Physics Group (Sem-II)

COURSE WISE DETAILED CURRICULUM

24UG BSC-FY101 Engineering Physics

Lectures : 3 Hrs/Week

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 beable to
CO1	**Summarize** the knowledge of basic quantum mechanics to understand Wave particle dualism and uncertainty principle.
CO2	**Demonstrate** the different crystal structure and their properties by Understanding crystal physics.
CO3	**Apply** the theory and phenomenon of nanophysics to produce nanomaterials.
CO4	**Define** the basic requirements of Architectural Acoustics.
CO5	**Illustrate** the diffraction and polarization phenomenon of light.
CO6	**Explain** the concepts and applications of LASER and necessary tools for Nuclear power plant.

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**	
	LASER: Introduction, Absorption, spontaneous emission and stimulated emission of radiations, Population inversion, Pumping energy, Characteristics of laser beams, Ruby laser. **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.	**07 Hrs**

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

24UG BSC-FY201 Engineering Mathematics-II

Lectures : 3 Hrs/Week

Evaluation Scheme

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
CO1	**Solve** ordinary differential equations of order one and degree one .
CO2	**Apply** numerical methods to solve ordinary differential equations of first order and first degree.
CO3	**Evaluate** double and triple integrals.
CO4	**Use** double integration to find area , mass of plane lamina.
CO5	**Evaluate** definite integrals using Gamma and Beta functions
CO6	**Estimate** definite integrals using numerical methods

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,	**8 Hrs**
	Application to orthogonal trajectory (Cartesian and Polar)	

Unit 2	**Numerical Solution of Differential Equation of order one degree One**	
	Eulers Method Eulers modified Method Runge-Kutta Method of order four Taylor Series Method	**7 Hrs**
Unit 3	**Multiple Integrations**	
	Evaluation of double integral (Cartesian and Polar) Change of order of integration (Cartesian and polar) Evaluation of triple integration Change of Cartesian to spherical coordinates	**8 Hrs**
Section – II		
Unit 4	**Application of Multiple Integrals**	
	Area using double integration Mass of plane lamina using double integration Moment of inertia of plane lamina Volume using triple integration	**6 Hrs**
Unit 5	**Integral Calculus**	
	Gamma Function and properties Beta function and properties Differentiation Under Integral Sign (with constant limits only)	**7 Hrs**
Unit 6	**Numerical Integration**	
	Trapezoidal Rule Simpson's (1/3) rule Simpson's (3/8) rule Weddle's rule	**6 Hrs**

Note-Minimum 06 Assignments should be given covering all units

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,ErwinKreyszig, 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**

24UG ESC-FY103 Basic Electrical and Electronics Engineering

Lectures : 2 Hrs/Week

Evaluation Scheme

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 willbe able to**
CO1	**Apply** the KCL and KVL to determine the current and voltage of DC circuits .
CO2	**Describe** the basic concepts of Magnetic circuits.
CO3	**Describe** the concepts of Basic Electronics components.
CO4	**Illustrate** the Nature of single phase AC series and parallel RLC circuits by calculating impedence power factor and power consumption.
CO5	**Explain** the concept of 3 phase supply Generation , transmission , Utilization and its advantages.
CO6	**Solve** the problems related to power losses to determine the efficiency of single phase transformer.

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,	

	Kirchhoff's laws, Mesh & Node analysis. (Numerical treatment on Mesh & Node analysis of two loops)	**05 Hrs**
Unit 2	**Magnetic circuits**	
	Concept of MMF, reluctance, magnetic flux, Magnetic flux density, magnetic field strength, Comparison of Electric & magnetic circuit, , Analysis of Series magnetic circuits.	**04 Hrs**
Unit 3	**Fundamentals of Electronics**	
	Introduction of Diode and V-I characteristics, Rectifier configuration, Analysis of Half wave Rectifier ,Full wave Rectifier and Bridge Rectifier, Introduction of Transistor.	**05 Hrs**
Section – II		
Unit 4	**Single phase A.C Circuits**	
	Faradays laws, Lenz's Law, generation of sinusoidal voltage, Analysis of pure Resistive, Inductive, Capacitive circuits, Analysis of series R-L,R-C, R-L-C circuits. (Numerical treatment on series R-L, R-C, R-L-C circuits)	**05 Hrs**
Unit 5	**Three phase A.C. Circuits**	
	Advantages of three phase system**,** Generation of three phase AC supply, phase sequence, Balanced system, Relation between line & phase quantities in Balanced star and Delta connected circuits.	**04 Hrs**
Unit 6	**Single phase Transformer**	
	Construction, operating principle, types, EMF Equation, Turns Ratios, Ideal Transformer, Power losses. (Numerical treatment on EMF Equation)	**05 Hrs**

