

Physics Group (Sem-II)

**COURSE WISE DETAILED
CURRICULUM**

FY101 Engineering Physics

Lectures : 3 Hrs/Week

Credit : 3

Evaluation Scheme

ISE : 40 Marks

ESE : 60 Marks

Course Objectives: The objective of the course is to		
1) provide the useful fundamental concepts of Physics to all Engineering disciplines. 2) make the student aware of new techniques in Physics applicable to engineering practices. 3) encourage them to understand engineering and technical development.		
Course Outcomes:		
COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Summarize the knowledge of basic quantum mechanics to understand wave particle dualism and uncertainty principle.	Understand
CO2	Demonstrate the different crystal structure and their properties by understanding crystal physics.	Understand
CO3	Apply the theory and phenomenon of nanophysics to produce nanomaterials	Apply
CO4	Define the basic requirements of Architectural Acoustics	Remember
CO5	Illustrate the different phenomenon of light.	Understand
CO6	Explain the concepts and applications of LASER and necessary tools for nuclear power plant.	Understand

Description:		
Engineering Physics course is offered as the basic science course. This course contains crystal structures and their properties, Approaches and techniques of nanomaterial and nanotechnology, Basic concepts of Architectural acoustics, Different phenomenon's of light, wave –particle dualism and uncertainty principle and nuclear energy. These are useful fundamental concepts of Physics to all Engineering disciplines and to make the student aware of new techniques in Physics applicable to engineering practices.		
Prerequisites:	1:	Fundamentals of properties of wave and particle and types of the solid.
	2:	Different phenomenon of light and sound.
	3:	Basics of Atomic Physics and Nuclear energy

Section – I		
Unit 1	Wave Mechanics	
	Introduction, Wave-particle dualism (De-Broglie's Hypothesis -light and matter), De-Broglie's wavelength in terms of Kinetic Energy, Potential Difference and Temperature, Properties of matter waves, Heisenberg's uncertainty principle for position and momentum, Compton Effect (statement, explanation and formula), Photoelectric Effect, Numerical.	06 Hrs
Unit 2	Crystallography	
	Introduction, Basics of crystal structure -Space Lattice, Basis, crystalline solid and Unit cell (geometry and types), Seven crystal system, Properties of unit cell for SC, BCC and FCC (number of atoms per unit cell, coordination number, atomic radius and packing density), Relation between density and lattice constant, Miller indices (procedure and sketches for planes), Bragg's x-ray spectrometer, Numerical.	07 Hrs
Unit 3	Nanoscience and Nanotechnology	
	Introduction, Nanomaterials, Nanoscience and Nanotechnology, Top down and bottom up approaches, Production techniques - Ball milling and Colloidal, Types of nanomaterial, Properties of material at nanoscale (Surface to Volume ratio and Quantum confinement effect), Applications of nanomaterials, Characterizations - Scanning Tunneling Microscope and Atomic Force Microscope.	06 Hrs
Section – II		
Unit 4	Architectural Acoustics	
	Introduction, Reverberation, Reverberation time, Absorption coefficient, Average absorption coefficient, Sabine's formula for reverberation time (no derivation), Factors affecting architectural acoustics and their remedy, Numerical.	06 Hrs
Unit 5	Wave Optics	
	Introduction, Theories of light, Interference of light and types, Diffraction of light and types, Construction of diffraction grating, Theory of fraunhofer diffraction by double slit, Resolving power of plane transmission grating, Polarization of light, double refraction, Huygens' theory of double refraction, Specific Rotation, Quarter wave plate and half wave plate, Laurent's half shade polarimeter, Numerical.	07 Hrs

Unit 6	LASER and Nuclear Physics	
	<p>LASER: Introduction, Absorption, spontaneous emission and stimulated emission of radiations, Population inversion, Pumping energy, Characteristics of laser beams, Ruby laser.</p> <p>Nuclear Physics: Introduction, Nuclear Fission, Energy released by 1 Kg of U235, Nuclear fission reactor, Nuclear fusion, Thermonuclear reactions (proton-proton chain and Carbon Nitrogen cycle), Numerical.</p>	07 Hrs

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	2	1													
CO2	2	1	1									1			
CO3	2	1	1									1			
CO4	2	1	1									1			
CO5	2	1	1									1			
CO6	2	1										1			

References:

Text Books	
1	M. N. Avadhanulu and P. G. Kshirsagar, "A Text book of Engineering Physics", S.Chand and Company, New Delhi.
2	R. K. Gaur and S. L. Gupta "Engineering Physics", Dhanpat Rai Publications, New Delhi.
Reference Books	
1	R. K. Gaur & Gupta S. L, Engineering Physics –Dhanapat Rai Publication
2	B. L. Theraja -Modern Physics - S. Chand & Company Ltd., Delhi
3	Subramanyam & BrijLal, A Text Book of Optics –S. Chand & Company (P.) Ltd.
4	M. N. Avadhanulu & P. G. Kshirsagar - A Text Book of Engineering Physics -S. Chand Publication.
5	B. K. Pandey and S. Chaturvedi- Engineering Physics, Cengage Learning

Web Links/ Video Lectures

Sr. No	Unit No./Topic	Web Links/ Video Lectures
1	Unit No. 1	https://nptel.ac.in/courses/115/101/115101010/
2	Unit No. 2	https://nptel.ac.in/courses/115/104/115104109/
3	Unit No. 2	https://nptel.ac.in/courses/115/105/115105099/
4	Unit No. 3	https://nptel.ac.in/courses/115/101/115101007/
5	Unit No. 5	https://nptel.ac.in/courses/115/105/115105083/
6	Unit No. 6	https://nptel.ac.in/courses/115/102/115102124/
7	Unit No. 6	https://nptel.ac.in/courses/115/104/115104043/
8	Physics	http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html
9	Physics	https://en.wikipedia.org/wiki/Fundamentals_of_Physics

