



**Radhakrishna Institute of Technology and Engineering, Bhubaneswar**

Plot No. 1, Khurda Industrial Estate, Dist: Khurda, Under B.D.A., Bhubaneswar, Bhubaneswar, Khordha, Odisha 752057

(Approved by AICTE, New Delhi, and Affiliated to BPUT, Rourkela, Odisha)

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# **Department of Basic Sciences & Humanities** **(BSH)**

## **Vision of Department**

To bring off brilliance in professional as well as in personal sphere with strong and influential research and teaching domain that accommodates challenges and also will be beneficial in the overall development of all the stakeholders.

## **Mission of Department**

To achieve excellence in teaching and learning, to generate, disseminate and preserve knowledge, promote learning in free thinking and innovative environment, cultivate skills and attitudes to promote knowledge creation.

  
Principal  
Radhakrishna Institute of Technology  
and Engineering, Bhubaneswar

## Course Outcomes (COs) of all Common Courses (Offered in 1<sup>st</sup> Year of all B.Tech programmes)

### 1<sup>st</sup> Year (1<sup>st</sup> Semester)

Course Code	Course Name	Course Outcomes (COs)	
		<i>At the completion of the course, students will be able to:</i>	
<b>RMA1A001</b>	<b>Mathematics –I</b>	<b>CO1</b>	Calculate the maxima and minima for problems involving a function of two variables.
		<b>CO2</b>	Apply the knowledge of calculus, Gamma & Beta functions for analysing engineering problems.
		<b>CO3</b>	Solve first order differential equation analytically using standard method.
		<b>CO4</b>	Demonstrate various physical models through higher order differential equation and solve such linear ordinary differential equation.
		<b>CO5</b>	Obtain series solution of differential equation and explain application of Bessel's function.
		<b>CO6</b>	Apply Laplace problem to determine complete solution to ordinary differential equation.
<b>RPH1A001</b>	<b>Physics</b>	<b>CO1</b>	Identify the different types of oscillations and waves, use that knowledge to study different phenomena related to electrical and mechanical system.
		<b>CO2</b>	Know the concept of interference, diffraction, its types, different types of optical instruments and its operation and



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			principles.
		CO3	Understand the concept, production, types, properties, working and application of various kinds of laser in different fields.
		CO4	Gain the different law and theories that are related in electromagnetism.
		CO5	Know the elementary concepts of quantum physics formulation to deal with physical systems.
		CO6	Know the concept behind the origin of schrodinger equation: Time dependent and time independent equation Application.
RBE1B001	Basic Electrical Engineering	CO1	Understand circuit laws with fundamentals of electrical circuit, and apply Thevenin and Norton Theorems to solve simple circuits with DC excitation.
		CO2	Analyze the single-phase AC circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel).
		CO3	Establish voltage and current relations in star and delta connections and solve the three phase circuits with balanced voltage and balanced load conditions.
		CO4	Establish magnetic circuits with BH characteristics and Hysteresis loss (Series and parallel magnetic circuits).
		CO5	Construct operate and performance testing of single-phase transformers.
		CO6	Establish torque-speed characteristics in induction motors (three phase).
RBM1B001	Basic Mechanical Engineering	CO1	Understand zeroth law, first law and second law of thermodynamics.
		CO2	Use steam tables for solving problems concerning internal energy and dryness fraction of steam.
		CO3	Describe the different components of thermodynamic systems (Air compressors, Steam Power Plant, Refrigerators and Heat pump, I.C. Engines) and working principles.
		CO4	Understand the working of basic power transmission devices (Belt, Rope, Gear drives. Coupling, clutch, brakes).
		CO5	Know robot anatomy, joints and links and common robot configurations.
		CO6	Know the working principals of instruments used for mechanical measurements (temperature, pressure, velocity, flow, strain, force, torque measurements).
RCE1E001	Communicative English	CO1	Understand and apply knowledge of human communication through English occur across various contexts and factors that influence communication (sender, receiver, channel, code, topic, message, context, feedback, 'noise',