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/

24UG ESC-FY104 Basic Civil Engineering

Lectures : 2 Hrs/Week

Evaluation Scheme

ISE : 40 Marks

ESE : 60 Marks

Course Objectives: The objective of the course is to
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**
CO1	**Illustrate** linear and angular measurements by considering principles and significance of Surveying
CO2	**Identify** nature of ground by using methods of leveling
CO3	**List** components of pavements, railway track and water supply scheme
CO4	**Demonstrate** basic knowledge of Civil Engineering and explain principles of building planning and Bye laws.
CO5	**Explain** various components and it's uses of building.
CO6	**Study** various building materials and it's uses.

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	**Linear and Angular Measurements**	
	Principles of surveying, Linear measurements- Chain Surveying, Instruments used- Metric chain, errors in chaining, Ranging(Direct only)- Instruments Used, nominal scale and R.F., chaining, offsetting & numerical, Angular Measurements- Compass survey, Meridian, bearing and its types, system of bearing, Types of compass: prismatic and surveyor	**05Hrs**

	compass, Calculation of included angles, correction for local attraction, Numerical.	
Unit 2	**Leveling**	
	Terms used in leveling, use of Dumpy level and Auto Level, Temporary adjustments. Methods of reduction of levels, types of leveling, Numerical.	**04 Hrs**
Unit 3	**Introduction to Transportation, Environmental Engineering**	
	Components of rigid and flexible pavement, components of railway track (Broad Gauge), Water Treatment Plant- Components with Flow Diagram	**04 Hrs**
Section – II		
Unit 4	**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 space requirements, F.S.I., setbacks, Ventilation, sanitation as per municipal corporation area requirement.	**05Hrs**
Unit 5	**Components of Building**	
	A) Sub-structure: Elements of sub-structures and their Functions of elements B) Super-structure: Elements of super-structures and their Functions of elements	**05Hrs**
Unit 6	**Building Materials and Design**	
	Building Materials- cement blocks- properties and specification, Cement- Types, grades, properties and uses in brief, Concrete-Plain and reinforced cement concrete and ready mix concrete and their grades, Use and properties of bricks, steel, timber, Use and properties of roofing materials etc**.**	**03Hrs**

References:

Text Books	
1	Basic Civil Engineeringby 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/

24UG ESC-FY105 Computer Aided Engineering Drawing

Lectures	**:** 2 Hrs/Week	**Evaluation Scheme**	
Credit	**:** 2	**ISE**	**:** 40 Marks
		ESE	**:** 60 Marks

Course Objectives: The objective of the course is to

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 beable to
CO1	**Implement** the knowledge of engineering drawing fundamentals, dimensioning and AutoCAD to draw an object.
CO2	**Draw** the neat drawings of Projection of lines
CO3	**Construct** the neat drawings of Projection of planes
CO4	**Classify** Solids and Projection of solids at different Positions.
CO5	**Visualize and construct** orthographic projection to represent in two-dimensional views.
CO6	**Prepare** the objects by developing surfaces of solids with cutting planes.

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 and Computer

Section – I

Unit 1	**Fundamentals of Engineering Drawing and Introduction to Computer Aided Sketching** A) Introduction, Instruments for drawing, sheet sizes, Types of different types of lines, Dimensioning. Construction of regular polygons. Introduction about first and third angle projection method. B) Introduction to CAD & Graphical user interface of the AutoCAD software, standard tool bars/ menus, navigational tools. Study and use of drawing and modify commands.	**04Hrs**