FY201 Engineering Mathematics-II

Lectures : 3 Hrs/Week

Evaluation Scheme

Credit : 3

ISE : 40 Marks

ESE : 60 Marks

Course Objectives: The objective of the course is to		
1) Model a real life scenario into differential equations and solve them analytically and numerically		
2) Learn different methods of solving improper and multiple integral		
Course Outcomes:		
COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Solve linear and nonlinear ordinary differential equations of order one and find orthogonal trajectory.	Knowledge, Application
CO2	Find numerical solutions of ordinary differential equations of first order and first degree.	Knowledge
CO3	Compute double and triple integrals.	Knowledge
CO4	Find area, mass of plane lamina using double integral.	Application
CO5	Evaluate definite integrals using Gamma and Beta functions.	Evaluation
CO6	Solve definite integral numerically.	Knowledge

Description:		
Engineering Mathematics-II course is offered as the basic science course. This course contains Mathematical methods and techniques that are typically used in engineering to solve complex engineering problems. This course has six units namely i) Differential equation of first order first degree and Applications, ii) Numerical Solution of Differential Equation of order one degree One, iii) Integral Calculus, iv) Numerical Integration, v) Multiple Integrations and vi) Application of Multiple Integrals		
Prerequisites:	1:	Trigonometric identities and Logarithmic identities
	2:	Differentiation and integration formulae
	3:	Shapes of basic curves like circle, parabola, ellipse, straight line.
Section – I		
Unit 1	Differential equation of first order first degree and Applications	
	Exact Differential Equation, Reducible to Exact Differential Equation, Linear Differential Equation, Reducible to Linear, Application to orthogonal trajectory (Cartesian and Polar)	
		8 Hrs

TextBooks	
1	Higher Engineering Mathematics, Dr. B. S. Grewal, S. Chand and Company, 40th Edition.
ReferenceBooks	
1	Advanced Engineering Mathematics”, H. K. Das, S. Chand Publication, 8th Edition.
2	A Text Book of Applied Mathematics”, Vol. I and II, P. N. Wartikar and J. N. Wartikar, Vidyarthi GrihaPrakashan, Pune.
3	A textbook of Engineering Mathematics, N. P. Bali, Iyengar, Laxmi Publications (P) Ltd, New Delhi
4	Advanced Engineering Mathematics, Erwin Kreyszig, Wiley India Pvt. Ltd

Web Links/ Video Lectures

Sr. No	Unit No.	Web Links/ Video Lectures
1	1	https://nptel.ac.in/courses/111/106/111106100/
2	2	https://nptel.ac.in/courses/111/107/111107063/
3	3,4,5	https://nptel.ac.in/courses/111/105/111105122/
4	6	https://youtu.be/_cgzqVmvqtQ

FY105 Basic Electrical and Electronics Engineering

Lectures : 2 Hrs/Week

Evaluation Scheme

Credit : 2

ISE : 40 Marks

ESE : 60 Marks

Course Objectives: The objective of the course is to		
Provide the Knowledge with an introductory and broad treatment in the field of Electrical and Electronics Engineering.		
Course Outcomes:		
COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Define and describe the various Parameters of Electrical and Electronics circuits.	Knowledge
CO2	Distinguish similarities and dissimilarities between Electric and magnetic circuit.	Compression
CO3	Apply the Kirchhoff's Law to the DC circuits for identifying the currents and voltage drops across each element.	Apply Analysis
CO4	Analyze the nature of AC Series circuits by determining various parameters like Impedance, power and power factor.	Analysis
CO5	Differentiate the Star and Delta connection in Three phase AC system in terms of Line and phase quantities.	Analysis
CO6	Determine the voltage and currents at primary and secondary levels to identify the various applications of Transformer.	Evaluation

Description:		
Basic Electrical & Electronics Engineering course is offered as the engineering science course. This course contains. Basic knowledge of Electrical & Electronics engineering and its advantages, applications. This course has six units namely i) Analysis of D.C. Circuits, ii) Magnetic circuits, iii) Fundamentals of electronics iv) Single phase AC circuits, v) Three phase AC circuits, vi). Single phase Transformer		
Prerequisites:	1:	Battery, Potential difference and current flow concept.
	2:	Few basic electrical and Electronics components identification
	3:	Difference between AC & DC circuits
Section – I		
Unit 1	Analysis of D.C. Circuits	
	Concept of EMF, Potential difference, current, Power, Energy, Resistance, Ohms law,	

References:

Text Books	
1)	P.V.Prasad and S.Shivan Raju – Electrical Engineering Concepts and applications – cenagage learning.
2)	B.H.Deshmukh, Electrical Engineering Concepts and applications
3)	Robert L.Boysted and Louis Nashelsky ,Electronics devices and circuit theory – Pearson education
Reference Books	
1)	B.L.Theraja – Electrical Technology Vol.1.- S.Chand publications.
2)	Nagarath I.J. and D.P.Kothari – Basic Electrical Engineering (2001) – Tata McGraw Hill.
3)	Bharati Dwivedi and Anurasg Tripathi – Fundamentals of Electrical engineering – Willey Precise.

