



# **COURSE STRUCTURE AND FULL-LENGTH SYLLABUS OF FIRST YEAR DIPLOMA IN ENGINEERING**



**BIRLA INSTITUTE OF TECHNOLOGY MESRA  
UNIVERSITY POLYTECHNIC**



# UNIVERSITY POLYTECHNIC BIRLA INSTITUTE OF TECHNOLOGY MESRA, RANCHI



## **SYLLABUS (DIPLOMA)**

**1<sup>ST</sup> YEAR (1<sup>ST</sup> & 2<sup>ND</sup> SEMESTER REVISED)**



## COURSE STRUCTURE (DIPLOMA ALL BRANCHES)

### 1<sup>ST</sup> SEMESTER

S. N.	COURSE CODE	COURSE TITLE	SEGMENT	L	T	P	LECTURE HOUR	CREDIT
1	DBS 101	Engineering Chemistry	BS	3	1		4	4
2	DBS 103	Applied Physics-I	BS	2	1		3	3
3	DBS 105	Mathematics-I	BS	3	1		4	4
4	DES 101	Introduction to IT Systems	ES	2	1		3	3
5	DBS 104	Applied Physics Lab	BS			2	2	1
6	<b>DHS 103</b>	<b>Communication Skills</b>	<b>HS</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>3</b>
7	DHS 102/104/106	Sports and Yoga/NSS/NCC	HS			2	2	1
8	DES 102	Engineering Graphics	ES			3	3	1.5
9	DES 104	Engineering Workshop Practice	ES			3	3	1.5
		<b>Periods per week</b>		13	4	10	<b>27</b>	
		<b>Total credits</b>						<b>22</b>
		<b>Total periods per week</b>						<b>27</b>



**COURSE STRUCTURE (DIPLOMA ALL BRANCHES)**

**2<sup>ND</sup> SEMESTER (DIPLOMA)**

<b>S. N.</b>	<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>SEGMENT</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>LECTURE HOUR</b>	<b>CREDIT</b>
1	DBS 201	Applied Physics-II	BS	2	1		3	3
2	DBS 203	Mathematics-II	BS	3	1		4	4
3	<b>DES 205</b>	<b>Fundamentals of Electrical &amp; Electronics Engineering</b>	<b>ES</b>	<b>3</b>			<b>3</b>	<b>3</b>
4	DES 203	Engineering Mechanics	ES	3			3	3
5	DAU 201	Environmental Sciences	AUDIT	2			2	0
6	DBS 202	Applied Chemistry Lab	BS			2	2	1
7	DES 202	Fundamentals of Electrical & Electronics Engineering Lab	ES			2	2	1
8	DES 204	Engineering Mechanics Lab	ES			2	2	1
9	DES 206	Introduction To IT Systems Lab	ES			2	2	1
10	DHS 202/204/206	Sports and Yoga/NSS/NCC	HS			2	2	1
		<b>Periods per week</b>		13	2	10	<b>25</b>	
		<b>Total credits</b>						<b>18</b>
		<b>Total periods per week</b>						<b>25</b>



## ENGINEERING CHEMISTRY

PROGRAMME: DIPLOMA IN ENGINEERING (ALL BRANCHES)							
COURSE CODE: DBS 101				COURSE TITLE: ENGINEERING CHEMISTRY			
COMPULSORY / OPTIONAL: COMPULSORY							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
4	1		4	4	QUIZ- 20, TA- 5, MID- 25	50	100

Keeping in view the continuous development in science & technology and the present need of industries as well as research organizations, the curriculum of Basic Chemistry has been designed so that

- The students will be able to develop knowledge; skill and scientific attitude w.r.t. distinguish, differentiate, analyze and solve basic problems of chemical sciences.
- The students may have better knowledge of Basic chemistry and its applications in the various fields of engineering and allied industries.
- A new chapter on Environmental Chemistry has been introduced to make the students acquainted with various types of pollution hazards, which are becoming more critical every day.
- Fundamental knowledge of measurement; related to different types of solutions.
- Structure and chemical properties of an atom & molecules, periodic trends, chemical bonding, concepts of acids & bases.

