate their Critical thinking by designing and developing clean and lucid writing skills.</p>
7	I-I	C-107	Cross Cultural Management	<p><b>CO1:</b> Understanding of the changing global business environment, emerging business and cross cultural issues, and implications for management.</p> <p><b>CO2:</b> Work cohesively in a cross-cultural team and demonstrate understanding of problem solving strategies in diverse teams.</p> <p><b>CO3:</b> Understand differences in cross cultural leadership styles and adaptability to cultural contexts.</p> <p><b>CO4:</b> Critically analyse cultural differences, conduct comparative analyses and consider the impact on global business organization</p> <p><b>CO5:</b> Written work that is clearly and logically presented, with evidence of persuasive arguments, culturally sensitive communication and linguistic accuracy.</p>
8	I-II	C-108	IT - LAB	<p><b>CO1:</b> 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.</p> <p><b>CO2:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.</p> <p><b>CO3:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.</p> <p><b>CO4:</b> 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.</p> <p><b>CO5:</b> Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.</p>
				<p><b>CO1:</b> Identify legal issues that impact financial and other risks affecting business.</p>



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9	I-II	C-201	Financial Management	CO2: Analyze relevant case law for the purpose of finding legal precedents that will be used to persuade a judge or jury
				CO3: Interpret statutory law for purposes of risk avoidance, and to establish control mechanisms
10	I-II	C-202	Human Resource Management	CO1: To develop the understanding of the concept of human resource management and to understand its relevance in organizations.
				CO2: To develop necessary skill set for application of various HR issues.
				CO3: To analyse the strategic issues and strategies required to select and develop manpower resources
				CO4: To integrate the knowledge of HR concepts to take correct business decisions.
11	I-II	C-203	Marketing Management	CO1: Students will demonstrate strong conceptual knowledge in the functional area of marketing management
				CO2: Students will demonstrate effective understanding of relevant functional areas of marketing management and its application.
				CO3: Students will demonstrate analytical skills in identification and resolution of problems pertaining to marketing management.
12	I-II	C-204	Operations Management	CO1: Identify the elements of operations management and various transformation processes to enhance productivity and competitiveness
				CO2: Analyze and evaluate various facility alternatives and their capacity decisions, develop a balanced line of production & scheduling and sequencing techniques in operation environments
				CO3: Develop aggregate capacity plans and MPS in operation environments.
				CO4: Plan and implement suitable materials handling principles and practices in the operations.
				CO5: Plan and implement suitable quality control measures in Quality Circles to TQM.
13	I-II	C-205	Business Research Methods	CO1: Have an understanding of various kinds of research, objectives of doing research, research process research designs and sampling.



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				<p><b>CO2:</b> Be able to formulate research problem and develop a sufficiently coherent research design.</p> <p><b>CO3:</b> Have basic knowledge on qualitative, quantitative as well as measurement &amp; scaling techniques.</p> <p><b>CO4:</b> Have a basic awareness of data analysis, including descriptive &amp; inferential measures.</p> <p><b>CO5:</b> Be able to write &amp; develop independent thinking for critically analyzing research reports.</p>
14	I-II	C-206	Project Management	<p><b>CO1:</b> Understand project characteristics and various stages of a project.</p> <p><b>CO2:</b> Understand the conceptual clarity about project organization and feasibility analyses – Market, Technical, Financial and Economic.</p> <p><b>CO3:</b> Analyze the learning and understand techniques for Project planning, scheduling and Execution Control.</p> <p><b>CO4:</b> Apply the risk management plan and analyse the role of stakeholders.</p> <p><b>CO5:</b> Understand the contract management, Project Procurement, Service level Agreements and productivity.</p> <p><b>CO6:</b> Understand the How Subcontract Administration and Control are practiced in the Industry.</p>
15	II-I	C-301	Strategic Management	<p><b>CO1:</b> Students will be able to describe major theories, background work, concepts and research output in the field of strategic management.</p> <p><b>CO2:</b> Students will demonstrate a clear understanding of the concepts, tools &amp; techniques used by executives in developing and executing strategies and will appreciate its integrative and interdisciplinary nature.</p> <p><b>CO3:</b> Students will be able to demonstrate effective application of concepts, tools &amp; techniques to practical situations for diagnosing and solving organizational problems.</p> <p><b>CO4:</b> Students will be able to demonstrate capability of making their own decisions in dynamic business landscape.</p> <p><b>CO5:</b> Students will be able to develop their capacity to think and execute strategically</p>
				<p><b>CO1:</b> Identify and develop operational research models from the verbal description of the real system.</p>