Web Links/ Video Lectures

Sr. No	Unit No.	Web Links/ Video Lectures
1	1	https://nptel.ac.in/courses/108/106/108106172/
2	2	https://nptel.ac.in/courses/108/106/108106172/
3	3	https://nptel.ac.in/courses/108/108/108108122/
4	4	https://nptel.ac.in/courses/108/105/108105053/
5	5	https://nptel.ac.in/courses/108/105/108105053/
6	6	https://nptel.ac.in/courses/108/105/108105017/

FY106 Basic Civil Engineering

Lectures : 2 Hrs/Week

Evaluation Scheme

Credit : 2

ISE : 40 Marks

ESE : 60 Marks

Course Objectives: The objective of the course is to		
<ol style="list-style-type: none"> 1. learn the brief introduction of all aspects under civil engineering 2. understand basic concepts of Surveying, Transportation Engineering 		
Course Outcomes:		
COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Demonstrate basic knowledge in different fields of Civil Engineering	Knowledge
CO2	Apply principles of planning, building Bye laws	Applying
CO3	Explain various uses and properties of building materials and also types of loads acting on building	Understand
CO4	Illustrate linear and angular measurements by considering principles and significance of Surveying	Analyzing
CO5	Identify nature of ground by using methods of leveling	Evaluating
CO6	List components of pavements, railway track and water supply scheme	Understand

Description:		
This course include principles of building planning, building components and their functions, building materials, surveying and its principles, leveling transportation engineering, irrigation		
Prerequisites:	1:	Properties of materials
	2:	Measurements
	3:	Principles
Section – I		
Unit 1	Introduction to Civil Engineering and Building Planning	
	Introduction, branches of civil engineering , Relevance of civil engineering in the overall development of the country, Principles of planning, Introduction to Bye-Laws regarding building line, height of building, open	05Hrs

References:

Text Books	
1	Basic Civil Engineering by G. K. Hiraskar, DhanpatRai Publication
2	Basic Civil Engineering by S. S. Bhavikatti, New Age International Publications
3	Building Construction by S P Arora & S P Bindra, DhanpatRai Publications
Reference Books	
1	Surveying by N. Basak, Tata Mc-Graw Hill Publication
2	Surveying Vol.I, Vol.II, Vol.III by B.C. Punmia, Laxmi Publication
3	Civil Engineering Materials - Technical Teacher's Training Institute, Chandigarh
4	Irrigation Engineering by B. C. Punmia, DhanpatRai Publications

Web Links/ Video Lectures

Sr. No	Unit No.	Web Links/ Video Lectures
1	1	https://nptel.ac.in/courses/105/103/105103093/
2	2	https://nptel.ac.in/courses/105/102/105102088/
3	3	https://nptel.ac.in/courses/105/102/105102088/
4	4	https://nptel.ac.in/courses/105/107/105107122/
5	5	https://nptel.ac.in/courses/105/107/105107122/
6	6	https://nptel.ac.in/courses/105/101/105101087/

FY107 Computer Aided Engineering Drawing

Lectures : 2 Hrs/Week

Credit : 2

Evaluation Scheme

ISE : 40 Marks

ESE : 60 Marks

Course Objectives: The objective of the course is to		
<ol style="list-style-type: none"> 1) Provide the basic knowledge of engineering drawing to visualize the objects. 2) Deliver the basic commands for drawing using AutoCAD. 		
Course Outcomes:		
COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Demonstrate drawings on AutoCAD	Understand
CO2	Draw the neat drawings of various curves, points, straight lines and planes.	Knowledge
CO3	Classify Solids and Projection of solids at different Positions.	Evaluation
CO4	Visualize and construct orthographic projection to represent in two-dimensional views.	Knowledge, Application
CO5	Creating neat Sketch isometric drawings of regular planes and solids.	Knowledge, Creating
CO6	Construct the objects by developing surfaces of solids with cutting planes.	Knowledge

Description:		
Computer Aided Engineering Drawing Course consists of engineering drawing of Projections of Planes and Solids, Sections of solids & Development of surfaces, Orthographic Projections, Isometric projections along with introduction to computer aided sketching		
Prerequisites:	1:	Knowledge of Geometry at SSC Level
	2:	Knowledge of free hand sketch
Section – I		
Unit 1	Fundamentals of Engineering Drawing and Introduction to Computer Aided Sketching	
	<p>A) Introduction, Instruments for drawing, sheet sizes, Types of different types of lines, Dimensioning. Construction of regular polygons (Up to hexagon). Ellipse, Parabola and hyperbola.</p> <p>B) Graphical user interface of the CAD software, standard tool bars/menus and description of most commonly used tool bars, navigational tools. Study and use of drawing and modify commands.</p>	05Hrs

Unit 2	Projection of planes (1st Angle Projection only)	
	Orthographic projection system, First and Third angle projection methods, Concept of Projection – points, lines Projection of planes (regular polygons and circle) inclined to both HRP and FRP	05Hrs
Unit 3	Projections of Solids	
	Projection of Solids such as Prisms, pyramids, cylinder and cone with their axis inclined to both the reference planes.(Only rest on HP)	04Hrs
Section – II		
Unit 4	Orthographic Projections	
	Orthographic views: Lines used, Selection of views, spacing of views, dimensioning and sections. Required views from given pictorial views (Conversion of pictorial view into orthographic view) including sectional orthographic view.	04Hrs
Unit 5	Isometric Projections	
	Introduction to isometric, Isometric scale, Isometric projections and Isometric views / drawings. Circles in isometric view. Isometric views of simple solids and objects.).	04Hrs
Unit 6	Sections of solids & Development of surfaces	
	Sections of solids (Simple positions and axis inclined to one plane and parallel to other) and Development of plane and curved lateral surfaces: Prisms, Pyramids, Cylinders and Cones (cutting planes specified).	04Hrs

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	3	2								2					
CO2	2	2								1					
CO3	3	2								2					
CO4	2	1								1					
CO5	2	1								1					
CO6	3	2								2					

References:

Text Books	
1	Engineering Drawing by N. D. Bhatt, Charotar Publication House, Bombay
2	Machine Drawing by N. D. Bhatt, Charotar Publication House, Bombay.
3	Engineering Drawing and Graphics Using AutoCAD by T. Jeyapoovan, Vikas Publication.
4	A text book of Engineering Drawing by R. K. Dhawan, S. Chand and Co.
Reference Books	
1	Engineering Graphics with AutoCAD - D. M. Kulkarni, A. P. Rastogi, A. K. Sarkar, (PHI) Publisher 2010.
2	Machine Drawing by K. L. Narayana, New Age Publication
3	Engineering Drawing by N. B. Shaha and B. C. Rana, Pearson Education.
4	Engineering Drawing by Prof. Amar Pathak, WILEY India Publication.

