



**UNIVERSITY DEPARTMENTS**  
**RAJASTHAN TECHNICAL UNIVERSITY, KOTA**

**FIRST YEAR CURRICULUM**  
for  
**UNDERGRADUATE DEGREE COURSES**  
(Engineering & Technology)

**Scheme and Syllabus**  
**Revised with 30% Reduction (For Theory Exams)**  
**as per COVID Pandemic Situation**

(Effective for 2020-21 only)



**University Departments**  
**Rajasthan Technical University, Kota**

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Scheme and Syllabus of First Year B. Tech. for UD, RTU

Effective for Session 2020-21 only with 30% Reduction (For theory Exams) as per COVID Pandemic Situation



# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

### Scheme for I Semester (First year)

Common to all branches of UG Engineering & Technology

Sr. No.	Type of Course	Course Code	Course	Credits	Hours			NG Units	Marks			Remark	
					L	T	P		IA	ETE	Total		
1	IC	MTL100	Engineering Mathematics-I	4	3	1	0		50	100	150		
2	IC	CSL100	Programming for Problem Solving	2	2	0	0		50	100	150		
3	IC	PYL100	Engineering Physics	4	3	1	0		50	100	150		
4	IC	CML101	Engineering Chemistry	4	3	1	0		50	100	150		
5	IC	MEL100	*Basic Mechanical Engineering	2	2	0	0		50	100	150		
6	IC	CEL100	*Basic Civil Engineering	2	2	0	0		50	100	150		
7	IC	EEL100	*Introduction to Electrical & Electronics Engineering	2	2	0	0		50	100	150		
8	NG	HUN101	Human Values & Professional Ethics		2	0	0	2	V/G/S/Z			Half of the students admitted to First year will study the courses in first semester and then remaining half in the second semester	
9	NG	HUN102	Communication Skills		2	0	0	2	V/G/S/Z				
10	IC	PYP100	Engineering Physics Lab	1	0	0	2		50	25	75		
11	IC	CMP101	Engineering Chemistry Lab	1	0	0	2		50	25	75		
12	IC	MEP100	*Basic Mechanical Engineering Lab	1	0	0	2		50	25	75		
13	IC	CEP100	*Basic Civil Engineering Lab	1	0	0	2		50	25	75		
14	IC	EEL100	*Basic Electrical & Electronics Engineering Lab	1	0	0	2		50	25	75		
15	IC	CEP102	Computer Aided Engineering Graphics	1	0	0	2		50	25	75		
16	IC	MEP102	Computer Aided Machine Drawing	1	0	0	2		50	25	75		
17	IC	MEP101	Product Realization through Manufacturing	1	0	0	2		50	25	75		
18	IC	XXP200	Skill Development Laboratory	1	0	0	2		50	25	75		
19	NG	HUN101	Human Values Lab		0	0	2	1	V/G/S/Z				
20	NG	HUN102	Language Lab		0	0	2	1	V/G/S/Z				
21	NG	SAN101	Induction Program		0	0	1	0.5	V/G/S/Z				
22	IC	CSP100	Programming Lab	1	0	0	2		50	25	75		
23		SAA100	SODECA (Anandam)	0.5					100				
<b>TOTAL</b>				<b>17.5</b>	<b>12</b>	<b>2</b>	<b>13</b>	<b>3.5</b>			<b>1075</b>		
<p>*Students of CS, EC, EE, EIC&amp; IT will study MEL100 and CEL100            *Students of CE, PE &amp; PC will study MEL100 and EEL100            *Students of AE, ME&amp; PIE will study CEL100 and EEL100</p>													

IC = Institute Core Course, NG = Non-graded Course, L = Lecture, T = Tutorial, P = Practical,  
 ETE = End Term Exam, IA = Internal Assessment & V/G/S/Z = Excellent / Good / Satisfactory / Unsatisfactory (Fail)



# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

### Scheme for II Semester (First year)

Common to all branches of UG Engineering & Technology

Sr. No.	Type of Course	Course Code	Course	Credits	Hours			NG Units	Marks			Remark
					L	T	P		IA	ETE	Total	
1	IC	MTL101	Engineering Mathematics-II	4	3	1	0		50	100	150	Half of the students admitted to First year will study the courses in first semester and then remaining half in the second semester
2	IC	CSL101	Data Analysis & AI Using Python	2	2	0	0		50	100	150	
3	IC	PYL100	Engineering Physics	4	3	1	0		50	100	150	
4	IC	CML101	Engineering Chemistry	4	3	1	0		50	100	150	
5	IC	MEL100	*Basic Mechanical Engineering	2	2	0	0		50	100	150	
6	IC	CEL100	*Basic Civil Engineering	2	2	0	0		50	100	150	
7	IC	EEL100	*Introduction to Electrical & Electronics Engineering	2	2	0	0		50	100	150	
8	NG	HUN101	Human Values & Professional Ethics		2	0	0	2	V/G/S/Z			
9	NG	HUN102	Communication Skills		2	0	0	2	V/G/S/Z			
10	IC	PYP100	Engineering Physics Lab	1	0	0	2		50	25	75	
11	IC	CMP101	Engineering Chemistry Lab	1	0	0	2		50	25	75	
12	IC	MEP100	*Basic Mechanical Engineering Lab	1	0	0	2		50	25	75	
13	IC	CEP100	*Basic Civil Engineering Lab	1	0	0	2		50	25	75	
14	IC	EEP100	*Basic Electrical & Electronics Engineering Lab	1	0	0	2		50	25	75	
15	IC	CEP102	Computer Aided Engineering Graphics	1	0	0	2		50	25	75	
16	IC	MEP102	Computer Aided Machine Drawing	1	0	0	2		50	25	75	
17	IC	MEP101	Product Realization through Manufacturing	1	0	0	2		50	25	75	
18	IC	XXP200	Skill Development Laboratory	1	0	0	2		50	25	75	
19	NG	HUN101	Human Values Lab		0	0	2	1	V/G/S/Z			
20	NG	HUN102	Language Lab		0	0	2	1	V/G/S/Z			
21	NG	TPN101	Club activity		0	0	1	0.5	V/G/S/Z			
22	IC	CSP101	Python Lab	1	0	0	2		50	25	75	
23		SAA100	SODECA (Anandam)	0.5					100			
<b>TOTAL</b>				<b>17.5</b>	<b>12</b>	<b>2</b>	<b>13</b>	<b>3.5</b>			<b>1075</b>	
<p>*Students of CS, EC, EE, EIC&amp; IT will study MEL100 and CEL100</p> <p>*Students of CE, PE &amp; PC will study MEL100 and EEL100</p> <p>*Students of AE, ME&amp; PIE will study CEL100 and EEL100</p>												