Unit 2	**Projection of line (1st Angle Projection only)**	
	First angle projection methods, Concept of true line, apparent line, Concept of Projection of lines (Rotating line Method only)	**04Hrs**
Unit 3	**Projection of planes (1st Angle Projection only)**	
	Orthographic projection system, First angle projection methods, Concept of Projection –Projection of planes (regular polygons and circle).	**05Hrs**
Section – II		
Unit 4	**Projections of Solids**	
	Projection of Solids such as Prisms, pyramids, cylinder and cone with their axis inclined to one of the reference planes.(Only rest on HP)	**04Hrs**
Unit 5	**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).Isometric Drawing (Theoretical Treatment only)	**05Hrs**
Unit 6	**Development of surfaces**	
	Development of Flat and curved lateral surfaces of Regular solids: Prisms, Pyramids, Cylinders and Cones.	**04Hrs**

References:

Text Books	
1	Engineering Drawing by N. D. Bhatt, Charotor Publication House, Bombay
2	Machine Drawing by N. D. Bhatt, Charotor 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, WIELY India Publication.

5	T. Jeyapoovan, “Engineering Drawing and Graphics Using AutoCAD” Vikas Publication. 9.
6	Ajeet Singh, “Machine Drawing includes AutoCAD”, Tata McGraw Hill Education

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

24UG HSSM-FY202 Employability Enhancement Skills (Sem - II)

Credit : 01 **ISE** : 50 Marks

ESE : NA

Course Objectives: The objective of the course is to
• To make students conscious about Recruitment procedure and ethics at workplace • To inculcate the importance of Behavioral Skills in day to day communication • To enhance the writing skills with technical report writing practice • To prepare students to deliver speeches of various types / occasions

Course Outcomes:	
COs	**At the end of successful completion of the course, the student will beable to**
CO1	**Understand** the procedure of recruitment drive
CO2	**Use** interpersonal skills with precision and competence in different scenario
CO3	**Prepare** technical reports for professional purposes
CO4	**Articulate** prepared speeches to express ideas, thoughts and emotions

Description:		
Employment Enhancement Skills course has correlation with the Sem- I course Communication Skills. After learning the basics of language in the first semester, this course concentrates on the personality development, interpersonal skills and expectation from an industry Hence the included models in the syllabus has the direct co-relation with employability of the students. This course would definitely boost personality and interpersonal skills of the learners.		
Prerequisites:	1:	Basic knowledge about English Vocabulary
	2:	Communication in simple English
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**

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 1st Edition*
3)	*Lesikar, R. V. and Pettit, J. ,D. Basic Business Communication, McGraw-Hill International Edition, Singapore 10th 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*
	www.buisnesscommunicationskills.com, www.kcitraing.com, www.mindtools.com

24UG BSC-FY101LP Engineering Physics Lab

Practical : 2 hr/week

Credit : 1

Evaluation Scheme

ISA : 25 Marks

POE : NA

COs	At the end of the successful completion of the course, the student will be able to
CO1	**Explain** the need for precise measurement practices for data recording.
CO2	**Interpret** the principle, concept, working and applications of wave optics, band gap energy as well as Crystal relevant experiments.
CO3	**Apply** the techniques and skills associated with modern scientific tools regarding LASER and Nuclear plants.
CO4	**Develop** scientific communication skills while performing the experiments and interpreting the results to communicate effectively the scientific activities

Description:		
This course aims to make the students gain practical knowledge to relate with the theoretical studies and to use the principle in the right way to implement modern technology. The experiments are selected from various areas of Physics like Measurements, Wave Optics, Lasers, Solid state physics and Basic Electronics. The Engineering Physics Laboratory manualis written in a simple scientific language with aim, apparatus, theory, diagrams, formula, graphs and questions. These experiments will help the students to expertise in the analysis of various concepts in Optics, measurements, crystallography andelectronics-related topics.		
Prerequisites:	1:	Higher secondary level Physics
	2:	Fundamentals of wave optics, Band theory and crystal.

