



SAGIRAMAKRISHNAM RAJU ENGINEERING COLLEGE(AUTONOMOUS) (Affiliated to JNTUK, Kakinada), (Recognized by AICTE, New Delhi) Accredited by NAAC with 'A' Grade UG Programmes CE, CSE,ECE, EEE,IT&ME are Accredited by NBA Chinna Amiram,Bhimavaram-534204.(AP)

B. TECH – MECHANICAL ENGINEERING

Department Vision

Mechanical Engineering Department strives to be recognized globally for quality education, training and research leading to well-qualified engineers, who are innovative, entrepreneurial, and successful in solving problems of society.

Department Mission:

- Impart quality education to students to enhance their skills and make them globally competitive.
- Maintain a vital and state-of-the-art research to provide its students and faculty with opportunities to create, interpret, apply, and disseminate knowledge.
- Prepare its graduates to pursue higher studies, serve the profession and meet intellectual, ethical and career challenges.

Program Educational Objectives (PEOs) :

	To Educate the graduate of the program to build a successful technical or
PEO1	
	professional career in Mechanical Engineering.
	To envisage graduate engineer to achieve the goal in terms of pursuing higher
PEO2	
	education and Research and Development activities.
PEO3	To help graduates become a moral & ethically responsible citizen in nation
	building
	ounding.

Program Specific Outcomes (PSO's):

PSO1	Apply mechanical engineering fundamentals to design mechanical engineering
	systems and thermal systems.
PSO2	Identify and select appropriate manufacturing processes and apply quality control
	methods for production of various components.



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Estd:1980

Program Outcomes (POs): Engineering Graduates will be able to:

	Engineering knowledge: Apply the knowledge of mathematics, science,
1	engineering fundamentals, and an engineering specialization to the solution of
	complex engineering problems.
2	Problem analysis: Identify, formulate, review research literature, and analyze complex
	engineering problems reaching substantiated conclusions using first principles of
	mathematics, natural sciences, and engineering sciences.
3	Design/development of solutions: Design solutions for complex engineering problems
	and design system components or processes that meet the specified needs with
5	appropriate consideration for the public health and safety, and the cultural, societal,
	and environmental considerations.
	Conduct investigations of complex problems: Use research-based knowledge
4	and research methods including design of experiments, analysis and interpretation
	of data, and synthesis of the information to provide valid conclusions.
	Modern tool usage: Create, select, and apply appropriate techniques, resources, and
5	modern engineering and IT tools including prediction and modeling to complex
	engineering activities with an understanding of the limitations.
	The engineer and society: Apply reasoning informed by the contextual knowledge
6	to assess societal, health, safety, legal and cultural issues and the consequent
	responsibilities relevant to the professional engineering practice.
	Environment and sustainability: Understand the impact of the professional
7	engineering solutions in societal and environmental contexts, and demonstrate the
	knowledge of, and need for sustain able development.
8	Ethics: Apply ethical principles and commit to professional ethics and
	responsibilities and norms of the engineering practice.
9	Individual and team work: Function effectively as an individual, and as a member
	orleader in diverse teams, and in multidisciplinary settings.
	Communication: Communicate effectively on complex engineering activities with the
10	engineering community and with society at large, such as, being able to comprehend
10	and write effective reports and design documentation, make effective presentations,
	and give and receive clear instructions.
	Project management and finance: Demonstrate knowledge and understanding of
11	the engineering and management principles and apply these to one's own work, as a
	member and leader in a team, to manage projects and in multi-disciplinary
	environments.
12	Lite-long learning: Recognize the need for, and have the preparation and ability
	to engage in independent and life-long learning in the broadest context of
	technological change.