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**Scheme and Syllabus of First Year B. Tech. for UD, RTU**

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# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

### SYLLABUS

#### I Semester

#### Common to all branches of UG Engineering & Technology

#### MTL100 : Engineering Mathematics-I

Credit: 4

3L+1T+0P

SN	CONTENTS
1	<b>Calculus:</b> Improper integrals (Beta and Gamma functions) and their properties; <del>Applications of definite integrals to evaluate surface areas and volumes of revolutions.</del>
2	<b>Sequences and Series:</b> <del>Convergence of sequence and series, tests for convergence;</del> Power series, Taylor's series, series for exponential, trigonometric and logarithm functions.
3	<b>Fourier Series:</b> Periodic functions, Fourier series, Euler's formula, Change of intervals, Half range sine and cosine series, <del>Parseval's theorem.</del>
4	<b>Multivariable Calculus (Differentiation):</b> <del>Limit, continuity and</del> partial derivatives, <del>directional derivatives, total derivative;</del> <del>Tangent plane and normal line;</del> Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence.
5	<b>Multivariable Calculus (Integration):</b> Multiple Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar), <del>Applications: areas and volumes, Centre of mass and Gravity (constant and variable densities);</del> Triple integrals (Cartesian), <del>Simple applications involving cubes, sphere and rectangular parallelepipeds;</del> Scalar line integrals, vector line integrals, scalar surface integrals, vector surface integrals, Theorems of Green, Gauss and Stokes.



# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

I Semester

Common to all branches of UG Engineering & Technology

### CSL100: Programming for Problem Solving

Credit: 2

2L+0T+0P

SN	CONTENTS
1	<b>Fundamentals of Computer:</b> <del>Stored program architecture of computers, Storage device Primary memory, and Secondary storage, Random, Direct, Sequential access methods, Concepts of High level, Assembly and Low level languages, Representing algorithms through flowchart and pseudo code.</del>
2	<b>Number system:</b> Data representations, Concepts of radix and representation of numbers in radix r with special cases of r=2, 8, 10 and 16 with conversion from radix r1 to r2, r's and (r-1)'s complement, Binary addition, Binary subtraction, Representation of alphabets.
3	<b>C Programming:</b> Problem specification, flow chart, data types, assignment statements, input output statements, developing simple C programs, If statement, for loops, while loops, do-while loops, switch statement, break statement, continue statement, development of C programs using above statements, Arrays, functions, parameter passing, recursion, Programming in C using these statements, Structures, files, pointers and multi file handling.



# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

I & II Semester

Common to all branches of UG Engineering & Technology

PYL100 : Engineering Physics

Credit: 4

3L+1T+0P

SN	CONTENTS
1	<b>Wave Optics:</b> Newton's Rings, Michelson's Interferometer, Fraunhofer Diffraction from a Single Slit. Diffraction grating: Construction, theory and spectrum, Resolving power and Rayleigh criterion for limit of resolution, <del>Resolving power of diffraction grating, X-Ray diffraction and Bragg's Law.</del>
2	<b>Quantum Mechanics:</b> <del>Introduction to quantum Mechanics, Wave particle duality,</del> Matter waves, Wave function and basic postulates, Time dependent and time independent Schrodinger's Wave Equation, Physical interpretation of wave function and its properties, Applications of the Schrodinger's Equation: Particle in one dimensional <del>and three dimensional boxes.</del>
3	<del>Coherence and</del> <b>Optical Fibers:</b> <del>Spatial and temporal coherence: Coherence length; Coherence time and 'Q' factor for light, Visibility as a measure of Coherence and spectral purity,</del> Optical fiber as optical wave guide, Numerical aperture; Maximum angle of acceptance and applications of optical fiber.
4	<b>Laser:</b> Einstein's Theory of laser action; Einstein's coefficients; Properties of Laser beam, Amplification of light by population inversion, Components of laser, Construction and working of He-Ne <del>and semiconductor</del> lasers, Applications of Lasers in Science, engineering and medicine.
5	<b>Material Science &amp; Semiconductor Physics:</b> <del>Bonding in solids: covalent and metallic bonding,</del> Energy bands in solids: Classification of solids as Insulators, Semiconductors and Conductors, Intrinsic and extrinsic semiconductors, Fermi dirac distribution function and Fermi energy, <del>Conductivity in semiconductors</del> , Hall Effect: Theory, Hall Coefficient and applications.
6	<b>Introduction to Electromagnetism:</b> Divergence and curl of electrostatic field, Laplace's and Poisson's equations for electrostatic potential, <del>Bio-Savart law, Divergence and curl of static magnetic field, Faraday's law, Displacement current and magnetic field arising from time dependent electric field, Maxwell's equations, Flow of energy and Poynting vector.</del>



# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

I & II Semester

Common to all branches of UG Engineering & Technology

CML101: Engineering Chemistry

Credit: 4

3L+1T+0P

SN	CONTENTS
1	<p><b>Water:</b> <del>Common impurities</del>, hardness, determination of hardness by complexometric (EDTA method), Degree of hardness, <del>Units of hardness</del> <del>Municipal water supply: Requisite of drinking water, Purification of water; sedimentation, filtration, disinfection, breakpoint chlorination.</del></p> <p>Boiler troubles: Scale and Sludge formation, <del>Internal treatment</del> methods, Priming and Foaming, Boiler corrosion and Caustic embrittlement Water softening; Lime-Soda process, Zeolite (Permutit) process, Demineralization process. Numerical problems based on Hardness, EDTA, Lime-Soda and Zeolite process.</p>
2	<p><b>Organic Fuels:</b> Solid fuels: Coal, <del>Classification of Coal</del>, Proximate and Ultimate analyses of coal and its significance, Gross and Net Calorific value, Determination of Calorific value of coal by Bomb Calorimeter. Metallurgical coke, Carbonization processes; Otto-Hoffmann by-product oven method. Liquid fuels: <del>Advantages of liquid fuels, Mining</del>, Refining and Composition of petroleum, Cracking, Synthetic petrol, Reforming, Knocking, Octane number, Anti-knocking agents, <del>Cetane number</del> Gaseous fuels; <del>Advantages, manufacturing, composition and Calorific value of coal gas and oil gas</del>, Determination of calorific value of gaseous fuels by Junker's calorimeter Numerical problems based on determination of calorific value (bomb calorimeter/Junkers calorimeter/Dulong's formula, proximate analysis &amp; ultimate and combustion of fuel</p>
3	<p><b>Corrosion and its control:</b> Definition <del>and significance of corrosion</del>, Mechanism of chemical (dry) and electrochemical (wet) corrosion, <del>galvanic corrosion, concentration corrosion and pitting corrosion.</del> Protection from corrosion; protective coatings-galvanization and tinning, cathodic protection, sacrificial anode and modifications in design.</p>