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

Number	Practical/Experiment/TutorialTopic	Hrs.
1	Measurements in Physics	02
2	Resistor and Capacitor Code	02
3	Measurement of Band Gap Energy	02
4	Study of seven Crystal Structure, Bravais Lattice and Properties of unit cell	02
5	Study of Symmetry Elements of Cubic Crystal	02

6	Determination of Interplaner distance using XRD pattern	02
7	Miller Indices	02
8	Divergence of LASER Beam	02
9	Resolving power of Telescope	02
10	Specific rotation by Polarimeter	02
11	Wavelength of different spectral lines of mercury using grating.	02
12	Determination of wavelength of LASER using diffraction grating.	02
13	The grating constant of the diffraction grating	02
14	Determination of e/m of an electron	02
15	Resolving power of diffraction grating	02

References:

TextBooks	
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
ReferenceBooks	
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:

1. **Experiment name-** Diffraction Grating (**Lab Name-**Optics virtual lab)
http://vlab.amrita.edu/?sub=1&brch=281&sim=334&cnt=1

2. **Experiment name-** Crystal Structure (**Lab Name-**solid state physics virtual lab)
http://vlab.amrita.edu/?sub=1&brch=282&sim=370&cnt=1

3. **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

4. **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

5. **Experiment name-** B-H Curve (**Lab Name-**solid state physics virtual lab)
http://vlab.amrita.edu/?sub=1&brch=282&sim=1507&cnt=1

6. **Experiment name-** Photoelectric effect (**Lab Name-**modern physics virtual lab)
http://vlab.amrita.edu/?sub=1&brch=195&sim=840&cnt=1

7. Experiment name- Energy Band Gap of Semiconductor (**Lab Name-**Basics of Physics lab)
https://bop-iitk.vlabs.ac.in/exp/energy-band-gap/

24UG BSC-FY201LT -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**
CO1	**Solve** linear and nonlinear ordinary differential equations of order one and find orthogonal trajectory.
CO2	**Find** numerical solutions of ordinary differential equations of first order and first degree.
CO3	**Compute** double and triple integrals.
CO4	**Find** area , mass of plane lamina using double integral.
CO5	**Evaluate** definite integrals using Gamma and Beta functions.
CO6	**Solve** definite integral numerically.

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 andApplications,ii)NumericalSolutionofDifferentialEquationofforderonedegreeOne,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/TutorialTopic	Hrs.
1	Exact and reducible exact differential equation	2
2	Linear, reducible to linear diff equation and Applications	2
3	Evaluation of double and triple integration	2
4	Change of order of integration	2
5	Area by double integral, Mass of Lamina	2
6	Gamma function and Differentiation under integral sign	2
7	Beta functions and properties	2
8	Euler and Eulers modified method	2
9	Taylor series and Runge Kutta of order four	2
10	Trapezoidal and Simpson (1/3) rule Simpsons (3/8)th andWeddles rule	2

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 GrihaPrakashan, Pune.
3	A textbook of Engineering Mathematics, N. P. Bali, Iyengar, Laxmi Publications (P) Ltd, New Delhi
4	Advanced Engineering Mathematics,ErwinKreyszig, Wiley India Pvt. Ltd

24UG ESC-FY103LP Basic Electrical & Electronics Engineering Lab (Sem- I & II)

Tutorial/Practical : 2 hr/week
Credit : 1

Evaluation Scheme
ISA : 25 Marks

COs	At the end of successful completion of the course, the student will beable to
CO1	**Make** electrical connection for different circuits
CO2	**Apply** the different laws
CO3	**Analyze** V-I characteristics of Bridge circuits
CO4	**Determine** the efficiency of transformer

Description:

Basic Electrical Engineering course is offered as the engineering science course. This course contains basic knowledge of electrical engineering and its advantages, applications. This course has six units namely i) Analysis of D.C.Circuits, ii) Magnetic circuits, iii) Single phase AC circuits, iv) Three phase AC circuits, v) Single phase Transformer and vi). Fundamentals of electronics

Prerequisites:	1:	Battery , Potential difference and current flow concept.
	2:	Few basic electrical components identification
	3:	Difference between AC & DC circuits
	4:	Few basic electronics components identification

Experiment

Number	Practical/ Experiment/Tutorial Topic	Hrs
1	Laboratory sessions covering, general introduction toelectrical engineering laboratory, experimental setups, Instruments etc. Electrical symbols	2
2	Electric shocks & precautions against shocks	2
3	Study of Ohm's law	2
4	Verification of Kirchhoff's Voltage law & Kirchhoff's Current law	2

5	B-H Curve for magnetic material	2
6	Study of Half wave Rectifier	2
7	Study of Full wave Rectifier	2
8	Determination of Reactance's for series R-L-C circuit	2
9	Demonstration of Power factor Improvement by static capacitor	2
10	Polarity & Ratio test for Single phase Transformer	2
11	Load tests on single phase transformer	2
12	Study of Basic method of Earthing, Use of Fuse & MCB	2
13	Study of different luminaries including Mercury Vapour lamp, fluorescent tube, CFL & LED lamp	2

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
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.