**COURSE OUTCOMES** Students will understand.

CO1	The fundamental knowledge of measurement and concentration in solutions. Better knowledge of Basic chemistry and its applications in the various fields of engineering and allied industries. Apply the knowledge of acids & bases and chemical equilibrium as required in core area.
CO2	Different types of water used for municipal, domestic, drinking and industrial purposes and its treatments. Students will be able to know the industry related problems of water and their remedies.
CO3	Overview of metallurgy with special reference to metallurgy of Iron and Aluminium. Alloys and their uses. Engineering materials like Polymers and their uses.
CO4	Fuel and its classification, properties. Petroleum and its refining process, Knocking of Petrol, Diesel, Gaseous fuel.
CO5	Corrosion, Types of corrosion and protection. Lubricants. Concept of Electrochemistry and its applications.



**COURSE CONTENT DETAILS:**

<b>MODULE</b>	<b>TOPICS/SUBTOPICS</b>
1	<p><b>TITLE: Basic concepts of Chemistry:</b></p> <p><b>1.1 Mole concept</b>, Equivalent weight, Concentration terms Molarity, Normality and molality with numerical.</p> <p><b>1.2 Atomic structure:</b> Concept of atom and molecules, Orbit and orbital, Atomic number, Mass number, Bohr's atomic model and its drawback, Hund's rule, Aufbau's rule, Electronic configuration, Dual nature of matter (de Broglie relationship).</p> <p><b>1.3 Periodic table</b> Modern periodic table, Law and structure of periodic table, Periodic properties (Atomic radius, Ionization energy, Electron affinity and Electronegativity) and its periodic trends,</p> <p><b>1.4 Chemical bonding</b> : Electrovalent bond, Covalent bond with suitable examples, Lewis dot structure.</p> <p>Course Outcome: CO1 Teaching Hours: 10 hrs</p>
2	<p><b>TITLE: Water Technology</b></p> <p>2.1 Hardness of water. Temporary &amp; Permanent Hardness.</p> <p>2.2 Water Treatment- Lime Soda, Zeolite and Ion exchange method..</p> <p>2.3 Action of Soap and detergent, Boiler feed water,</p> <p>2.4 Scale &amp; Sludge formation, Priming and foaming as troubles and remedial measures.</p> <p>Course Outcome: CO2 Teaching Hours: 10 hrs</p>
3	<p><b>TITLE: Metallurgy and Polymer</b></p> <p>3.1 General Process of Extraction.</p> <p>3.2 Definition of metallurgy related term like Ore, Mineral, Gangue (matrix), Flux, Slag.</p> <p>3.3 Extraction of - Iron from haematite ore using blast furnace. (Reactions and Fig)</p> <p>3.4 Extraction of Aluminium from bauxite along with reactions. (Reactions and Flowsheet)</p> <p>3.5 Alloys – Definition, purposes of alloying, ferrous alloys and non-ferrous with suitable examples, properties and applications. General chemical composition, composition-based applications</p> <p>3.6 Polymers, Types of polymerization, monomer.</p> <p>3.7 Thermoplastics and thermosetting plastics</p> <p>3.8 Application of Polymers and the uses, (Polythene, Polypropene, PVC, PS, PTFE, Buna -S, Buna-N, nylon – 6, nylon-6,6 and Bakelite),</p> <p>3.9 Rubber and vulcanization of rubber</p> <p>Course Outcome: CO3 Teaching Hours: 10 hrs</p>
4	<p><b>TITLE: Fuel &amp; Combustion</b></p> <p>4.1 Definition, classification of fuels.</p> <p>4.2 Calorific values (HCV and LCV), calculation of HCV and LCV using Dulong's formula</p> <p>4.3 Fuel Petrol and diesel, Knocking- fuel rating (octane and cetane numbers),</p> <p>4.4 Proximate and Ultimate Analysis of coal.</p> <p>4.5 LPG, CNG, water gas, coal gas, producer gas and biogas</p>