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4	<p><b>Engineering Materials:</b> Portland Cement; Definition, Manufacturing by Rotary kiln. Chemistry of setting and hardening of cement. Role of Gypsum. Glass: Definition, Manufacturing by tank furnace, significance of annealing, Types and properties of soft glass, <del>hard glass, borosilicate glass, glass wool, safety glass</del> Lubricants: Classification, Mechanism, Properties; Viscosity and viscosity index, flash and fire point, cloud and pour point. <del>Emulsification and steam emulsion number.</del></p>
5	<p><b><del>Organic reaction mechanism and introduction of drugs:</del></b> <del>Organic reaction mechanism: Substitution; SN1, SN2, Electrophilic aromatic substitution in benzene, free radical halogenations of alkanes, Elimination; elimination in alkyl halides, dehydration of alcohols, Addition: electrophilic and free radical addition in alkenes, nucleophilic addition in aldehyde and ketones, Rearrangement; Carbocation and free radical rearrangements</del> Drugs: Introduction, Synthesis, properties and uses of Aspirin, Paracetamol</p>





# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

I & II Semester

Common to all branches of UG Engineering & Technology

MEL100: Basic Mechanical Engineering

Credit: 2

2L+0T+0P

SN	CONTENTS
1	<b>Fundamentals:</b> Introduction to mechanical engineering, concepts of thermal engineering, <del>mechanical machine design, industrial engineering</del> and manufacturing technology. Steam Boilers classification and types of steam boilers and steam turbines. Introduction and Classification of power plants.
2	<b>Pumps and IC Engines:</b> Applications and working of Reciprocating and Centrifugal pumps. <del>Introduction</del> , Classification of IC Engines, <del>Main Components of IC Engines</del> , Working of IC Engines and its components.
3	<b>Refrigeration and Air Conditioning:</b> Introduction, classification and types of refrigeration systems and air-conditioning. <del>Applications of refrigeration and Air conditioning.</del>
4	<b>Transmission of Power:</b> Introduction and types of Belt and Rope Drives, Gears.
5	<b>Primary Manufacturing Processes:</b> Metal Casting Process: Introduction to Casting Process, Patterns, Molding, Furnaces. <del>Metal Forming Processes: Introduction to Forging, Rolling, Extrusion, Drawing.</del> Metal Joining Processes: Introduction to various types of Welding, Gas Cutting, Brazing, and Soldering.
6	<b>Engineering Materials and Heat Treatment of Steel:</b> Introduction to various engineering materials and their properties.



# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

I & II Semester  
Common to all branches of UG Engineering & Technology

CEL100: Basic Civil Engineering

Credit: 2

2L+0T+0P

SN	CONTENTS
1	<b>Introduction to objective, scope and outcome the subject</b>
2	<b>Introduction:</b> Scope and Specialization of Civil Engineering, Role of civil Engineer in Society, Impact of infrastructural development on economy of country.
3	<b>Surveying:</b> Object, Principles & Types of Surveying; Site Plans, Plans& Maps; Scales & Unit of different Measurements. Linear Measurements: Instruments used. Linear Measurement by Tape, Ranging out Survey Lines and overcoming Obstructions; <del>Measurements on sloping ground; Tape corrections, conventional symbols.</del> Angular Measurements: Instruments used; Introduction to Compass Surveying, Bearings and Longitude & Latitude of a Line, Introduction to total station. <del>Levelling: Instrument used, Object of levelling, Methods of levelling in brief, Contour maps.</del>
4	<b>Buildings:</b> Selection of site for Buildings, Layout of Building Plan, Types of buildings, Plinth area, carpet area, floor space index, Introduction to building byelaws, <del>concept of sun light and ventilation. Components of Buildings &amp; their functions, Basic concept of R.C.C., Introduction to types of foundation.</del>
5	<b>Transportation:</b> Introduction to Transportation Engineering; Traffic and Road Safety: Types and Characteristics of Various Modes of Transportation; Various Road Traffic Signs, <del>Causes of Accidents</del> and Road Safety Measures.



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<b>6</b>	<p><b>Environmental Engineering:</b> Environmental Pollution, <del>Environmental Acts and Regulations</del>, Functional Concepts of Ecology, Basics of Species, Biodiversity, Ecosystem, Hydrological Cycle; <del>Chemical Cycles: Carbon, Nitrogen &amp; Phosphorus; Energy Flow in Ecosystems.</del></p> <p>Water Pollution: Water Quality standards, Introduction to Treatment &amp; Disposal of Waste Water. Reuse and Saving of Water, Rain Water Harvesting.</p> <p>Solid Waste Management: Classification of Solid Waste, Collection, Transportation and Disposal of Solid. <del>Recycling of Solid Waste: Energy Recovery, Sanitary Land fill, On-Site Sanitation.</del></p> <p>Air &amp; Noise Pollution: Primary and Secondary air pollutants, Harmful effects of Air Pollution, Control of Air Pollution. Noise Pollution, Harmful Effects of noise pollution, <del>control of noise pollution, Global warming &amp; Climate Change, Ozone depletion, Green House effect</del></p>
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# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