			filters and barriers); the importance of audience and purpose.
		<b>CO2</b>	Identify and rectify the common errors during subject-verb agreement, noun/ pronoun/ articles/ prepositions usage, word choice vocabulary building.
		<b>CO3</b>	Understand about the sounds of used during communication in English (sentence rhythm and weak forms, contrastive stress Intonation: falling, rising and falling-rising tunes problem sounds in cultural contexts).
		<b>CO4</b>	Learn communication challenges in culturally diverse workforce and ethics in communication.
		<b>CO5</b>	Find, use, and evaluate primary academic writing associated with the English communication discipline.
		<b>CO6</b>	Develop knowledge, skills, and judgment around human communication that facilitate their ability to work collaboratively with others.
<b>RPH1A201</b>	<b>Physics Lab</b>	<b>CO1</b>	Determine the Young's modulus and Rigidity modulus of materials applying suitable method.
		<b>CO2</b>	Determine the surface tension, acceleration due to gravity and verification of laws of vibration of string using suitable set up.
		<b>CO3</b>	Determine the wave length of light by suitable set up.
		<b>CO4</b>	Determine the wavelength of laser, and grating element of a diffraction grating by suitable set up.
		<b>CO5</b>	Plot the characteristic curve of a PN junction diode and characteristic curves of BJT by suitable set up.
		<b>CO6</b>	Prove the Hall Effect, determine the unknown resistance and energy gap suitable set up.
<b>RBE1B201</b>	<b>Basic Electrical Engineering</b>	<b>CO1</b>	Get an exposure to common electrical components and their ratings.
		<b>CO2</b>	Make electrical connections by wires of appropriate ratings.
		<b>CO3</b>	Understand the usage of common electrical measuring instruments.
		<b>CO4</b>	Get an exposure of series RLC circuit (Power measurement).
		<b>CO5</b>	Understand the basic characteristics of 1 phase transformers and electrical machines.
		<b>CO6</b>	Get an exposure to the components of House wiring.
<b>RBM1B201</b>	<b>Basic Mechanical</b>	<b>CO1</b>	Get an exposure to components of steam power plant.
		<b>CO2</b>	Get an exposure to components of two stroke and four stroke I.C. Engine.

	<b>Engineering Lab</b>	<b>CO3</b>	Get an exposure to components of refrigerator & air conditioners and an automobile.
		<b>CO4</b>	Determine the velocity ratio of belt drive on lab set up.
		<b>CO5</b>	Practically verify the Bernoulli's Theorem on designed set up.
		<b>CO6</b>	Calibrate the Bourdon Tube Pressure gauge and measure of pressure using manometers.
<b>REG1B201</b>	<b>Engineering Graphics &amp; Design Lab</b>	<b>CO1</b>	Understand the BIS conventions of engineering drawing with basic concepts, ideas and methodology.
		<b>CO2</b>	Get familiar with the layout of the AUTO CAD software, standard tool bar/menus and description of most commonly used toolbars, navigational tools.
		<b>CO3</b>	Apply the commands used in AUTOCAD for different basic geometries
		<b>CO4</b>	Understand the orthographic projection concepts in plane surfaces and apply the concepts in the areas of drafting.
		<b>CO5</b>	Draw and visualize projections of Solids (tetrahedron, hexahedron cube, prisms, pyramids, cylinders and cones in different positions) and sections and development of lateral surfaces of solids.
		<b>CO6</b>	Visualize the components by isometric projection by representing three dimensional objects in two dimensions in technical and engineering drawings.
<b>RCE1E201</b>	<b>English Language Lab</b>	<b>CO1</b>	Get exposure and awareness of correct usage of English in Listening and speaking.
		<b>CO2</b>	Increase his/her reading speed and comprehension of academic articles (Technical and General txt).
		<b>CO3</b>	Strengthen his/her ability to write academic papers, essays and summaries using the process approach (Guided composition and Free-writing)
		<b>CO4</b>	Attain and enhance competence in the four modes of literacy: writing, speaking, reading and listening.
		<b>CO5</b>	Develop his/ her ability as critical reader and writer.
		<b>CO6</b>	Give oral presentations in English communication medium with better performance.