Web Links/ Video Lectures

Sr. No	Unit No.	Web Links/ Video Lectures
1	1	http://nptel.ac.in/courses/112/104/112104172/
2	2	http://nptel.ac.in/courses/112/104/112104172/
3	3	http://nptel.ac.in/courses/112/104/112104172/
4	4	http://nptel.ac.in/courses/112/104/112104172/
5	5	http://nptel.ac.in/courses/112/104/112104172/
6	6	http://nptel.ac.in/courses/112/104/112104172/
7	4	http://vlabs.iitb.ac.in/vlabs-dev/labs/mit_bootcamp/egraphics_lab/labs/index.php

FY202 Soft Skills

Lectures : 01 Hrs/Week

Evaluation Scheme

Credit : 01

ISE : 50 Marks

ESE : NA

Course Objectives: The objective of the course is to		
1) make students conscious about Recruitment procedure and ethics at workplace 2) inculcate the importance of Behavioral Skills in day to day communication 3) enhance the writing skills with technical report writing practice 4) prepare students to deliver speeches of various types / occasions		
Course Outcomes:		
COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Understand the procedure of recruitment drive	Understand
CO2	Prepare technical reports for variety of purposes	Evaluate
CO3	Deliver prepared speeches to express ideas, thoughts and emotions	Apply
CO4	Make use of interpersonal skills in different scenario.	Apply

Description:		
<p>Soft Skills course has correlation with the Sem- I course Professional Communication. After learning the basics of language in the first semester, this course concentrates on the personality development, interpersonal skills and expectation from an industry. The included models in the syllabus have the direct correlation with employability of the students. This course would boost personality and interpersonal skills of the learners.</p>		
Prerequisites:	1:	Basic knowledge of English
	2:	Basic English Vocabulary
Unit 1	Recruitment and Career Skills	
	Importance of Planning and Managing Career Job Application and Resume/CV/Bio data Group Discussion Mock Personal Interview Corporate Etiquettes & Manners	03 Hrs
Unit 2	Behavioral Skills	
	Understanding Self: Self Esteem Personality Types and Traits Time Management & Stress Management Positive Attitude Building Emotional Intelligence	05 Hrs

Unit 3	Technical Writing Skills	
	Importance and Objectives of Technical Writing Structure and Types of Reports (Investigation and Accident Report) Corporate Email Writing: Dos & Don'ts	04 Hrs
Unit 4	Developing Presentation Skills	
	Techniques of Public Speaking Speeches for Various Occasions: Welcome Speech, Introduction of a Guest, Vote of Thanks	02 Hrs

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1						2	2					2			
CO2							2								
CO3						2	2								
CO4						2	2			2		2			
CO5															
CO6						2	2					2			

References:

Recommended Books:	
1)	Communication Skills for Engineers by S. Mishra & C. Muralikrishna (Pearson)
2)	Communication Skills by Meenakshi Raman and Sangeeta Sharma, Oxford University Press 2016 1 st Edition
3)	Lesikar, R. V. and Pettit, J., D. Basic Business Communication, McGraw-Hill International Edition, Singapore 10 th Edition, 2006
4)	Managing Soft Skills for Personality Development by B.N. Ghosh, Tata McGraw Hill, 2012.
5)	Bikram K. Das, KalyaniSamantray, "An Introduction to Professional English and Soft Skills" Cambridge University Press New Delhi.
6)	Comfort, Jeremy, et al. (2011) Speaking Effectively: Developing Speaking Skills for Business English. Cambridge: Cambridge University Press. (Reprint)
7)	Sharma, R. C. and Krishna Mohan, Basic Correspondence and Report Writing: A Practical Approach to Business and Technical Communication, Tata McGraw-Hill Publishing Company Limited, India, 5th Edition, 2017
8)	Business Correspondence & Report-writing by R.C.Sharma&KrishnaMohan, Tata McGraw-Hill Education
9)	Dr. Abha Singh, "Behavioural Science" Wiley India Pvt.Ltd
10)	Soft Skills by K. Alex, S. Chand and Company, 2013

Web Links/ Video Lectures

Sr. No	Unit No.	Web Links/ Video Lectures
1	1	https://cvdesign.mobi/ https://zety.com/cv-maker https://www.javatpoint.com/group-discussion https://www.themuse.com/advice/interview-questions-and-answers
2	2	https://www.verywellmind.com/what-is-self-esteem-2795868 https://managementhelp.org/personalproductivity/time-stress-management.htm https://www.helpguide.org/articles/mental-health/emotional-intelligence-eq.htm
3	3	https://www.mindtools.com/CommSkill/EmailCommunication.htm
4	4	https://business.tutsplus.com/tutorials/effective-public-speaking-skills-techniques--cms-30848

FY101T Engineering Physics Lab

Practical : 2 hr/week

Credit : 1

Evaluation Scheme

ISA : 25 Marks

POE : NA

Course Objectives: The objective of the course is to

- 1) furnish the conceptual understanding of the basic principles.
- 2) make the students gain practical knowledge to co-relate with the Physics theory.
- 3) encourage them to understand engineering and technical development.
- 4) achieve perfectness in experimental skills and the study of practical applications will bring more
- 5) confidence and ability to develop the skills needed to set up the equipment.

Course Outcomes:

COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Explain the need for precise measurement practices for data recording.	Understand
CO2	Interpret the principle, concept, working and applications of relevant technologies and compare the results with theoretical calculations.	Understand
CO3	Build basic communication skills through working in groups in performing the Engineering Physics laboratory experiments and by interpreting the results.	Apply
CO4	Assume the techniques and skills associated with modern scientific tools.	Analyze

Description:

The aim of this course is to make the students gain practical knowledge to co-relate with the theoretical studies and to use the principle in the right way to implement the modern technology.