### I & II Semester

#### Common to all branches of UG Engineering & Technology

#### EEL100: Introduction to Electrical & Electronics Engineering

Credit: 2

2L+0T+0P

SN	CONTENTS
1	<b>DC Circuits:</b> Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff current and voltage laws, <del>Series-Parallel circuits</del> , Node voltage method, <del>Mesh current method</del> , Superposition, Thevenin's, Norton's and Maximum power transfer theorems.
2	<b>AC Circuits:</b> Representation of sinusoidal waveforms, peak and r.m.s values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase AC circuits consisting of R, L, C, RL, RC and RLC combinations (series and parallel), resonance. <del>Three phase balanced circuits, voltage and current relations in star and delta connections.</del>
3	<b>Transformers:</b> Ideal and practical transformer, EMF equation, equivalent circuit, losses in transformers, <del>regulation and</del> efficiency.
4	<b>Electrical Machines:</b> Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, <del>Significance of torque slip characteristic</del> . Starting and speed control of induction motor, <del>single phase induction motor</del> . Construction, working, torque-speed characteristic and speed control of separately excited DC motor. <del>Construction and working of synchronous generators.</del>
5	<b>Electronic Devices:</b> Semiconductors, PN junction diode, Zener diode, LED, photo diode, Bipolar Junction Transistors: Structure, principle of operation, different

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configurations, load line and operating point, ~~biasing and stabilization~~, Transistor as amplifier, switch, Junction Field Effect Transistors: Structure, principle of operation, characteristics ~~MOSFET: Structure, principle of operation, characteristics~~, ~~Principle of operation of Photo-transistor, UJT, SCR, Diode circuits and power supplies: Series and parallel diode circuits~~, Half-wave & full wave rectifiers. Basic circuits of single phase rectifier with R load. Study of dc-dc converters and dc-ac converters.



# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

I & II Semester  
Common to all branches of UG Engineering & Technology

HUN101: Human Values & Professional Ethics

Credit: 2 (Non-graded)

2L+0T+0P

SN	CONTENTS
1	<p><b>Course Introduction - Need, Basic Guidelines, Content and Process for Value Education</b></p> <p>Understanding the need, basic guidelines, Self Exploration - its content and process; 'Natural Acceptance' and Experiential Validation, Continuous Happiness and Prosperity- Human Aspirations, Right understanding, Relationship and Physical Facilities, Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario.</p> <p><del>Method to fulfill the above human aspirations: understanding and living in harmony at various levels</del></p>
2	<p><b>Understanding Harmony in the Human Being - Harmony in Myself</b></p> <p>Understanding human being as a co-existence of the sentient 'I' and the material 'Body'</p> <p>Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha</p> <p>Understanding the Body as an instrument of 'I', Understanding the characteristics and activities of 'I' and harmony in 'I' Understanding the harmony of I with the Body: Sanyam and Swasthya; <del>correct appraisal of Physical needs, meaning of Prosperity in detail</del>, Programs to ensure Sanyam and Swasthya.</p>
3	<p><b>Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship</b></p> <p>Understanding harmony in the Family, Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) , meaning of Vishwas; Difference between intention and competence, meaning of Samman, Difference between respect and differentiation;</p> <p>the other salient values in relationship, <del>harmony in the society, Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals, Visualizing a universal harmonious order in society Undivided Society (AkhandSamaj), Universal Order (SarvabhaumVyawastha) from family to world family.</del></p>

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4	<p><b>Understanding Harmony in the Nature and Existence - Whole existence as Coexistence</b></p> <p>Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature. Understanding Existence as Co-existence <del>-(Sah-astitva)-of mutually interacting units in all pervasive Space.</del> <del>Holistic perception of harmony at all levels of existence</del></p>
5	<p><b>Implications of the above Holistic Understanding of Harmony on Professional Ethics. Natural acceptance of human values</b></p> <p>Definitiveness of Ethical Human Conduct. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in Professional Ethics: a) Ability to utilize the professional competence for augmenting universal human order, (b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems, technologies and management models. <del>Strategy for transition from the present state to Universal Human Order: (a). At the level of individual: as socially and ecologically responsible engineers, technologists and managers. (b). At the level of society: as mutually enriching institutions and organization. Case studies related to values in professional life and individual life.</del></p>





# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

I & II Semester  
Common to all branches of UG Engineering & Technology

### HUN102: Communication Skills

Credit: 2 (Non-graded)

2L+0T+0P

SN	CONTENTS
1	<b>Communication:</b> Meaning, Importance and Cycle of Communication. Media and Types of Communication. Verbal and Non-Verbal Communication. Barriers to communication. <del>Formal and Informal Channels of Communication (Corporate Communication).</del> <del>Divisions of Human Communication and Methods to improve Interpersonal Communication.</del> Qualities of good communication.
2	<b>Grammar:</b> Passive Voice. Reported Speech. Conditional Sentences. <del>Modal Verbs.</del> Linking Words (Conjunctions)
3	<b>Composition:</b> Job Application and Curriculum-Vitae Writing. <del>Business Letter Writing.</del> Paragraph Writing. Report Writing.
4	<b>Short Stories:</b> “Luncheon” by Somerset Maugham. <del>“How Much Land Does a Man Need?” by Count Leo Tolstoy.</del> “The Night Train at Deoli” by Ruskin Bond.
5	<b>Poems:</b> “No Men are Foreign” by James Kirkup. <del>“If” by Rudyard Kipling.</del> “Where the Mind is without Fear” by Rabindranath Tagore.



# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

I & II Semester  
Common to all branches of UG Engineering & Technology

**PYP100 : Engineering Physics Lab**

**Credit: 1**  
**OL+OT+2P**

1. To determine the wave length of monochromatic light with the help of Michelson's interferometer.
2. To determine the wave length of sodium light by Newton's Ring.
3. To determine the wave length of prominent lines of mercury by plane diffraction grating with the help of spectrometer.
4. Determination of band gap using a P-N junction diode.
5. To determine the height of given object with the help of sextant.
6. To determine the dispersive power of material of a prism with the help of spectrometer.
7. To study the charge and discharge of a condenser and hence determine the same constant (both current and voltage graphs are to be plotted).
8. To determine the coherence length and coherence time of laser using He – Ne laser.
9. To measure the numerical aperture of an optical fibre.
10. To study the Hall Effect and determine the Hall Voltage and Hall coefficients.



# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

I & II Semester  
Common to all branches of UG Engineering & Technology

**CMP101 : Engineering Chemistry Lab**

**Credit: 1**  
**OL+OT+2P**

1. Determination the hardness of water by EDTA method
2. Determination of residual chlorine in water
3. Determination of dissolved oxygen in water
4. Determination of the strength of Ferrous Ammonium sulphate solution with the help of  $K_2Cr_2O_7$  solution by using diphenyl amine indicator
5. Determination of the strength of  $CuSO_4$  solution iodometrically by using hypo solution
6. Determination of the strength of NaOH and  $Na_2CO_3$  in a given alkali mixture
7. Proximate analysis of Coal
8. Determination of the flash & fire point and cloud & pour point of lubricating oil
9. Determination of the kinematic viscosity of lubricating oil by Redwood viscometer no. 1 at different temperature
10. Synthesis of Aspirin/ Paracetamol



# **UNIVERSITY DEPARTMENTS**

## **RAJASTHAN TECHNICAL UNIVERSITY, KOTA**

**I & II Semester**

**Common to all branches of UG Engineering & Technology**

**MEP100: Basic Mechanical Engineering Lab**

**Credit: 1**

**OL+OT+2P**

Exposure to a wide range of applications of mechanical engineering through a variety of activities, including hands-on assembly and disassembly of machines, such as, bicycle, sewing machine, pumps, engines, air-conditioners, machine tools, amongst others; observational study of complex systems via cut sections, videos and computer simulations.



# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

### I & II Semester

#### Common to all branches of UG Engineering & Technology

#### CEP100 : Basic Civil Engineering Lab

**Credit: 1**  
**OL+OT+2P**

1. Linear Measurement by Tape:
  - a) Ranging and Fixing of Survey Station along straight line and across obstacles.
  - b) Laying perpendicular offset along the survey line
2. Compass Survey: Measurement of bearing of lines using Surveyor's and Prismatic compass
3. Levelling: Using Tilting/ Dumpy/ Automatic Level
  - a) To determine the reduced levels in closed circuit.
  - b) To carry out profile levelling and plot longitudinal and cross sections for road by Height of Instrument and Rise & Fall Method.
4. To study and take measurements using various electronic surveying instruments like EDM, Total Station etc.
5. To determine pH, hardness and turbidity of the given sample of water.
6. To study various water supply Fittings.
7. To determine the pH and total solids of the given sample of sewage.
8. To study various Sanitary Fittings.



# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

### I & II Semester

### Common to all branches of UG Engineering & Technology

### EET100: Basic Electrical & Electronics Engineering Lab

**Credit: 1**

**OL+OT+2P**

1. Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors.
2. Transformers: Observation of the no-load current waveform on an oscilloscope. Loading of a transformer: measurement of primary and secondary voltages and currents, and power.
3. Three-phase transformers: Star and Delta connections. Voltage and Current relationships (line-line voltage, phase-to-neutral voltage, line and phase currents).Phase-shifts between the primary and secondary side.
4. Demonstration of cut-out sections of machines: dc machine (commutator-brush arrangement), induction machine (squirrel cage rotor), synchronous machine (field winding - slip ring arrangement) and single-phase induction machine.
5. Torque Speed Characteristic of separately excited dc motor.
6. Study of electronic devices viz. PN Junction diode, Zener diode, LED, photo diode, Bipolar Junction Transistors, MOSFET, Photo transistor, UJT, SCR.
7. Demonstration of (a) dc-dc converters (b) dc-ac converters – PWM waveform (c) Study of Half wave and Full wave Rectifiers.



# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

### I & II Semester

### Common to all branches of UG Engineering & Technology

### CEP102: Computer Aided Engineering Graphics

**Credit: 1**

**OL+OT+2P**

**Introduction:** Principles of drawing, lines, type of lines, usage of Drawing instruments, lettering, Conic sections including parabola, hyperbola, Rectangular Hyperbola (General method only); Scales-Plain, Diagonal and Vernier Scales.

**Projections of Point & Lines:** Position of Point, Notation System, Systematic Approach for projections of points, front view & Top view of point, Position of straight lines, line parallel to Both the RPs, Line perpendicular to either of the RPs, Line inclined to one RP and parallel to the other, Line inclined to Both the RPs, Traces of a line (One drawing sheet, one assignment in sketch book).

**Projection of Planes:** Positions of planes, Terms used in projections of planes, plane parallel to RP, plane inclined to one RP and perpendicular to the other RP, plane perpendicular to Both the RPs, plane Inclined to Both the RPs, True shape of the plane, Distance of a point from plane, Angle between two planes.

**Projections of Regular Solids:** frustum and truncated solids, those inclined to both the Planes-Auxiliary Views.

**Section of Solids:** Theory of sectioning, section of prisms and cubes, section of pyramids and Tetrahedron section of Cylinders, section of cones, section of spheres (One drawing sheet, one assignment in sketch book)

**Overview of Computer Graphics :** Covering theory of CAD software [such as: The menu System, Toolbars (standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.: Isometric Views of lines, Planes, Simple and compound Solids.





# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

### I & II Semester

### Common to all branches of UG Engineering & Technology

### MEP102: Computer Aided Machine Drawing

**Credit: 1**

**OL+OT+2P**

**Introduction:** Principles of drawing, conventional representation of machine components and materials, lines, types of lines, dimensioning types, rules of dimensioning.

**Conversion of pictorial views into orthographic views:** (1 drawing sheet) Introduction to orthographic projection, concept of first angle and third angle projection, drawing of simple machine elements in first angle projection, missing view problems covering Principles of Orthographic Projections.

**Sectional views of mechanical components:** (1 drawing sheet) Introduction, cutting plane line, type of sectional views-full section, half section, partial or broken section, revolved section, removed section, offset section, sectioning conventions-spokes, web rib, shaft, pipes, different types of holes, conventions of section lines for different metals and materials.

**Fasteners and other mechanical components:** (Free hand sketch) Temporary and permanent fasteners, thread nomenclature and forms, thread series, designation, representation of threads, bolted joints, locking arrangement of nuts, screws, washers, foundation bolts etc., keys, types of keys, cotter and knuckle joints. Riveted joints, rivets and riveting, type of rivets, types of riveted joints etc. Bearing: Ball, roller, needle, foot step bearing. Coupling: Protected type, flange, and pin type flexible coupling. Other components: Welded joints, belts and pulleys, pipes and pipe joints, valves, etc.

**Overview of Computer Graphics:** (2 drawing sheets) Covering theory of CAD software such as: The menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), Command Line (Where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.: Isometric Views of Lines, Planes, Simple and compound Solids.



# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

### I & II Semester

### Common to all branches of UG Engineering & Technology

### MEP101: Product Realization through Manufacturing

**Credit: 1**

**OL+OT+2P**

#### **Fitting Shop**

1. Finishing of two sides of a square piece by filing.
2. To cut a square notch using hacksaw and to drill a hole and tapping.