	<p>4.6 Lubricant, Definition, classification with examples, and characteristic properties of good lubricant, classification with examples</p> <p>4.7 Lubrication – function, lubrication mechanism – hydrodynamic and boundary lubrication, physical properties (viscosity and viscosity index, oiliness, and chemical properties (coke number, total acid number saponification value) of lubricants.</p> <p>4.8 Flash and fire point, cloud and pour point.</p> <p>Course Outcome: CO4      Teaching Hours: 10 hrs</p>
5	<p><b>TITLE: Electrochemistry and Corrosion</b></p> <p><b>5.1</b> Electronic concept of Oxidation, reduction and redox reactions. Definition of terms Electrolyte, Non-Electrolyte with suitable examples, Faraday laws of electrolysis and simple numerical problems.</p> <p><b>5.2</b> Electrometallurgy, Electroplating, and Electrolytic refining.</p> <p><b>5.3</b> Application of Redox reactions in Electrochemical cells. Primary cells- Dry cells, Secondary cells- commercially used Lead storage battery, Fuel and storage battery. Fuel and Solar cells</p> <p><b>5.4</b> Definition, Types of Corrosion, Hydrogen liberation and Oxygen absorption mechanism of Electrochemical Corrosion, Factors affecting rate of Corrosion.</p> <p><b>5.5</b> Internal Corrosion preventive measures.</p> <p><b>5.6</b> Purification, Alloying and heat treatment and external corrosion preventive measure, (metal, anodic, cathodic), Coating, Organic Inhibitors.</p> <p>Course Outcome: CO5      Teaching Hours: 10 hrs</p>

#### REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Engineering Chemistry	Shashi Chawla, Dhanpat Rai & Co. 3 <sup>rd</sup> edition, 2017	ASIN: B01MUBN7F2
2.	Engineering Chemistry	Jain & Jain, Dhanpat Rai, 17 <sup>th</sup> edition, 2018	9352165721
3.	Pradeep's New Course Chemistry for Class 11 & 12 (Vol. 1 & 2)	S.C. Kheterpal, S. N. Dhawan, Pradeep, 2020	9789391966355
4.	NCERT CHEMISTRY For Class XI & XII	NCERT, 2018	81-7450-648-9

#### E-REFERENCES:

- <https://ncert.nic.in/textbook.php?lech1=ps-9>
- <http://www.tndte.gov.in/site/wp-content/uploads/2016/08/Engineering-Chemistry.pdf>





## APPLIED PHYSICS-I

PROGRAMME: DIPLOMA IN ENGINEERING (ALL BRANCHES)							
COURSE CODE: DBS 103				COURSE TITLE: Applied Physics-I			
COMPULSORY / OPTIONAL: COMPULSORY							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
2	1		3	3	QUIZ- 20, TA- 5, MID- 25	50	100