The experiments are selected from various areas of Physics like Measurements, Wave Optics, Lasers, Solid state physics and Basic Electronics. Engineering Physics Laboratory manual is written in a simple scientific language with aim, apparatus, theory, diagrams, formula, graph and questions. These experiments will help the students to expertise in the analysis of various concepts in Optics, measurements, crystallography and Electronics related topics.

Prerequisites:

- | | |
|----|--|
| 1: | Higher secondary level Physics |
| 2: | Fundamentals of wave optics and crystal. |

Practical/ Experiment Topic
(Minimum 8 experiments should be completed)

Number	Practical/ Experiment/Tutorial Topic	Hrs.	Cognitive levels of attainment as per Bloom's
1	Measurements in Physics	02	Remember
2	Resistor and Capacitor Code	02	Remember
3	Measurement of Band Gap Energy	02	Understand
4	Study of seven Crystal Structure, Bravais Lattice and Properties of unit cell	02	Apply
5	Study of Symmetry Elements of Cubic Crystal	02	Apply
6	Determination of Interplaner distance using XRD pattern	02	Analyze
7	Miller Indices	02	Analyze
8	Divergence of LASER Beam	02	Apply
9	Resolving power of Telescope	02	Apply
10	Specific rotation by Polarimeter	02	Apply
11	Wavelength of different spectral lines of mercury using grating.	02	Analyze
12	Determination of wavelength of LASER using diffraction grating.	02	Analyze
13	Grating constant of diffraction grating	02	Apply
14	Determination of e/m of an electron	02	Apply
15	Resolving power of diffraction grating	02	Apply

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	2									1		1			
CO2	2	1								1		1			
CO3	2									2		1			
CO4	2	1										1			

References:

Text Books	
1	Engineering Physics Lab Manual, TKIET Warananagar
2	Madhusudhan Rao, Engineering Physics Lab Manual, Scitech Publication
3	O.P. Singh, Vipin Kumar, R.P. Singh, Engineering Physics Practical Manual, Ram Prasad Publication
Reference Books	
1	Resnick Halliday, Physics Volume-I, Krane -John Wiley & Sons Pub.
2	Resnick Halliday, Physics Volume-II, Krane -John Wiley & Sons Pub.

Virtual Lab Link :

- Experiment name-** Diffraction Grating (**Lab Name-** Optics virtual lab)
<http://vlab.amrita.edu/?sub=1&brch=281&sim=334&cnt=1>
- Experiment name-** Crystal Structure (**Lab Name-** solid state physics virtual lab)
<http://vlab.amrita.edu/?sub=1&brch=282&sim=370&cnt=1>
- Experiment name-** Laser beam divergence and spot size (**Lab Name-** laser optics virtual lab)
<http://vlab.amrita.edu/?sub=1&brch=189&sim=342&cnt=1>
- Experiment name-** Numerical Aperture of Optical Fiber (**Lab Name-** laser optics virtual lab)
<http://vlab.amrita.edu/?sub=1&brch=189&sim=343&cnt=1>
- Experiment name-** B-H Curve (**Lab Name-** solid state physics virtual lab)
<http://vlab.amrita.edu/?sub=1&brch=282&sim=1507&cnt=1>
- Experiment name-** Photoelectric effect (**Lab Name -** modern physics virtual lab)
<http://vlab.amrita.edu/?sub=1&brch=195&sim=840&cnt=1>

FY201T-ENGINEERING MATHEMATICS – II TUTORIAL

Tutorial/Practical : 1 hr/week

Credit : 1

Evaluation Scheme

ISA : 25 Marks

POE : NA

Course Objectives: The objective of the course is to

. Model a real life scenario into differential equations and solve them analytically and numerically

. Learn different methods of solving improper and multiple integral.

Course Outcomes:

COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Solve linear and nonlinear ordinary differential equations of order one and find orthogonal trajectory.	Knowledge, Application
CO2	Find numerical solutions of ordinary differential equations of first order and first degree.	Knowledge
CO3	Compute double and triple integrals.	Knowledge
CO4	Find area, mass of plane lamina using double integral.	Application
CO5	Evaluate definite integrals using Gamma and Beta functions.	Evaluation
CO6	Solve definite integral numerically.	Knowledge

Description:

Engineering Mathematics-II course is offered as the basic science course. This course contains Mathematical methods and techniques that are typically used in engineering to solve complex engineering problems. This course has six units namely i) Differential equation of first order first degree

and Applications, ii) Numerical Solution of Differential Equation of order one degree One, iii) Integral

Calculus, iv) Numerical Integration, v) Multiple Integrations and vi) Application of Multiple Integrals

Prerequisites:	1:	Trigonometric identities and Logarithmic identities
	2:	Differentiation and integration formulae
	3:	Shapes of basic curves like circle, parabola, ellipse, straight line.