#### **Welding Shop**

1. Butt joint by arc welding.
2. Lap joint by arc welding.
3. T-joint by arc welding.
4. Lap joint by gas welding.
5. Demonstration of brazing, soldering & gas cutting.

#### **Foundry Shop**

1. Moulding of any pattern.
2. Casting of any simple pattern.

#### **Sheet Metal Shop**

1. Study of sheet and wire gauge.
2. Making mechanical joint and soldering of joint on sheet metal.

#### **Machine Shop Practice**

1. Demonstration and prepare a job on lathe with one step turning and chamfering operations.



# **UNIVERSITY DEPARTMENTS**

## **RAJASTHAN TECHNICAL UNIVERSITY, KOTA**

**I & II Semester**

**Common to all branches of UG Engineering & Technology**

**MEP200: Skill Development Laboratory**  
**(Students of AE, ME, PIE)**

**Credit: 1**  
**OL+OT+2P**

Study of various tools used in assembly and disassembly of Mechanical Systems. Exposure to a wide range of applications of mechanical engineering through a variety of activities, including hands-on assembly and disassembly of machines, such as, bicycle, sewing machine, pumps, engines, air-conditioners, machine tools, amongst others; observational study of complex systems via cut sections, visits, videos and computer simulations; design of simple machines/systems including specifications formulation; visits to industries.

Note: Student will be required to submit written report indicating the learning achieved by Hands on assembly/Disassembly.



# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

### I & II Semester

### Common to all branches of UG Engineering & Technology

#### CEP200: Skill Development Laboratory (Students of CE)

**Credit: 1**  
**OL+OT+2P**

#### **(A) Skill development as Interior designer**

1. Develop the sketch of internal arrangement in bedrooms, drawing rooms, kitchens, washrooms, dining rooms of a given house.
2. Develop the sketch of wooden furniture (Utility counter, storage almirah, study purpose almirah wash basin vanity counters etc) used at various places of the house.
3. Preparation of the placement plan of electrical appliances (deciding of number, capacity etc.) and electrical switch boards etc used at various places of the house.
4. Preparation of the placement plan of plumbing and sanitary services, kitchen shelf, kitchen platform used at various places of the house.
5. Preparation of the sketch of various designs of false ceiling(including lighting arrangements), door window curtain for various rooms of the house.

#### **(B) Skill development as engineering material engineer**

1. To perform an exercise of developing the various types of bonds(english, flemish).
2. To study the mortar mixing, cube moulding and conducting the compressive strength test for cubes.
3. To physically examine the basic characteristic properties of bricks and study its testing.
4. To physically examine the basic characteristic properties of cement and study its various tests.
5. To physically examine the basic characteristic properties of coarse and fine aggregates



# UNIVERSITY DEPARTMENTS RAJASTHAN TECHNICAL UNIVERSITY, KOTA

I & II Semester

Common to all branches of UG Engineering & Technology

PCP200: Skill Development Laboratory  
(Students of PC)

Credit: 1  
OL+OT+2P

## List of Experiment:-

1. Study of mass transfer behavior of two liquid with different concentration.
2. Study of heat transfer behavior of any material with temperature gradient.
3. Study of flow behavior and pressure variation of liquid.
4. Study of safety measure used in chemical industries.
5. Study of different types of control valve used in chemical industries.
6. Study of types of microorganism present in our environment.
7. Study of crystal system of any solid material.
8. Study of possible types of chemical reactions and its kinetics.
9. Study of conventional and non-conventional energy resources and its effect on environment.
10. Study of electrical and magnetic properties of material used in chemical industries.



# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

I & II Semester

Common to all branches of UG Engineering & Technology

PEP200: Skill Development Laboratory  
(Students of PE)

Credit: 1  
OL+OT+2P

### List of Experiment:-

1. Observation and microscopic examination of drill cuttings (formation rock chips)/core samples
2. Study of the internal structure of the earth.
3. To identify igneous rocks, Metamorphic and Sedimentary rocks in hand specimen.
4. To identify (Mark) the components of rotary drilling rig.
5. To prepare the model of the rotary drilling rig.
6. To identify (Mark) the various types of drilling bit.
7. Study of the cementing procedure during drilling.
8. To identify (Mark) the components of Christmas-tree.
9. To draw the sketch of the Sucker Rod Pump and mark the components.
10. To draw the diagram of fractional distillation column and mark the temperature of various fractions.



# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

### I & II Semester

### Common to all branches of UG Engineering & Technology

#### EEP200: Skill Development Laboratory (Students of CS, EC, EE, EIC & IT)

**Credit: 1**  
**OL+OT+2P**

1. House wiring by PVC casing capping including testing and commissioning
2. House wiring by PVC rigid pipe including testing and commissioning
3. Industrial wiring by MS pipe including testing and commissioning
4. Measurement of earth resistance by earth tester
5. Common faults in ac & dc fans , regulators and remedies
6. Trouble shooting of other household appliances (induction heater, electric kettle, mixer / grinder etc.)
7. Maintenance of different types of motor wiring
8. Electronic circuit making (led driver making)
9. Maintenance of tube light, different CFL, LED lamps
10. Maintenance of street lighting and flood lighting system (using sodium vapour, metal halide and led lamps)
11. Maintenance of storage batteries and condition of cells
12. Maintenance of elevator demonstration of solar based system and maintenance training
13. Maintenance of emergency lighting system (including inverter & ups) wiring installation and maintenance of pump motor
14. Precautions from electric shock and method of shock treatment





# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

### I & II Semester

### Common to all branches of UG Engineering & Technology

### HUN101 : Human Values LAB

**Credit: 1(Non-graded)**  
**OL+OT+2P**

#### **PS 1:**

Introduce yourself in detail. What are the goals in your life? How do you set your goals in your life? How do you differentiate between right and wrong? What have been your salient achievements and shortcomings in your life? Observe and analyze them.

#### **PS 2:**

Now-a-days, there is a lot of talk about many techno-genic maladies such as energy and material resource depletion, environmental pollution, global warming, ozone depletion, deforestation, soil degradation, etc. - all these seem to be manmade problems, threatening the survival of life Earth - What is the root cause of these maladies & what is the way out in opinion?

On the other hand, there is rapidly growing danger because of nuclear proliferation, arms race, terrorism, breakdown of relationships, generation gap, depression & suicidal attempts etc. - what do you think, is the root cause of these threats to human happiness and peace - what could be the way out in your opinion?