### COURSE OUTCOMES

This paper Applied Physics-I, enables the students to understand

CO1	<p><b>Measurement of Physical Quantities &amp; Dimensions:</b> In this Module helps us study the Classification of Physical quantities, Scalar &amp; Vector quantities, System of units, To study about Dimensions of the physical quantities, Order of magnitude, Significant figures, Error, Differential &amp; Integral calculus (Introduction only).</p>
CO2	<p><b>Force and Motion</b> This Module enable the students to understand the Distance, Displacement, Velocity, Speed and Acceleration, Momentum, Force, Torque, Moment of Inertia, Motion in straight line, Circular motion, Equations of Motion. To introduce the knowledge Newton's laws of motion, Motion of lift, Projectile motion.</p>
CO3	<p><b>Gravity and Planetary Motion:</b> To students understand the concepts of Newton's law of gravitation, Variation of acceleration due to gravity 'g', Gravitational Potential Energy, Escape Velocity, Planets and Satellites, Kepler's laws of Planetary motion. To introduce the knowledge on <i>Work, Energy and Power</i></p>
CO4	<p><b>Mechanical Properties of Matter:</b> To be able analyse and explain <i>Elasticity</i>: Stress, Strain, Hooke's law, Modulus of elasticity. <i>Surface Tension</i>, Surface Tension, Surface energy, Determination of surface tension by capillary rise method. <i>Fluids</i> -To study Density and Pressure, Fluid at rest (Pascal Principle, Archimedes's Principle), Bernoulli's Theorem. <i>Viscosity</i>- Newton's law of viscosity, Stoke's law, Poiseuille's formula.</p>
CO5	<p><b>Heat and Thermodynamics:</b> To make the students understanding the fundamental aspects of three modes of transmission of heat , good and bad conductor, expansion of solid. To study</p>





	Boyle's Law, Charles's law and Gay-Lussac's law, Avogadro's Number, Ideal Gas equation, Zeroth law, First law of Thermodynamics,
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## COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1	<p><b>Measurement of Physical Quantities &amp; Dimensions:</b>            Classification of Physical quantities (Fundamental &amp; Derived with their Units), Scalar &amp; Vector quantities, System of units (M.K.S., C.G.S., F.P.S. &amp; SI), Dimensions of the physical quantities, Principle of homogeneity of dimensions, Order of magnitude, Significant figures, Error in measurement- Systematic error and Random Error, Estimation of errors- Absolute error, Relative error and Percentage error, Simple Problem, Differential &amp; Integral calculus (Introduction only).            Course Outcome: CO1      Teaching Hours : 8 hrs      Marks: 20 (PE+FINAL)</p>
2	<p><b>Force and Motion:</b>            Definitions of Distance, Displacement, Velocity, Speed and Acceleration, Momentum, Force, Torque, Moment of Inertia, Motion in straight line, Circular motion,            Equations of Motion- <math>v = u + at</math>, <math>S = ut + \frac{1}{2}at^2</math>, <math>v^2 = u^2 + 2as</math>, Distance travelled by particle in <math>n^{\text{th}}</math> second, Equations of motion for motion under gravity.            Statements of Newton's laws of motion, Motion of lift,  <b>Projectile motion</b>-Time of flight, Vertical height and Horizontal range, Simple problems.            Course Outcome: CO2      Teaching Hours : 8 hrs      Marks: 20 (PE+FINAL)</p>
3	<p><b>Gravity and Planetary Motion:</b>            Newton's law of gravitation, Variation of acceleration due to gravity 'g' (On the Earth Surface, inside the earth and above the earth), Gravitational Potential Energy, Escape Velocity, Planets and Satellites, Kepler's laws of Planetary motion, Simple Problem.  <b>Work, Energy and Power:</b>            Definitions of work, energy and power with their units and mathematical expressions, kinetic energy and potential energy, Related problems.            Course Outcome: CO3      Teaching Hours : 8 hrs      Marks: 20 (PE+FINAL)</p>
4	<p><b>Mechanical Properties of Matter:</b>  <b>Elasticity:</b> Stress, Strain, Hooke's law, Modulus of elasticity (Young's Modulus, Bulk's Modulus and Modulus of rigidity).  <b>Surface Tension:</b> Surface Tension, Surface energy, Relation between Surface Tension and Surface energy, Angle of contact, Shape of Meniscus, Capillarity, Determination of surface tension by capillary rise method, Simple Problem.  <b>Fluids (At rest and motion):</b>            Density and Pressure, Fluid at rest (Pascal Principle, Archimedes's Principle), Bernoulli's Theorem (Without Proof)  <b>Viscosity:</b> Newton's law of viscosity, Coefficient of viscosity, Streamline and turbulent flow, Critical velocity and Reynold's number, Stoke's law, Poiseuille's formula for steady flow (Without proof), Simple Problem.            Course Outcome: CO4      Teaching Hours : 8 hrs      Marks: 20 (PE+FINAL)</p>
5	<p><b>Heat and Thermodynamics:</b>            Three modes of transmission of heat (Conduction, Convection and Radiation), good and bad conductor with examples, expansion of solid –linear, aerial and cubical and relation between them. Boyle's Law, Charles's law and Gay-Lussac's law, Avogadro's Number, Ideal Gas equation, Isothermal, Isobaric, Isochoric and Adiabatic processes, Zeroth law of Thermodynamics, First law of Thermodynamics, Related Problem.            Course Outcome: CO5      Teaching Hours : 8 hrs      Marks: 20 (PE+FINAL)</p>



## REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	1. Physics Part-I Textbook for Class XI	National Council of Educational Research and Training (NCERT)	ISBN-81-7450-508-3
2.	2. Concepts of Physics by H C Verma Part-I	H.C Verma, Bharati Bhawan.	ISBN-13 978-8177091878
3.	Question Bank Physics For Class XI	Tata McGraw-Hill, publisher, McGraw-Hill Education (India) Pvt Limited.	ISBN, 0070221952
4.	Modern ABC of Physics - Class XI	Modern Publishers Satish K. Gupta	ISBN:9789388352383
5.	S. Chand's Principles of Physics For class XI	S. Chand & Company LTD., V.K. Mehta, Rohit Mehta,	ISBN:9788121919340
6.	ISC Physics Book - 1 for Class XI	S.Chand (G/L) & Company Ltd D.K. Benerjee P. Vivekanandan	ISBN 9788121918978 (ISBN10: 8121918979)

## E-REFERENCES:

1. <http://www.freebookcentre.net>
2. <http://www.msuniv.ac.in>
- 3.
4. <https://e-booksdirctory.com>
5. <https://www.infobooks.org>
6. e-books/e-tools/ learning physics software/websites etc.



## MATHEMATICS-I

<b>PROGRAMME: DIPLOMA IN ENGINEERING</b>							
COURSE CODE: DBS 105			COURSE TITLE: <b>MATHEMATICS-I</b>				
<b>COMPULSORY / OPTIONAL: COMPULSORY</b>							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
3	1	0	4	4	Q-20, TA-5, MID-25	50	100

L= Lecture, T= Tutorial and P= Practical, Q= Quiz, TA= Teacher Assesment, MID= Mid Semester Exam

**RATIONALE:** Provide basic knowledge of Mathematics for understanding the concepts of engineering and technology.

### COURSE OUTCOMES

CO1	Students will learn the fundamentals of Elementry Algebra, e.g., Complex Numbers, Solution of Quadratic Equations, Binomial Theorem, A.P., and G.P.
CO2	The students will get basic knowledge of 2-D Coordinate Geometry required for various fields of engineering and allied sciences.
CO3	The students will learn and understand the fundamental trigonometric identities and their applications.
CO4	The students will understand and apply the Algebra of Vectors and Vector Products knowledge.
CO5	The students get an intuitive knowledge of the basic concept of Limits and Derivatives.

### COURSE CONTENT DETAILS:

<b>MODULES WITH TOPICS</b>
<p><b>1. MODULE-I Basic Algebra</b></p> <p>1.1. Definition and algebra of complex numbers, conjugate, modulus, and their properties.</p> <p>1.2. Nature of roots of quadratic equations. Solution of quadratic equations with complex roots.</p> <p>1.3. Definition of factorial notation, the formula of permutation and combinations. Binomial theorem for positive index. General terms and related problems.</p> <p>1.4. Definition of A.P., G.P. Finding nth term and sum to n terms of A.P. and G.P.</p> <p><i>Course Outcome: CO1      Teaching Hours: 12 hrs</i></p>
<p><b>2. MODULE-II Coordinate Geometry:</b></p> <p>2.1. Cartesian Coordinates, Distance formulae, section formulae, midpoint, centroid of triangle, area of a triangle.</p> <p>2.2. General equation of a straight line and its standard forms. Length of perpendicular.</p> <p>2.3. Equation of circle, circle through three points, the circle with a given diameter.</p> <p>2.4. Standard equations and properties of ellipse, parabola, and hyperbola.</p> <p><i>Course Outcome: CO2      Teaching Hours: 10 hrs</i></p>
<p><b>3. MODULE-III Trigonometry</b></p>