Tutorials

Number	Practical/Experiment/Tutorial Topic	Hrs.	Cognitive levels of attainment as per Bloom's
1	Exact and reducible exact differential equation	2	Knowledge
2	Linear, reducible to linear diff equation and Applications	2	Knowledge, Application
3	Evaluation of double and triple integration	2	Knowledge
4	Change of order of integration	2	Knowledge
5	Area by double integral, Mass of Lamina	2	Knowledge, Application
6	Gamma function and Differentiation under integral sign	2	Knowledge
7	Beta functions and properties	2	Knowledge
8	Euler and Eulers modified method	2	Knowledge
9	Taylor series and Runge Kutta of order four	2	Knowledge
10	Trapezoidal and Simpson (1/3) rule Simpsons (3/8)th and Weddles rule	2	Knowledge

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	2	1													
CO2	2	1													
CO3	2	1													
CO4	2	1													

References:

TextBooks	
1	Higher Engineering Mathematics, Dr. B. S. Grewal, S. Chand and Company, 40th Edition.
ReferenceBooks	
1	Advanced Engineering Mathematics”, H. K. Das, S. Chand Publication, 8th Edition.
2	A Text Book of Applied Mathematics”, Vol. I and II, P. N. Wartikar and J. N. Wartikar, Vidyarthi Griha Prakashan, Pune.
3	A textbook of Engineering Mathematics, N. P. Bali, Iyengar, Laxmi Publications (P) Ltd, New Delhi
4	Advanced Engineering Mathematics, Erwin Kreyszig, Wiley India Pvt. Ltd

FY105T- Basic Electrical and Electronics Engineering Lab

Practical : 2 hrs/week

Credit : 1

Evaluation Scheme

ISA : 25 Marks

POE : NA

Course Objectives: The objective of the course is to		
1) Introduce fundamental concepts and techniques to analyse the behaviour of electrical & electronics circuits. 2) Provide the details regarding principle of operation and methods to evaluate the performance of electrical apparatus. 3) Impart an over view about electrical wiring and protection mechanisms for domestic applications		
Course Outcomes:		
Cos	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Make electrical connection for different circuits	Understanding
CO2	Apply the different laws	Apply
CO3	Analyze V-I characteristics of Bridge circuits	Analyze
CO4	Determine the efficiency of transformer	Evaluate

Description:		
This course contains. Basic knowledge of Electrical & Electronics engineering and its advantages, applications		
Prerequisites:	1:	Battery, Potential difference and current flow concept.
	2:	Few basic electrical and Electronics components identification
	3:	Difference between AC & DC circuits

Practical

Minimum 8 Experiments from the following list should be performed

Number	Practical/ Experiment/Tutorial Topic	Hrs.	Cognitive levels of attainment as per Bloom's
1	Laboratory sessions covering, general introduction to electrical engineering laboratory, experimental setups,	2	Knowledge

	Instruments etc. Electrical symbols		
2	Electric shocks & precautions against shocks	2	Knowledge
3	Study of Ohm's law	2	Analysis
4	Verification of Kirchhoff's Voltage law & Kirchhoff's Current law	2	Analysis
5	B-H Curve for magnetic material	2	Knowledge
6	Study of Half wave Rectifier	2	Analysis
7	Study of Full wave Rectifier	2	Analysis
8	Determination of Reactance's for series R-L-C circuit	2	Analysis
9	Demonstration of Power factor Improvement by static capacitor.	2	Analysis
10	Polarity & Ratio test for Single phase Transformer	2	Evaluation
11	Load tests on single phase transformer	2	Evaluation
12	Study of Basic method of Earthing, Use of Fuse & MCB	2	Application
13	Study of different luminaries including Mercury Vapour lamp, fluorescent tube, CFL & LED lamp	2	Application

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	2	-	-	1	-	-	-	-	-	-	-	-	-	-	-
CO3	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	1	1	-	-	-	1	-	-	-	-	-	-	-	-	-

References:

Text Books	
1	P.V.Prasad and S.Shivan Raju – Electrical Engineering Concepts and applications – cenagage learning.
2	Robert L.Boysted and Louis Nashelsky ,Electronics devices and circuit theory – Pearson education
Reference Books	
1	B.L.Theraja – Electrical Technology Vol.1.- S.Chand publications.
2	Nagarath I.J. and D.P.Kothari – Basic Electrical Engineering (2001) – Tata McGraw Hill.

FY106T- Basic Civil Engineering Lab

Tutorial/Practical : 2 hr/week

Evaluation Scheme

Credit : 1

ISA : 25 Marks

POE : NA

Course Objectives: The objective of the course is to		
<ol style="list-style-type: none"> 1. To learn the brief introduction of all aspects under civil engineering 2. To understand basic concepts of Surveying, Transportation Engineering 		
Course Outcomes:		
COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Identify and apply different distance measurement tools	Application
CO2	Determine positions of an object by compass	Evaluating
CO3	find the elevations of given points	Evaluating
CO4	Illustrate principle of planning	Understand

Description:		
This course include principles of building planning, building components and their functions, building materials, surveying and its principles, leveling transportation engineering, irrigation		
Prerequisites:	1:	Distance measurement
	2:	Directions with respect to North
	3:	Nature of ground

Number	Practical/ Experiment/Tutorial Topic	Hrs.	Cognitive levels of attainment as per Bloom's
1	Measurement of Distances	2	Application
2	Traversing by Compass	2	Application
3	Reduction of levels by Collimation Plane Method	2	Application, Analysis
4	Finding out gradient of line by Rise & fall method	2	Application, Analysis
5	Site visit for study of various construction processes and building planning	2	Application
6	Drawing a line plan of residential building by applying principles of planning	2	Application
7	Drawing sheet showing various building components	2	Application

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	1	2													
CO2	1	2													
CO3	1	2													
CO4	1	1													

References:

Text Books	
1	Basic Civil Engineering by G. K. Hiraskar, DhanpatRai Publication
2	Basic Civil Engineering by S. S. Bhavikatti, New Age International Publications
3	Building Construction by S P Arora & S P Bindra, DhanpatRai Publications
Reference Books	
1	Surveying by N. Basak, Tata Mc-Graw Hill Publication
2	Surveying Vol.I, Vol.II, Vol.III by B.C. Punmia, Laxmi Publication
3	Civil Engineering Materials - Technical Teacher's Training Institute, Chandigarh
4	Irrigation Engineering by B. C. Punmia, DhanpatRai Publications