# R K COLLEGE OF ENGINEERING

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 (An ISO 9001:2015 Certified Institution)  
 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



16	II-I	C-302	Operations Research	CO2: Understand the mathematical tools that are needed to solve optimization problems.
				CO3: Use mathematical software to solve the proposed models.
				CO4: Develop a report that describes the model and the solving technique, analyze
				CO5: The results and propose recommendations in language understandable to the decision-making processes in Management Engineering
17	II-I	EH-301	Leadership and Change Management	CO1: Understand the concepts related to Business.
				CO2: Demonstrate the roles, skills and functions of management.
				CO3: Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.
				CO4: Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities.
18	II-I	EH-302	Performance Evaluation and Compensation Management	CO1: Students will be able to apply the concepts of performance appraisal and compensation management practically.
				CO2: Understand the relationships among job requirements, employee KSAs, and employer-provided compensation.
				CO3: Develop a clear link between work required, performance demonstrated, and pay provided to each employee.
				CO4: Develop incentive and indirect compensation programs to recognize achievement of individual, group and organizational objectives, improving the organization's ability to attract and retain quality employees.
				CO5: Recognize what competitors are paying for comparable employees in relevant labor markets to permit the organization to attract and keep competent employees.
				CO1: Relate the importance of using data-based reasoning to support HR decisions.
				CO2: Calculate absenteeism costs, turnover costs, and return-on-investment.



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



19	II-I	EH-303	Human Resource Metrics and Analytics	CO3: Develop recommendations for workforce planning (e.g., staffing needs) based on the results of analysis
				CO4: Develop effective surveys for use in an organizational setting.
				CO5: Translate research findings into practical conclusions and recommendation
20	II-I	EH-304	Human Capital Management	CO1: Integrated perspective on role of HRM in modern business. Ability to plan human resources and Implement techniques of job design
				CO2: Competency to recruit, train, and appraise the performance of employees
				CO3: Rational design of compensation and salary administration
				CO4: Ability to handle employee issues and evaluate the new trends in HRM
21	II-I	EH-305	Manpower Planning, Recruitment, and Selection	CO1: Integrated perspective on role of HRM in modern business. Ability to plan human resources and Implement techniques of job design
				CO2: Competency to recruit, train, and appraise the performance of employees
				CO3: Rational design of compensation and salary administration
				CO4: Ability to handle employee issues and evaluate the new trends in HRM
22	II-I	EF-301	Investment Analysis and Portfolio Management	CO1: Demonstrate a basic understanding of investments and the nuances of investing
				CO2: Exhibit the acquaintance of the securities market and its constituents
				CO3: Apply knowledge gained to perform analysis of various securities
				CO4: Analyze and apply models to securities performance and forecasting
				CO5: Construct optimal portfolios and evaluate them using models
23	II-I	EF-302	Managing Banks and Financial Institutions	CO1: Understand the various services offered and various risks faced by banks
				CO2: Understand the dynamic changes of the banking industry and the policy responses because of the recent crisis
				CO3: Have a practical understanding of the various