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Course outcomes (Cos) of all courses of all programs offered by the institution

Course Outcomes for First Year First Semester Course		
Course Code:B20HS1101		
Course 7	Title: ENGLISH	
CO-1	Identify the context, topic and pieces of specific information by understanding and responding to the social or transactional dialogues spoken by native speakers of English.	
CO-2	Apply suitable strategies for skimming and scanning to get the main idea of a text and locate specific information.	
CO-3	Build confidence and adapt themselves to the social and public discourses, discussions and presentations.	
CO-4	Apply the principles of writing to paragraphs, arguments, essays and formal/ informal communication.	
CO-5	Construct sentences using proper grammatical structures and correct word forms.	
Course C	Code:B20BS1101	
Course 1	Sitle: MATHEMATICS – I	
<u>CO-1</u>	Solve a given system of linear algebraic equations	
CO-2	Determine Eigen values and Eigen vectors of a system represented by a matrix.	
0.3	Apply the knowledge in simple applications such as Newton's law of cooling	
CO-4	orthogonal trajectories and simple electrical circuits	
$\frac{\text{CO-5}}{\text{CO-6}}$	Solve linear ordinary differential equations of second order and higher order.	
	Determine Laplace transform, inverse Laplace transform and solve linear ODE	
Course 7	Code: D20DS1102	
Course	Interpret the behavior of light radiation in interference and diffraction Phenomena and their	
CO-1	applications.	
CO-2	applications.	
CO-3	Understand the basics of modern optical technologies like lasers and optical fibers and their utility in various fields.	
CO-4	Explain the important aspects of semiconductors and electrical conductivity in them.	
CO-5	Understand the basics of technology of Ultrasonics in various fields and demonstrate the synthesis and applications of nanomaterials.	
Course (Code:B20ME1101	
Course 1	Title: ENGINEERING DRAWING	
<u>CO-1</u>	Apply principles of drawing to Construct polygons and engineering curves.	
CO-2	Apply principles of Orthographic projections to draw the projections of points and lines.	
CO-3	Apply principles of drawing to draw the projections of planes.	
CO-4	Apply principles of drawing to draw developments and nictorial view of solids	
Course (Sode B20EE1102	
Course 7	Title: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	
CO-1	Apply concepts of Ohm's Law, Kirchhoff's laws, Superposition theorem for solving DC circuits and Phasor representation.	
CO-2	Apply Faraday's laws and induced EMF concepts to describe the operating principles and characteristics of DC Machines. Transformers and Induction motors	
CO-3	Analyze the operation of DC Motors by using Speed Control methods and Transformers with OC & SC Tests	
CO-4	Illustrate the concepts of diodes, Zener diodes in different applications like rectifier voltage regulator and Light Emitting Diode	
CO-5	Explain transistor operation, sensors and transducers related to electrical signals	
Course Code B20EE1105		
Course 7	Sitle: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB	
CO-1	Verify Kirchhoff's Laws & Superposition theorem for dc supply	
CO-2	Analyze the performance of AC and DC Machines by testing	
CO-3	Perform speed control of dc shunt motor	
CO-4	Conduct experiments to obtain I – V Characteristics of Diode	
CO-5	Determine the ripple factor of half wave & full wave rectifiers	
Course (Code: B20BS1107	



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Course Title: APPLIED PHYSICS LAB		
CO-1	Get hands on experience in setting up experiments and using the instruments /equipment individually.	
CO-2	Get introduced to using new / advanced technologies and understand their significance.	
Course Code: B20ME1102		
Course Title: WORKSHOP PRACTICE		
CO-1	Apply wood working skills in real world applications.	
CO-2	Build different parts with metal sheets in real world applications.	
CO-3	Apply fitting operations in various applications.	
CO-4	Apply different types of basic electric circuit connections.	