FY107P Computer Aided Engineering Drawing

Tutorial/Practical : 2 hr/week

Credit : 1

Evaluation Scheme

ISA : 25 Marks

POE : 25 Marks

Course Objectives: The objective of the course is to		
1. Communicate information by graphical means.		
2. Understand and read drawing and present the same		
Course Outcomes:		
COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Draw the neat drawings of engineering curves, straight lines, Plane, Solid.	Knowledge
CO2	Use AutoCAD for drawing orthographic projection.	Knowledge Application
CO3	Creating neat Sketch isometric drawings of regular planes and solids.	Knowledge, Creating
CO4	Visualize and developing surfaces of solids with cutting planes.	Knowledge Application

Description:	
Computer Aided Engineering Drawing Course consists of drawings on each unit. Students solve the more problems and draw drawings so they can Visualize and construct objects.	
Prerequisites:	1: Knowledge of Geometry at SSC Level
	2: Knowledge of free hand sketch

Practical

Number	Practical/ Experiment/Tutorial Topic	Hrs.	Cognitive levels of attainment as per Bloom's
1	Fundamentals of Engineering Drawing and Construction of Engineering Curves	2	Knowledge Application
2	Draw the Projection of planes (1st Angle Projection only)	4	Knowledge Application
3	Draw the Projections of Solids	4	Knowledge Application

4	Study of Graphical user interface of the CAD software, standard tool and commands. Use and practice of basic CAD software commands	4	Knowledge
5	Draw the orthographic views, (One simple orthographic & one Sectional Orthographic) by using CAD. Four problems on drawing sheet.	4	Knowledge Application
6	Draw the isometric view of solid Four problems of isometric view on drawing sheet.	4	Knowledge Application
7	Draw the sectional view of solid & development of the surfaces of the solids in given conditions of the planes Four problems on drawing sheet.	2	Knowledge Application

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	3	2								2					
CO2	2	2								1					
CO3	3	2								2					
CO4	2	1			2					1					

References:

Text Books	
1	Engineering Drawing by N. D. Bhatt, Charotar Publication House, Bombay
2	Machine Drawing by N. D. Bhatt, Charotar Publication House, Bombay.
3	Engineering Drawing and Graphics Using AutoCAD by T. Jeyapoovan, Vikas Publication.
4	A text book of Engineering Drawing by R. K. Dhawan, S. Chand and Co.
Reference Books	
1	Engineering Graphics with AutoCAD - D. M. Kulkarni, A. P. Rastogi, A. K. Sarkar, (PHI) Publisher 2010.
2	Machine Drawing by K. L. Narayana, New Age Publication
3	Engineering Drawing by N. B. Shaha and B. C. Rana, Pearson Education.
4	Engineering Drawing by Prof. Amar Pathak, WILEY India Publication.

FY202P Soft Skills Lab

Tutorial/Practical : 02 hr/week

Credit : 1

Evaluation Scheme

ISA : 25 Marks

POE : 25 Marks

Course Objectives: The objective of the course is to		
1) Strengthening Recruitment Skills- Group Discussion & Personal Interview		
2) inculcate the Behavioral Skills in day to day communication and corporate environment		
3) Preparing students for writing technical reports and delivering speeches on different occasions		
Course Outcomes:		
COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Follow the procedure of recruitment drive	Understand
CO2	Prepare technical reports	Create
CO3	Deliver formal speeches	Apply
CO4	Use interpersonal skills with precision and competence in different scenario.	Apply

Description:	
This course is designed to differentiate between formal and informal communication and language, strategies for communicating in the workplace, using negotiation and diplomacy, and how to be a good promoter of using communication and soft skills complementing to hard skills while getting to be recruited and applying workplace etiquettes.	
Prerequisites:	1: Basic knowledge about English Vocabulary
	2: Communication in simple English

Practical

Number	Practical/ Experiment/Tutorial Topic	Hrs	Cognitive levels of attainment asper Bloom's
01	SWOC- Analysis	02	Understand
02	Group Discussion	04	Analyze
03	Debate	02	Analyze

04	Mock Interview	04	Analyze
05	Speeches for Various Occasions	02	Apply
06	Email Writing	02	Apply
07	Practice on Technical Writing	04	Apply
08	Extempore or Pep talk	02	Apply

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1						2	2					2			
CO2							2								
CO3						2	2								
CO4						2	2			2		2			

References:

Recommended Books:	
1)	Communication Skills for Engineers by S. Mishra & C. Muralikrishna (Pearson)
2)	Communication Skills by Meenakshi Raman and Sangeeta Sharma, Oxford University Press 2016 1 st Edition
3)	Lesikar, R. V. and Pettit, J. ,D. Basic Business Communication, McGraw-Hill International Edition, Singapore 10 th Edition, 2006
4)	Managing Soft Skills for Personality Development by B.N. Ghosh, Tata McGraw Hill, 2012.
5)	Bikram K. Das, KalyaniSamantray, “An Introduction to Professional English and Soft Skills” Cambridge University Press New Delhi.
6)	Comfort, Jeremy, et al. (2011) Speaking Effectively: Developing Speaking Skills for Business English. Cambridge: Cambridge University Press. (Reprint)
7)	Sharma, R. C. and Krishna Mohan, Basic Correspondence and Report Writing: A Practical Approach to Business and Technical Communication, Tata McGraw-Hill Publishing Company Limited, India ,5th Edition, 2017
8)	Business Correspondence & Report-writing by R.C.Sharma&KrishnaMohan,Tata McGraw-Hill Education
9)	Dr. Abha Singh, “Behavioural Science” Wiley India Pvt.Ltd
10)	Soft Skills by K. Alex, S. Chand and Company, 2013