#### **PS 3:**

1. Observe that each of us has the faculty of 'Natural Acceptance', based on which one can verify what is right or not right for him. (As such we are not properly trained to listen to our 'Natural Acceptance' and may a time it is also clouded by our strong per-conditioning and sensory attractions).

Explore the following:

- (i) What is 'Naturally Acceptable' to you in relationship the feeling of respect or disrespect for yourself and for others?
- (ii) What is 'naturally Acceptable' to you - to nurture or to exploit others?

Is your living in accordance with your natural acceptance or different from it?

2. Out of the three basic requirements for fulfillment of your aspirations - right understanding, relationship and physical facilities - observe how the problems in your family are related to each. Also observe how much time & effort you devote for each in your daily routine.

#### **PS 4:**

1. a. Observe that any physical facility you use, follows the given sequence with time:



## UNIVERSITY DEPARTMENTS

### RAJASTHAN TECHNICAL UNIVERSITY, KOTA

Necessary and tasteful - unnecessary but still tasteful - unnecessary and tasteless - intolerable

b. In contrast, observe that any feeling in you is either naturally acceptable or not acceptable at all. If not acceptable, you want it continuously and if not acceptable, you do not want it any moment!

2. List down all your important activities. Observe whether the activity is of 'I' or of Body or with the participation of both or with the participation of both 'I' and Body.

3. Observe the activities within 'I'. Identify the object of your attention for different moments (over a period of say 5 to 10 minutes) and draw a line diagram connecting these points. Try to observe the link between any two nodes.

#### **PS 5:**

1. Write a narration in the form of a story, poem, skit or essay to clarify a salient Human Value to the children.
2. Recollect and narrate an incident in your life where you were able to exhibit willful adherence to values in a difficult situation.

#### **PS 6:**

List down some common units (things) of Nature which you come across in your daily life and classify them in the four orders of Nature. Analyse and explain the aspect of mutual fulfillment of each unit with other orders.

#### **PS 7:**

Identify any two important problems being faced by the society today and analyze the root cause of these problems. Can these be solved on the basis of natural acceptance of human values? If so, how should one proceed in this direction from the present situation?

#### **PS 8:**

1. Suggest ways in which you can use your knowledge of Science/Technology/Management etc. for moving towards a universal human order.
2. Propose a broad outline for humanistic Constitution at the level of Nation.

#### **Project:**

**Every student required to take-up a social project e.g. educating children in needy/weaker section; services in hospitals, NGO's and other such work i.e. social work at villages adopted by respective institute/ college.**



# **UNIVERSITY DEPARTMENTS**

## **RAJASTHAN TECHNICAL UNIVERSITY, KOTA**

**I & II Semester**  
**Common to all branches of UG Engineering & Technology**

**HUN102: Language Lab**

**Credit: 1 (Non-graded)**

**OL+OT+2P**

1. Phonetic Symbols and Transcriptions.
2. Extempore.
3. Group Discussion.
4. Dialogue Writing.
5. Listening comprehension.



# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

### I Semester

### Common to all branches of UG Engineering & Technology

### SAN101: Induction program

**Credit: 0.5 (Non-graded)**

**OL+OT+1P**

In University Departments, the induction program for newly admitted students has been conducted in line with AICTE Induction program policy, every year before the commencement of the first semester classes. The objective of the Induction program is to demystify what is expected of students in Intermediate level and to provide adequate foundation in the core applied science subjects and English limited to moderate level so that students do not face any difficulty when the classes commence.

During the induction program there are sessions on soft skills, Sports and cultural activities. Eminent personalities from academia and industry, personality development trainers, and other noted speakers are invited to give lectures to the students. During the interaction of few days with the faculty, the students will come out of their hesitation and it will be the best platform for the students to interact with the faculty members, making it responsible for them to build strong relationships with faculty, advisers and other students.

This induction program will help the students to have a smooth transition to the Engineering course. The sound grasp of the fundamentals of the engineering subjects lays the strong foundation for the entire four-year program. The main focuses of induction program are as follows:

- Make the students feel comfortable in the new environment.
- Allow them to explore their academic interests and activities.
- To introduce students about engineering courses.
- Reduce competition and make them work for excellence.
- Promote bonding within them.
- Build relations between teachers and students.
- Give a broader view of life.
- Build sound moral character.



# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

### I Semester

### Common to all branches of UG Engineering & Technology

#### CSP100: Programming Lab

**Credit: 1**

**OL+OT+2P**

1. To learn about the C Library, Preprocessor directive, Input-output statement.
2. Programs to learn data type, variables, If-else statement
3. Programs to understand nested if-else statement and switch statement
4. Programs to learn iterative statements like while and do-while loops
5. Programs to understand for loops for iterative statements
6. Programs to learn about array and string operations
7. Programs to understand sorting and searching using array
8. Programs to learn functions and recursive functions
9. Programs to understand Structure and Union operation
10. Programs to learn Pointer operations
11. Programs to understand File handling operations
12. Programs to input data through Command line argument



# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

### I& II Semester

### Common to all branches of UG Engineering & Technology

### SAA100 : SODECA (Anandam)

**Credit: 0.5**

#### **I. Component A: Discipline (50 marks)**

Minimum 50 marks shall be awarded unless is involved in indiscipline.

The marks shall be deducted from this component for those who shall involve themselves in indiscipline/ undesirable activities/ Detained from departments or in case of penalty of marks imposed by Chief Proctor/ Standing Disciplinary Committee (SDC), such deduction should be preferably approved by Head of the Institution/Principal/Director and subject to a maximum of 50 marks.

#### **II. Component B: Extra Curricular Activities (50 marks)**

In this component the various activities are categorized as below:

##### **A. Games and Sports / Field Based Activities:**

NCC, NSS, Scouts & Guide, Sports Activities or any other related activity.

##### **B. Cultural/ Literary Activities:**

Activities under the banner of ESF, Celebration of recognized National Days/ Birth Anniversary of great personalities, Hostel Day/ Annual Day/ Fresher's Day or any other related activity.

##### **C. Academic/Technical/ Professional Development Activities:**

Attending/ organizing conferences, workshops, FDPs for reasonable duration/numbers.

##### **D. Social Outreach / Personality Development Based Activities:**

Contribution towards social upgradation based activities, Activities by social organization like, Art of Living, Yoga etc., Blood donation, Awareness programs, personality development programs, activities under different clubs (if not covered under above heads) like, photography etc., NGO activities, Plantation/ cleanliness activities etc.