### 1<sup>st</sup> Year (2<sup>nd</sup> Semester)

Course Code	Course Name	Course Outcomes (COs)	
		<i>At the completion of the course, students will be able to:</i>	
<b>RMA2A001</b>	<b>Mathematics-II</b>	<b>CO1</b>	Apply the knowledge of matrix algebra for solving system of linear equations and compute the inverse of matrices.
		<b>CO2</b>	To develop the essential tool of matrices to compute eigen values and eigen vectors required for matrix diagonalization process.
		<b>CO3</b>	Illustrate the concept of vector differential calculus to understand the solenoidal and irrotational vectors
		<b>CO4</b>	Illustrate the concept of vector integral calculus and exhibit the inter dependence of line, surface and volume integrals.
		<b>CO5</b>	Know the use of periodic functions and Fourier series, Fourier integral, Fourier transform to analyze circuit and system communication.
		<b>CO6</b>	Have a clear-cut understanding of important concepts of matrix Algebra.
<b>REM2B001</b>	<b>Engineering Mechanics</b>	<b>CO1</b>	Compose and resolve the forces and equilibrium of concurrent coplanar forces, and determine resultant of various force systems.
		<b>CO2</b>	Establish general case of forces in a plane- composition of forces in a plane and equilibrium of forces in a plane, and determine centroid, moment of inertia and solve problems related to friction.
		<b>CO3</b>	Determine reactions of beams, calculate forces in cables using principles of equilibrium.
		<b>CO4</b>	Solve trusses, frames for finding member forces and apply principles of equilibrium to forces in space.
		<b>CO5</b>	Calculate position, velocity and acceleration of particle using principles of kinematics.

		CO6	Analytically prove principle of D'Alembert's in curvilinear motion.
RCH2A002	Chemistry	CO1	Understand the basics of quantum mechanical concepts and spectroscopy.
		CO2	Know principles and applications of UV-Visible molecular absorption spectroscopy.
		CO3	Rationalize bulk properties and processes using thermodynamic considerations.
		CO4	Have preliminary understanding and introductory idea about nano materials.
		CO5	Analyze the quantitative aspects of fuel combustion and the mechanism of corrosion.
		CO6	Use the nanomaterials in environmental fields and electronic devices.
RBL2B002	Basic Electronics Engineering	CO1	Establish V-I characteristics of junction diode, and find AC and DC resistance in diode.
		CO2	Know operations and their characteristics in Field Effect Transistor (JFET-types) and MOSFETs.
		CO3	Understand inverting and non – inverting configurations of Operational Amplifiers.
		CO4	Know principle of operation of Digital Inverters (CMOS).
		CO5	Know the fundamentals and principals of Digital electronic components.
		CO6	Understand all laws and rules of Boolean algebra for digital electronic applications.
RBC2B002	Basic Civil Engineering	CO1	Understand the development of various materials of construction and methods of construction in civil engineering applications.
		CO2	Understand classification, composition and characteristics of Building Material used Building Construction
		CO3	Enlist building components and their basic requirements (mortar, stone masonry, brick masonry, roof, floors).
		CO4	Understand the need and fundamentals of surveying and know the all ordinary and modern surveying instruments like EDM and Total Station.
		CO5	Know various types of shallow and deep foundations and fundamentals of Irrigation Engineering.
		CO6	Understand about planning and design aspects of transportation engineering for different modes of transport (highway engineering, rail engineering, airport engineering, traffic engineering, urban engineering).
RPL2B001	Programming for Problem	CO1	Formulate simple algorithms for arithmetic and logical problems.
		CO2	Translate the algorithms to programs (in C language).

	<b>Practice</b>	<b>CO2</b>	Handle appropriate hand tool, cutting tool and machine tools to manufacture a job.
		<b>CO3</b>	Understand the construction, working and functions of machine tools and their parts.
		<b>CO4</b>	Get familiar about how to use gas welding & Electric Arc welding set up.
		<b>CO5</b>	Get exposure to perform simple & complex operations (Turning, Facing, steeped cylindrical cutting, thread cutting) on a centre lathe.
		<b>CO6</b>	Get exposure to perform shaping operation on shaper and milling operation on a milling machine.
<b>RPL2B201</b>	<b>Programming for Problem Solving using C Lab</b>	<b>CO1</b>	Deeply familiar with basic UNIX/LINUX command, vi editor.
		<b>CO2</b>	Write programs on Conditional Branching, Loops, single dimensional array and two-dimensional array.
		<b>CO3</b>	Write programs on Functions and Recursive Functions.
		<b>CO4</b>	Write programs on Pointers, Dynamic Memory Allocation, Structure, Union, and File Handling.
		<b>CO5</b>	Implement the linear and Binary Search.
		<b>CO6</b>	Implement the Bubble, insertion and selection.

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		<b>CO1</b>	Deeply familiar with basic UNIX/LINUX command, vi editor.
<b>RPL2B201</b>	<b>Programming for Problem Solving using C Lab</b>	<b>CO2</b>	Write programs on Conditional Branching, Loops, single dimensional array and two-dimensional array.
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