Course Outcomes for First Year Second Semester Course

Course (Code:B20BS1201		
Course Title: MATHEMATICS – II			
CO-1	Determine Fourier series and half range series of functions		
CO-2	Determine Fourier transforms of non-periodic functions and also use them to evaluate integrals.		
CO-3	Compute partial derivatives, total derivative and Jacobians.		
CO-4	Find maxima/minima of functions of two variables and evaluate some real definite integrals.		
CO-5	Form partial differential equations and solve Lagrange linear equation. Solve linear higher order homogeneous and non-homogeneous PDEs.		
CO-6	Find theoretical solution of one-dimensional wave equation and one-dimensional heat equation		
Course (Code: B20BS1203		
Course 7	Yitle: APPLIED CHEMISTRY		
CO-1	Develop polymer composites, synthetic polymers and formulation of polymers and their use in design		
	Apply the knowledge about quality of water and its treatment methods for domestic and industrial		
CO-2	applications. Understanding the principle, mechanism of corrosion and utilization of various techniques to control.		
CO 2	Develop the knowledge of fuels and their economics, advantages and limitations. Make use of the		
0.0-3	basic concepts of semiconductors and liquid crystals for engineering applications.		
CO-4	Identify constituents of various ceramic materials, characteristics and their appropriate use in construction. Apply the knowledge of electrochemistry principles to design energy storage		
Course (Code:B20CS1201		
Course 7	itle: PROGRAMMING FOR PROBLEM SOLVING USING C		
CO-1	Apply Precedence and Associativity rules to evaluate Expressions.		
CO-2	Make use of Decision Making and Looping statements to solve various problems in C		
CO-3	Illustrate the importance of Arrays and Strings and to apply various operations on them.		
CO-4	Solve various problems by making use of Structure and Union concepts		
CO-5	Design and implement programs to analyze the different pointer applications		
CO-6	Develop programs using Functions and Pointers.		
Course (Code:B20ME1201		
Course 7	Title: ENGINEERING MECHANICS		
CO-1	Solve for the resultant of the given force systems & Analyze force systems using equations of equilibrium.		
CO-2	Determine centroid, center of gravity and moment of inertia of areas and bodies.		
CO-3	Analyze trusses and solve mechanics problems associated with friction force.		
CO-4	Determine the displacement, velocity and acceleration relations and apply the workenergy and impulse		
	momentum to dynamic systems in rectilinear and curvilinear motion.		
CO-5	Determine the displacement, velocity and acceleration relations and apply the workenergy and impulse momentum to rigid bodies.		
Course (Code:B20ME1202		
Course 7	Title: MATERIAL SCIENCE AND METALLURGY		
CO-1	Understand the basic terminology used in computer programming.		
CO-2	Write, compile and debug programs in C language.		
CO-3	Use different data types in a computer program.		
CO-4	Design programs involving decision structures, loops and functions.		
CO-5	Explain the difference between call by value and call by reference.		
CO-6	Understand the dynamics of memory by the use of pointers.		
CO-7	Use different data structures and create/update basic data files.		
Course (Code: B20BS1208		
Course Title: APPLIED CHEMISTRY LAB			
CO-1	Gain technical knowledge of measuring, operating and testing of chemical instruments and		



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	equipments. Carrying out different types of chemical reactions for analyzing different materials in
	micro level quantities.
CO-2	Analyze and generate experimental skills to enhance the analytical thinking capabilities in the modern
	trends in engineering and technology.
Course	Code: B20HS1202
Course Title: COMMUNICATION SKILLS LAB	
CO-1	Apply their linguistic competence in all LSRW skills to professional and personal settings.
00.0	Apply communication skills learnt through various language learning activities totheir advancement in
0.0-2	academics and competitive examinations.
CO-3	Draft job application letters, E-Mail messages and other writing discourses.
CO-4	Adopt professional etiquette consistent with formal settings.
CO-5	Improve fluency and clarity in both spoken and written English.
Course	Code: B20CS1205
Course Title: PROGRAMMING FOR PROBLEM SOLVING USING C LAB	
CO-1	Write, Trace and Debug the programs and correct syntax and logical errors.
CO-2	Solve various Problems by making use of Arrays, Strings, Structures, Unions and Pointers
CO-3	Solve a complex problem by decomposing into several modules by using Functions
CO-4	Apply various File I/O operations
Course	Code: B20MC1201
Course 7	Fitle: ENVIRONMENTAL SCIENCE
CO-1	Bring awareness among the students about the nature and natural ecosystems
CO-2	Sustainable utilization of natural resources like water, land, energy and air
	Resource pollution and over exploitation of land, water, air and catastrophic (events) impacts of
CO-3	climate change, global warming, ozone layer depletion, marine, radioactive pollution etc to inculcate
	the students about environmental awareness and safe transfer of our mother earth and its natural
	resources to the next generation.
CO-4	Constitutional provisions for the protection of natural resources.
CO-5	Green technologies and its applications.