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				<p>distribution channels of insurance products for effective marketing.</p> <p><b>CO4:</b> Have a practical understanding of regulations and be able to understand insurance operations both in life as well as general insurance.</p>
24	II-I	EF-303	Financial Markets and Services	<p><b>CO1:</b> Understand the role and function of the financial system in reference to the macro economy</p> <p><b>CO2:</b> Demonstrate an awareness of the current structure and regulation of the Indian financial services sector</p> <p><b>CO3:</b> Evaluate and create strategies to promote financial products and services</p>
25	II-I	EF-304	Mergers, Acquisitions and Corporate Restructuring	<p><b>CO1:</b> Identify the key issues and concepts of mergers and acquisitions.</p> <p><b>CO2:</b> Understand the major strategies that underlie most M&amp;A transactions.</p> <p><b>CO3:</b> Examine the necessary conditions for value to be created.</p> <p><b>CO4:</b> Assess various case studies to analyze valuation strategies, pre and post merger issues and challenges</p>
26	II-I	EF-305	Taxation	<p><b>CO1:</b> Students would identify the technical terms related to Income Tax.</p> <p><b>CO2:</b> Students would determine the residential status of an individual and scope of total income.</p> <p><b>CO3:</b> Students would compute income from salaries, house property, business/profession, capital gains and income from other sources.</p> <p><b>CO4:</b> Students would discuss the various benefits/deductions under Chapter VI-A of the Income tax act, 1961</p> <p><b>CO5:</b> Students would compute the net total income of an individual.</p>
27	II-I	EM-301	Consumer Behavior	<p><b>CO1:</b> Demonstrate how knowledge of consumer behavior can be applied to marketing.</p> <p><b>CO2:</b> Identify and explain factors which influence consumer behavior.</p> <p><b>CO3:</b> Relate internal dynamics such as personality, perception, learning motivation and attitude to the choices consumers make</p> <p><b>CO4:</b> Use appropriate research approaches including sampling, data collection and questionnaire design for</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				specific marketing situations. <b>CO5:</b> In a team, work effectively to prepare a research report on consumer behavior issues within a specific context.
28	II-I	EM-302	Retail Management	<b>CO1:</b> Understand the functions of retail business and various retail formats and retail channels. <b>CO2:</b> Understand the difference between Retail and Manufacturing Supply Chain <b>CO3:</b> Understand, key drivers of retail supply chain and how to select a retail store location? <b>CO4:</b> Analyze Retail Market and Financial Strategy including product pricing. <b>CO5:</b> Integrate the various Supply Chain partners and how to collaborate with them?
29	II-I	EM-303	Customer Relationship Management	<b>CO1:</b> Understand the basic concepts of Customer relationship management. <b>CO2:</b> To understand marketing aspects of Customer relationship management. <b>CO3:</b> Learn basics of analytical Customer relationship management. <b>CO4:</b> Understand basics of operational Customer relationship management
30	II-I	EM-304	Strategic Marketing Management	<b>CO1:</b> Compare and contrast the key principles of marketing strategy <b>CO2:</b> It Explains marketing and strategy concepts and ideas in their own words <b>CO3:</b> Think strategically about marketing issues and provide recommendations <b>CO4:</b> Successfully work as a team <b>CO5:</b> Deliver an oral presentation in a professional, engaging manner <b>CO6:</b> Prepare a professional, logical and coherent report in the form of a marketing plan
31	II-I	EM-305	Digital and	<b>CO1:</b> Analyse the confluence of marketing, operations, and human resources in real-time delivery. <b>CO2:</b> Comprehend the importance of conversion and working with digital relationship marketing; and <b>CO3:</b> Analyse cross-cultural and ethical issues in globalised digital markets



# R K COLLEGE OF ENGINEERING

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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



			Social Media Marketing	<p><b>CO4:</b> Investigate and evaluate issues in adapting to globalised markets that are constantly changing and increasingly networked.</p> <p><b>CO5:</b> Demonstrate cognitive knowledge of the skills required in conducting online research and research on online markets, as well as in identifying, assessing and selecting digital market opportunities.</p>
32	II-II	C-401	Supply Chain Management and Analytics	<p><b>CO1:</b> Develop an understanding of the importance of logistics in the formulation of the business strategy and the conduct of supply chain operations.</p> <p><b>CO2:</b> Develop an in-depth understanding of logistics operating areas and their interrelationship.</p> <p><b>CO3:</b> Strengthen integrative management analytical and problem-solving skills</p>
33	II-II	C-402	Innovation and Entrepreneurship	<p><b>CO1:</b> Entrepreneurship and Innovation minors will be able to sell themselves and their ideas. Students master oral and visual presentation skills and establish a foundation of confidence in the skills necessary to cause others to act.</p> <p><b>CO2:</b> Entrepreneurship and Innovation minors will be able to find problems worth solving. Students advance their skills in customer development, customer validation, competitive analysis, and iteration while utilizing design thinking and process tools to evaluate in real-world problems and projects.</p> <p><b>CO3:</b> Entrepreneurship and Innovation minors will be able to create value. Students are able to create presentations and business plans that articulate and apply financial, operational, organizational, market, and sales knowledge to identify paths to value creation through 1) company formation (for-profit); 2) social innovation (nonprofit); or 3) intellectual property licensing.</p> <p><b>CO4:</b> Entrepreneurship and Innovation minors will develop and cultivate endurance. Students increase their awareness and deliberately practice the skills and disciplines necessary to increase confidence and agency and self-advocacy; improve communication and problem-solving skills, manage strong impulses and feelings; and identify personal purpose.</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