24UG ESC-FY104LP-Basic Civil Engineering Lab

Tutorial/Practical : 2 hr/week
Credit : 1

Evaluation Scheme
ISA : 25 Marks
POE : NA

Course Objectives: The objective of the course is to
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**
CO1	**Identify** and apply different distance measurement tools.
CO2	**Determine** positions of an object by compass.
CO3	**Find** the elevations of given points.
CO4	**Illustrate** principle of planning

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/TutorialTopic**	**Hrs.**
1	Measurement of Distances	2
2	Traversing by Compass	2
3	Reduction of levels by Collimation Plane Method	2
4	Finding out gradient of line by Rise &fall method	2
5	Site visit for study of various construction processes and Building planning	2
6	Drawing a line plan of residential building by applying Principles of planning	2
7	Drawing sheet showing various building components	2

References:

Text Books	
1	BasicCivilEngineeringbyG. K. Hiraskar,DhanpatRaiPublication
2	BasicCivilEngineeringbyS. S. Bhavikatti,NewAgeInternationalPublications
3	BuildingConstructionbySP Arora&S PBindra,DhanpatRaiPublications
ReferenceBooks	
1	SurveyingbyN.Basak,TataMc-GrawHillPublication
2	SurveyingVol.I,Vol.II,Vol.IIIbyB.C.Punmia,LaxmiPublication
3	CivilEngineeringMaterials-TechnicalTeacher'sTrainingInstitute,Chandigarh
4	IrrigationEngineeringbyB. C. Punmia,DhanpatRaiPublications

24UG ESC-FY105LP Computer Aided Engineering Drawing Lab

Tutorial/Practical : 2 hr/week **Evaluation Scheme**

Credit : 1 **ISA** : 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**	**Bloom's Taxonomy**
CO1	**Implement** the knowledge of engineering drawing fundamentals, dimensioning and AutoCAD to draw an object..	Remember
CO2	**Draw** the neat drawings of Projection of straight lines, Plane, Solid using AutoCAD	Understand, Apply
CO3	**Create** orthographic projection using AutoCAD	Understand, Create
CO4	**Visualize** and develop surfaces of solids using AutoCAD.	Understand, Apply

Description:		
Computer Aided Engineering Drawing Course consists of drawings line, plane and solids using AutoCAD software.		
Prerequisites:	1:	Knowledge of Geometry at SSC Level and Knowledge of Computer

Practical

Number	**Practical/ Experiment/Tutorial Topic**	**Hrs.**	**Bloom's Taxonnomy**
1	Draw the projections of lines using AutoCAD	10	Understand, Apply
2	Draw the projections of planes using AutoCAD	8	Understand, Apply
3	Draw the projections of solids using AutoCAD	8	Understand, Apply
4	Imagine and draw the orthographic views using AutoCAD	8	Understand, Apply
5	Draw development of the surfaces of the solids using AutoCAD.	6	Understand, Apply

References:

Text Books	
1	Engineering Drawingby N. D. Bhatt, Charotor Publication House, Bombay
2	Machine Drawing by N. D. Bhatt, Charotor 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, WIELY India Publication.
5	T. Jeyapoovan, “Engineering Drawing and Graphics Using AutoCAD” Vikas Publication. 9.
6	Ajeet Singh, “Machine Drawing includes AutoCAD”, Tata McGraw Hill Education

24UG HSSM-FY202LP Employability Enhancement Skills (Sem - II) – PRACTICAL

Tutorial/Practical : 02 hr/week **Evaluation Scheme**

Credit : 1 **ISA** : 25 Marks

COs	At the end of successful completion of the course, the student will beable to
CO1	**Understand** the procedure of recruitment drive
CO2	**Prepare** technical reports for variety of purposes
CO3	**Deliver** prepared speeches to express ideas, thoughts and emotions
CO4	**Use** interpersonal skills with precision and competence in different scenario.