Sr. No	Unit No.	Web Links/ Video Lectures
1	1	https://cvdesign.mobi/ https://zety.com/cv-maker https://www.javatpoint.com/group-discussion https://www.themuse.com/advice/interview-questions-and-answers
2	2	https://www.verywellmind.com/what-is-self-esteem-2795868 https://managementhelp.org/personalproductivity/time-stress-management.htm https://www.helpguide.org/articles/mental-health/emotional-intelligence-eq.htm
3	3	https://www.mindtools.com/CommSkll/EmailCommunication.htm
4	4	https://business.tutsplus.com/tutorials/effective-public-speaking-skills-techniques--cms-30848

FY108T Workshop Practice Lab

Tutorial/Practical : 2 hr/week

Credit : 1

Evaluation Scheme

ISA : 50 Marks

POE : NA

Course Objectives: The objective of the course is to		
<ol style="list-style-type: none"> 1) develop a skill in dignity of labour, precision, safety at work place, team working and development of right attitude 2) acquire skills in basic engineering practice 3) develop general machining skills in the students and develop small products 		
Course Outcomes:		
Cos	At the end of successful completion of the course the student will be able to	Blooms Taxonomy
CO1	Use the techniques, skills, and modern engineering tools necessary in smithy, welding and sheet metal working and apply them practically.	Understand Apply
CO2	Learn the techniques, skills, and modern engineering tools necessary for fitting and carpentry operations and Possess knowledge of measurement and measuring instrument.	Understand Apply

Description:		
<p>Workshop practice is the backbone of the real industrial environment which helps to develop and enhance relevant technical hand skills required by the technician working in the various engineering industries and workshops.</p>		
Prerequisites:	1:	General safety Measures should be taken
	2:	Safety rules regarding each machine or equipment should be followed
	3:	Use of Personal protective equipment.

Number	Practical/ Experiment/Tutorial Topic	Hrs.	Cognitive levels of attainment as per Bloom's
1	Safety precautions while working in workshop. Introduction to tools	02	Understand
2	Introduction to smithy operations like, bending, forming upsetting, drawing Smithy tools hammer, hot & cold chisel flatters, tongs, anvil etc, Preparation of job as per the drawing	02	Understand and Apply
3	Preparation of smithy job as per drawing	02	Apply
4	Types of welding likes Gas Welding, arc welding, Welding equipment's, welding of various metals electrode classification and coding, welding joints, and preparation of welding component.	02	Understand and Apply
5	Preparation of welding job as per drawing	02	Understand and Apply
6	Specifications of metal sheets working tools, sheet metal and operations, and prepare the job as per drawing.	02	Understand and Apply
7	Preparation of sheet metal component as per drawing.	02	Understand and Apply
8	Preparation of sheet metal component as per drawing.	02	Understand and Apply
9	Study of various tools ,files, Drills, Taps, Die & Fitting operations to complete small product in fitting shop	02	Understand and Apply
10	Operations to develop small product.	02	Understand and Apply
11	Introduction, Classifications of wood. carpentry joints. carpentry tools to develop carpentry product.	02	Understand and Apply

Mapping of POs & COs:

	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO1	PO1	PO1	If applicable		
	1	2	3	4	5	6	7	8	9	0	1	2	PSO 1	PSO 2	PSO 3
CO 1						1			2						2
CO 2									2						2

References:

TextBooks	
1	Elements of Workshop Technology, Vol – I by Hajara Chaudhari, Media Promoters.
ReferenceBooks	
1	Workshop Technology, Vol – I by Gupta and Kaushik, New Heights.
2	Workshop Technology, Vol – I by Chapman, The English Language Book Society
3	Workshop Technology, Vol.-I by H.S. Bawa, TMH Publications, New Delhi

Web Links/ Video Lectures are to be provided to Theory and Practical /Experiments

Practical 1. <http://nptel.ac.in/courses/>

FY203A Water Management

Course Objectives: The objective of the course is to		
<ol style="list-style-type: none"> 1) develop understanding of water resources 2) study global water cycle and factors that affect this cycle. 3) analyze the process for water resources and management. 4) study the research and development areas necessary for efficient utilization and management of water resources. 		
Course Outcomes:		
Cos	At the end of successful completion of the course the student will be able to	Blooms Taxonomy
CO1	Understand the global water cycle and its various processes.	Understanding
CO2	Understand climate change and their effects on water systems	Understanding
CO3	Understand Drinking treatment and quality of groundwater and surface water	Understanding
CO4	Understand the Physical, chemical, and biological processes involved in water treatment and distribution	Understanding

Description:		
<p>Water is a vital resource for all life on the planet. Only three percent of the water resources on Earth are fresh and two-thirds of the freshwater is locked up in ice caps and glaciers. One fifth of the remaining one percent is in remote, inaccessible areas. As time advances, water is becoming scarcer and having access to clean, safe, drinking water is limited among countries. Pure water supply and disinfected water treatment are prerequisites for the well-being of communities all over the world. One of the biggest concerns for our water-based resources in the future is the sustainability of the current and even future water resource allocation. This course will provide students a unique opportunity to study water management activities like planning, developing, distributing and optimum use of water resources. This course covers the topics that management of water treatment of drinking water, industrial water, sewage or Wastewater, management of water resources, management of flood protection.</p>		
Prerequisites:	1:	Nil

Unit 1	Understanding ‘water’-Climate change and the global water cycle, understanding global hydrology	
Unit 2	Water resources planning and management-Water law and the search for sustainability: a comparative analysis, Risk and uncertainty in water resources planning and management	
Unit 3	Agricultural water use -The role of research and development for agriculture water use Urban	
Unit 4	water supply and management - The urban water challenge, Water sensitive urban design	

Reference Books	
1	R. Quentin Graft, Karen Hussey, Quentin Graft, Karen Hussey, Publisher, "Water Resources Planning and Management", Cambridge University Press, ISBN: 9780511974304, 9780521762588.
2	P. C. Basil, "Water Management in India", ISBN: 8180690970, 2004.
3	C.A. Brebbia, "Water Resources Management", ISBN: 978-1-84564-960-9, 978-1-84564-961-6.