34	II-II	EH-401	Labor Welfare and employment laws	CO1: Students should able to elaborate the concept of Industrial Relations
				CO2: The students should able to illustrate the role of trade union in the industrial setup.
				CO3: Students should able to outline the important causes & impact of industrial disputes.
				CO4: Students should able to elaborate Industrial Dispute settlement procedures
				CO5: Student should be able to summarize the important provisions of Wage Legislations, in reference to Payment of Wages Act 1936, Minimum Wages Act 1948 & Payment of Bonus Act 1965
35	II-II	EH-402	International HRM	CO1: Integrated perspective on role of HRM in modern business. Ability to plan human resources and implement techniques of job design
				CO2: Competency to recruit, train, and appraise the performance of employees
				CO3: Rational design of compensation and salary administration
				CO4: Ability to handle employee issues and evaluate the new trends in HRM
				CO5: Understand and apply Human Resource Management Perspective
36	II-II	EH-403	Employee Relations and Engagement	CO1: Describe and critique the concept of employee engagement
				CO2: Identify problems associated with both over-engagement and disengagement
				CO3: Examine the extent to which emotional and aesthetic labour are positioned in some contemporary organizations
				CO4: Critically evaluate the measurement of employee engagement
				CO5: Identify the issues associated with employee engagement in times of organizational change, including the role of effective communications during organizational change
37	II-II	EH-404	Human Resources Development	CO1: Explain the importance of human resources and their effective management in organizations
				CO2: Describe the meanings of terminology and tools used in managing employees effectively



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				<p><b>CO3:</b> Analyze the key issues related to administering the human elements such as motivation, compensation, appraisal, career planning, diversity, ethics, and training</p> <p><b>CO4:</b> Research the advantages and disadvantages of induction processes for new incumbents in a role</p> <p><b>CO5:</b> Demonstrate appropriate implementation, monitoring and assessment procedures of training</p>
38	II-II	EH-405	Strategic HRM	<p><b>CO1:</b> Demonstrate a basic understanding of business and the role of strategic human resources in the organization, and the business skills necessary</p> <p><b>CO2:</b> Describe the basic knowledge and skills of the disciplines that comprise the human resources field; compensation and benefits, employee training and development, workforce planning and talent management, and performance management</p> <p><b>CO3:</b> Understand the leadership role of human resources in shaping the future of organizations such as: Creating and managing global workforces, working in diverse organizations, managing strategic change in the organization,</p> <p><b>CO4:</b> creating strategic partnerships both within the organization and external to the organization, and managing the well-being of employees.</p> <p><b>CO5:</b> contribute to the achievement of organizational goals in a rapidly changing global environment.</p>
39	II-II	EF-401	Financial Derivatives	<p><b>CO1:</b> Students will be able to analyze the risks in different financial markets</p> <p><b>CO2:</b> Acquire ability to selection of various options and then can apply them to specific markets.</p> <p><b>CO3:</b> Student will be able to strategically manage the financial derivatives.</p>
40	II-II	EF-402	Global Financial Management	<p><b>CO1:</b> Apply competences with financial analytical skills required to evaluate the performance of the firm, including the interpretation of financial data</p> <p><b>CO2:</b> Identify the operations of the developed global financial markets, the trading of financial instruments, and the role of regulatory bodies</p> <p><b>CO3:</b> Evaluate the financial instruments used in the equity and debt markets for funding the corporation</p> <p><b>CO4:</b> Critically analyse the issues underlying the capital structure theory and practices to achieve the optimal</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				debt to equity ratio
				<b>CO5:</b> Discuss advanced topics in corporate financial management including specialized topics such as international investments, foreign exchange management, and global portfolio management
41	II-II	EF-403	Financial Risk Management	<b>CO1:</b> Identify the key components of the Basel framework
				<b>CO2:</b> Be able to analyze market risk on a standalone basis VaR frame work and ways to manage
				<b>CO3:</b> Develop a general risk management strategy for a financial Institution
				<b>CO4:</b> Be able to analyze operational risk using the standardized approach and ways to manage operational risk.
42	II-II	EF-404	Strategic Financial Management	<b>CO1:</b> If the course will be completed successfully, students should be able to think critically, including self-reflection, and creatively in identifying, evaluating of the alternative solutions to business problems.
				<b>CO2:</b> If the course will be completed successfully, students should be able to solve complex problems and business management decisions including numeracy and quantitative skills
				<b>CO3:</b> If the course will be completed successfully, students should be able to undertake research into a financially related business problem and to apply skills in the assembling and analysis of data collected.
				<b>CO4:</b> If the course will be completed successfully, students should be able to synthesize and use information and knowledge effectively
				<b>CO5:</b> If the course will be completed successfully, students should be able to communicate with CFOs and teammates in order to produce efficient solutions within the certain time limits
43	II-II	EF-405	Behavioral Finance	<b>CO1:</b> The learning occurs primarily through reading and thinking about the papers or chapters of books recommended and discussion in class.
				<b>CO2:</b> This reading is supported by the programme of ten lectures and nine tutorials, in each of which an overview of the topic is presented and the findings of a number of relevant papers are reviewed in some detail. Students are required to write a report.