## **UNIVERSITY DEPARTMENTS** **RAJASTHAN TECHNICAL UNIVERSITY, KOTA**

### **E. Anandam Program Activities:**

The students are expected to perform the following activities:

- Do at least one act of individual service each day
- Record this act of service in a dedicated Register/Personal Diary (PD)
- Participate in a sharing and presentation on the group service in the discussion session held once a month

### **III. Awarding Marks:**

Effective contribution and active participation may be judged for awarding the marks. Additionally, following levels may be defined in each component A, B, C, D & E:

Component B	Level wise Marks		
	Level-1	Level-2	Level-3
A. Games and Sports / Field Based Activities	-	-	40
B. Cultural/ Literary Activities	20	30	40
C. Academic/Technical/ Professional Development Activities	20	30	40
D. Social Outreach / Personality Development Based Activities	20	30	40
E. Anandam Program Activities	20	30	40
Maximum Marks	50		

Level-1: (i) Active Participation in activities at College/City Level  
(ii) Do at least one act of individual service each day in category E

Level-2: (i). Active participation in multiple activities at Level-1  
(ii). Participation at State level  
(iii) Getting award/ recognition at District/State Level  
(iv) Record this act of service in a dedicated Register/Personal Diary in category E

Level-3: (i). Active participation in multiple activities at Level-2  
(ii). Participation at National level  
(iii) Getting award/ recognition at National Level  
(iv) Participate in a sharing and presentation on the group service in the discussion session held once a month in category E



# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

### II Semester

### Common to all branches of UG Engineering & Technology

### MTL101: Engineering Mathematics-II

Credit: 4

3L+1T+0P

SN	CONTENTS
1	<b>Matrices:</b> Rank of a matrix, rank-nullity theorem; System of linear equations; <del>Symmetric, skew symmetric and orthogonal matrices;</del> Eigenvalues and eigenvectors; <del>Diagonalization of matrices;</del> Cayley-Hamilton Theorem, <del>and Orthogonal transformation.</del>
2	<b>First order ordinary differential equations:</b> Linear and Bernoulli's equations, Exact equations, <del>Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.</del>
3	<b>Ordinary differential equations of higher orders:</b> Linear Differential Equations of Higher order with constant coefficients, <del>Simultaneous Linear Differential Equations,</del> Second order linear differential equations with variable coefficients: Homogenous and Exact forms, one part of CF is known, Change of dependent and independent variables, method of variation of parameters, <del>Cauchy Euler equation;</del> <del>Power series solutions including Legendre differential equation and Bessel differential equations.</del>
4	<b>Partial Differential Equations – First order:</b> Order and Degree, Formation; Linear Partial differential equations of First order, Lagrange's Form, Non Linear Partial Differential equations of first order, <del>Charpit's method,</del> Standard forms.
5	<b>Partial Differential Equations– Higher order:</b> Classification of Second order partial differential equations, Separation of variables method to simple problems in Cartesian coordinates <del>including two dimensional Laplace, one dimensional Heat and one dimensional Wave equations.</del>





# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

### II Semester

### Common to all branches of UG Engineering & Technology

### CSL101: Data Analysis & AI through Python

Credit: 2

2L+0T+0P

SN	CONTENTS
1	<b>Data Analysis:</b> Types of data analysis techniques and methods; Data analysis process; Steps of web data analysis (identify, extract, prepare, integrate& consume); <del>Considerations / issues in data analysis.</del>
2	AI: Introduction to Artificial Intelligence; Graph search algorithms, classification, optimization, reinforcement learning; <del>Applications like game playing engines, handwriting recognition, and machine translation etc.</del>
3	<b>Python Programming:</b> Introduction, Keywords and Identifiers, Statement, Indentation and Comments, variables, Data types, type conversion, I/O and imports, operators, namespace; Flow control, if-else, for, while, break, continue, pass; functions, argument, recursion, anonymous function, local, nonlocal, global, modules, package; List, tuple, string, set, dictionary; <del>files, operations, exception handling, user defined exceptions; Class, multiple inheritance, operator overloading; Iterator, generator, closure, decorator, property; date &amp; time, sleep().</del>
<b>TOTAL</b>	



# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

### II Semester

### Common to all branches of UG Engineering & Technology

#### TPN101: Club Activity

**Credit: 0.5 (Non-graded)**  
**OL+OT+1P**

The objectives of different activity groups running at University Departments are as per the following:-

1. To foster and develop all student activities in the institute
2. To promote and develop organizational abilities in students
3. Identify student issues and promote discussion on them
4. To develop a well-informed, articulate and participative student community life, and increase social awareness
5. To function as the office for all election/nominations of students for SFAC activities
6. To offer clerical and office support for all recognized student activities.

List of different activity groups in UD RTU is as follows:

1. Flying Mustangs (Aeromodelling Club)
2. Tech knights (Programming Club)
3. Robotics Club
4. Society of Automotive Engineers
5. Words' Worth
6. Master Builders Club
7. Marketing and Management Club
8. Dance Club
9. Dramatics Club
10. Music Club
11. Shutterbugs (Photography and Filming Club)
12. Literature Club
13. Art Club
14. IN-DEED Club
15. Inspire Club
16. Vivekananda Study Circle
17. Cricket Club



## **UNIVERSITY DEPARTMENTS**

### **RAJASTHAN TECHNICAL UNIVERSITY, KOTA**

18. Badminton Club
19. Volleyball Club
20. Athletics Club
21. Football Club
22. Table-tennis Club
23. Chess Club



# UNIVERSITY DEPARTMENTS

## RAJASTHAN TECHNICAL UNIVERSITY, KOTA

### II Semester

### Common to all branches of UG Engineering & Technology

#### CSP101: Python Lab

**Credit: 1**

**OL+OT+2P**

1. To learn about Statement, Indentation and Comments.
2. Programs to learn variables, data types, type conversion.
3. Programs to understand I/O and imports, operators & namespace.
4. Programs to learn flow control using if-else statements.
5. Programs to learn flow control using for & while statements.
6. Programs to learn about break, continue & pass statements.
7. Programs to understand functions and passing arguments.
8. Programs to learn recursion, anonymous functions.
9. Programs to understand local, nonlocal, global constructs.
10. Programs to learn the use of tuple, string, set & dictionary.
11. Programs to understand file operations.  
Programs to implement exception handling