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
01	SWOC- Analysis	02
02	Group Discussion	04
03	Debate	02
04	Mock Interview	04

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

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 1st Edition*
3)	*Lesikar, R. V. and Pettit, J. ,D. Basic Business Communication, McGraw-Hill International Edition, Singapore 10th 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*
	www.buisnesscommunicationskills.com, www.kcitraing.com, www.mindtools.com

24UG CC-FY107T Cyber Security Lab

Tutorial/Practical : 02 hr/week

Credit : 1

Evaluation Scheme

ISA : 25 Marks

POE/OE : 25 Marks

COs	At the end of successful completion of the course, the student will beable to
CO1	**Understand** different cyber crime.
CO2	**Understand** phishing Emails.
CO3	**Apply** authentication methods.
CO4	**Understand** VAPT Audit.

Description:		
Course deals with understanding of different types of Cyber Security, Cyber Crime.		
Prerequisites:	1:	Fundamental knowledge of Computer.
	2:	Fundamental knowledge of Mobile Application.
	3:	Awareness of internet.

Practical

No's	Practical/ Experiment/Tutorial Topic	Hrs
01	Introduction to Cyber Security.	02
02	Checklist for reporting cyber crime at Cyber crime PoliceStation.	02
03	Checklist for reporting cyber crime online.	02
04	Reporting phishing emails. (Spoofing, Phishing)	02
05	Setting and configuring two factor authentications in theMobile phone.	02
06	Checklist for secure net banking.	02
07	Basic checklist, privacy and security settings for popularSocial media platforms.	02
08	Configuring security settings in Mobile Wallets and UPIs	02
09	Checklist for reporting Mobile stolen/ lost, file complaint on www.ceir.gov.in	02
10	VAPT Audit format.	02

References:

Recommended Books
1. Cyber Crime Impact in the New Millennium, by R. C Mishra , Auther Press. Edition 2010.
2. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011)
3. Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson , 13th November, 2001)
4. Electronic Commerce by Elias M. Awad, Prentice Hall of India Pvt Ltd.
5. Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers.
6. Network Security Bible, Eric Cole, Ronald Krutz, James W. Conley, 2nd Edition, Wiley India Pvt. Ltd.
7. Fundamentals of Network Security by E. Maiwald, McGraw Hill.

24UG VSEC-FY108T Manufacturing Techniques Lab

Tutorial/Practical : 2 hr/week
Credit : 1

Evaluation Scheme
ISA : 50 Marks
POE : NA

Course Objectives: The objective of the course is to
1) Develop a skill in dignity of labour, precision, safety at work place, team working anddevelopment 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 studentwill be able to**
CO1	**Use** the techniques, skills, and modern engineering tools necessaryin smithy, welding and sheet metal working and apply them practically.
CO2	**Learn** the techniques, skills, and modern engineering tools necessary for fitting and carpentry operations and Possess knowledge ofmeasurement and measuring instrument.
CO3	**Demonstrate** proficiency in using various tools to complete small products , enhancing precision fitting & assembly skills for fabricating components.

Description:

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.

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.
1	Safety precautions while working in workshop.Introduction to tools	02
2	Introduction to smithy operations like, bending, formingupsetting, drawing Smithy tools hammer, hot & cold chisel flatters, tongs, anvil etc, Preparation of job as per the drawing	02
3	Preparation of smithy job as per drawing	02
4	Types of welding likes Gas Welding, arc welding, Welding equipment's, welding of various metals electrode classification and coding, welding joints, andpreparation of welding component.	02
5	Preparation of welding job as per drawing	02
6	Specifications of metal sheets working tools, sheet metaland operations, and prepare the job as per drawing.	02
7	Preparation of sheet metal component as per drawing.	02
8	Preparation of sheet metal component as per drawing.	02
9	Study of various tools ,files, Drills, Taps, Die & Fittingoperations to complete small product in fitting shop	02
10	Operations to develop small product.	02
11	Introduction, Classifications of wood. carpentry joints.carpentry tools to develop carpentry product.	02

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/