# R K COLLEGE OF ENGINEERING

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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				<p><b>CO3:</b> Prior to each session you are required to complete the reading assignments given. During the session, the lecture slides will be used to focus the discussion and to help to summarize key issues.</p> <p><b>CO4:</b> As the structure of the elective is designed to be cumulative, student will be expected to bring your learning and insights from previous sessions to bear on subsequent sessions.</p> <p><b>CO5:</b> The student brings together and test out your understanding of the issues discussed in the course during the lectures.</p>
44	II-II	EM-401	Digital Marketing	<p><b>CO1:</b> Demonstrate an extended understanding of the similarities and differences in service-based and physical product-based marketing activities;</p> <p><b>CO2:</b> Demonstrate a knowledge of the extended marketing mix for services</p> <p><b>CO3:</b> Develop and justify marketing planning and control systems appropriate to service-based activities</p> <p><b>CO4:</b> Specify, analyse and select markets for specific service products</p> <p><b>CO5:</b> Prepare, communicate and justify marketing mixes and information systems for service-based organizations</p>
45	II-II	EM-402	Promotional and Distribution Management	<p><b>CO1:</b> Students will be able to identify the scope and significance of Marketing In Domain Industry</p> <p><b>CO2:</b> Students will be able to examine marketing concepts and phenomenon to current business events In the Industry.</p> <p><b>CO3:</b> Students will be able to coordinate the various marketing environment variables and interpret them for designing marketing strategy for business firms</p> <p><b>CO4:</b> Students will be able to illustrate market research skills for designing innovative marketing strategies for business firms</p> <p><b>CO5:</b> Students will be able to practice marketing communication skills relevant to the corporate world.</p>
46	II-II	EM-403	Green Marketing	<p><b>CO1:</b> Identify the specificities of green green marketing in relation to 'traditional' marketing.</p> <p><b>CO2:</b> To critically analyze the strategic context (external and internal) influencing the</p>



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 Kethanakonda (V), Ibrahimpatnam (M), Vijayawada, AMARAVATI - AP - 521456



				marketing strategies of companies and organizations. <b>CO3:</b> Build integrated and grounded marketing decisions focused on issues /products / services with a strong environmental component. <b>CO4:</b> Develop marketing plans.
47	II-II	EM-404	Advertising and Brand Management	<b>CO1:</b> To understand the nature, role, and importance of brand management and advertising in marketing strategy <b>CO2:</b> To understand effective design and implementation of advertising strategies <b>CO3:</b> To present a general understanding of content, structure, and appeal of advertisements <b>CO4:</b> To understand ethical challenges related to responsible management of advertising and brand strategy
48	II-II	EM-405	Global Marketing Management	<b>CO1:</b> Understand the key characteristics of important country markets in different regions of the world and learn how to develop marketing plans for these diverse country markets <b>CO2:</b> Learn to gather, categorize, analyze, interpret, and evaluate relevant information about markets in different countries around the world. <b>CO3:</b> Learn how to assess the social/cultural, economic/financial, political/regulatory, and technological/infrastructure environments of different countries and how to adjust a company's marketing practices based on these factors <b>CO4:</b> Learn how to analyze customers, competitors, and product markets in different countries and how to apply this analysis to developing international and global marketing strategies <b>CO5:</b> Learn to critically analyze and evaluate local versus global perspectives in developing marketing plans and to make decisions about which aspects of marketing to localize and which to globalize in developing marketing plans