3.1. Measurements of angles. Trigonometric or Circular functions. Formula and use of the identities  $\sin(A \pm B)$ ,  $\cos(A \pm B)$ ,  $\tan(A \pm B)$ ,  $\cot(A \pm B)$ ,  $\cos\left(\frac{A \pm B}{2}\right)$ ,  $\sin\left(\frac{A \pm B}{2}\right)$

3.2. Trigonometric ratios of multiple angles and related identities.

3.3. Trigonometric ratios sub-multiple angles with related identities.

*Course Outcome: CO3      Teaching Hours: 12 hrs*

#### 4. MODULE-IV Vector Algebra

4.1. Definition of Vector, Position Vector, Algebra of vectors (Equality, addition, subtraction, and scalar multiplication).

4.2. Dot (Scalar) product with properties.

4.3. Vector (Cross) product with properties.

*Course Outcome: CO4      Teaching Hours: 6 hrs*

#### 5. MODULE-V Elementary Calculus: Derivatives

5.1. The intuitive idea of functions and limits. Limits of polynomials and rational functions; trigonometric, exponential, and logarithmic functions.

5.2. The definition of derivative relates to the slope of the tangent of the curve, the derivative of the sum, difference, product, and quotient of functions.

5.3. Derivatives of polynomial and trigonometric functions.

*Course Outcome: CO5      Teaching Hours: 8 hrs*

### TEXT AND REFERENCE BOOKS

S. N.	Title	Author, Publisher, Edition, and Year of publication	ISBN
5.	Senior Secondary School Mathematics for Class 11	R. S. Agarwal, Bharati Bhavan Publishers & Distributors. 2020	<b>ISBN-13 :</b> 978-9350271476
6.	Senior Secondary School Mathematics for Class 12	R. S. Agarwal, Bharati Bhavan Publishers & Distributors. 2020	<b>ISBN-13 :</b> 978-9350271247
7.	ISC Mathematics Book 1 XI	O.P. Malhotra & S. K. Gupta & Anubhuti Gangal, 2020	<b>ASIN :</b> B0B2W2DXGM

### E-REFERENCES:

1. [NCERT \(Mathematics for Class-XI\)](#)
2. [NCERT \(Mathematics for Class-XII Part-1\)](#)
3. [NCERT \(Mathematics for Class-XII Part-2\)](#)
4. [SWAYAM Lecture on Mathematics XI Part-I](#)
5. [SWAYAM Lecture on Mathematics XI Part-II](#)
6. [SWAYAM Lecture on Mathematics XII Part-I](#)



## Introduction to IT Systems

PROGRAMME: DIPLOMA IN ENGINEERING							
COURSE CODE: <b>DES 101</b>				COURSE TITLE: <b>Introduction to IT Systems</b>			
COMPULSORY / OPTIONAL: COMPULSORY							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
2	1		3	3	50	50	100

### COURSE OUTCOMES

CO1	Students should learn about the working of the computer system and the role of software.
CO2	Students should understand how data is represented and processed within the computer.
CO3	Students should learn about the computer networks and the Internet, and various device involved in their setup, and also their advantages.
CO4	Students should be aware of various types of threats when connected online, and certain precautions they should take to prevent them.
CO5	Students should be familiar with various upcoming and evolving technologies.

### COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1	<b>TITLE Introduction to Computer Hardware and Software</b> 1.1 Data processing, Computer Hardware and Software, 1.2 Components of Computer, I/O Devices 1.3 Computer Memory 1.4 Types of Computer Software, Application Software, Operating System 1.5 Programming Languages, Translators. Course Outcome: CO1      Teaching Hours : 8 hrs      Marks: 20 (PE+FINAL)
2	<b>TITLE Computer Codes and Data Representation</b> 1.1 Data Representation: Number Systems 1.2 Conversion from one base to another 1.3 Arithmetic Operations on Binary Data 1.4 Alphanumeric Representation 1.5 Floating Point Representation. Course Outcome: CO2      Teaching Hours : 8 hrs      Marks: 20 (PE+FINAL)
3	<b>TITLE Computer Network and Internet</b> 1.1 Data Communication, Communication Devices 1.2 Computer Networks, Type of Network 1.3 Internet, Internet Services, Internet Protocols 1.4 URL & IP Addresses 1.5 World-wide Web, Web Browsers, Web Servers Course Outcome: CO3      Teaching Hours : 8 hrs      Marks: 20 (PE+FINAL)
4	<b>TITLE Information and Network Security</b> 1.1 Information Security 1.2 Software Vulnerabilities



	1.3 Network Security and Authentication 1.4 Cyber Security, Common Cyber Threats 1.5 Cyber Law Course Outcome: CO4      Teaching Hours : 8 hrs      Marks: 20 (PE+FINAL)
5	<b>TITLE Emerging Areas</b> 1.1 Multimedia, E-commerce 1.2 Geographical Information System 1.3 Virtual Reality (VR), Augmented Reality 1.4 Artificial Intelligence (AI), Machine Learning (ML) 1.5 Internet of Things (IoT), Robotics 1.6 Data Sciences, Block Chain Course Outcome: CO5      Teaching Hours : 8 hrs      Marks: 20 (PE+FINAL)

### REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	“Fundamental of Computers”	V. Rajaraman, PHI	
2.	“Fundamental of Computers”	E. Balagurusamy, Mc Graw Hill	9780070141605

### E-REFERENCES:

- Jaiswal. S., “Information Technology Today”, Galgotia Publication.



## APPLIED PHYSICS LAB

PROGRAMME: DIPLOMA IN ENGINEERING							
COURSE CODE: <b>DBS 104</b>				COURSE TITLE: <b>APPLIED PHYSICS LAB</b>			
COMPULSORY / OPTIONAL: COMPULSORY							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
		2	2	1	60	40	100

### COURSE OUTCOMES

To impart basic knowledge in the discipline of Physics including its phenomenology, theories, concepts, general principles and techniques.

- 1- To enable the students to have a thorough exposure to the different branches of Physics so as to gain a comprehensive knowledge in the subject of Basic Physics.
- 2- To understand the links of Physics to other disciplines and also to the societal issues.
- 3- To bridge the gap between the School and Diploma levels of Physics by providing a completer and more logical framework in important areas of basic Physics.
- 4- Objective of the paper is to provide a basic knowledge in Applied Physics for Diploma students who do not study physics as major/allied subject

OBJECTIVE: This paper Applied Physics Lab, enables the students to understand Vernier Calipers, Screw Gauge, Ohm's law, Ammeter, Galvanometer, Acceleration due to gravity, Colour code resistance, Prism, Force Constant, Modulus of rigidity etc..

- To be able to understand the concepts of Physics through different experiments.
- To acquire the basic trouble shooting skills and appreciate Physics concepts through experiments
- Learners will acquire the basic knowledge of Physics
- Objective of the paper (Physics Lab) is to gain knowledge on Basic applications of Physics

### LIST OF EXPERIMENTS

1. To find the diameter and volume of a given wire using a Screw Gauge.





2. To find the side and volume of a given wooden cube using a Vernier Caliper.
3. To find the length, diameter and volume of a given wooden cylinder using a Vernier Caliper.
4. To Verify Ohm's Law by using an Ammeter & Voltmeter.
5. To determine the value of 'g' (accelerator due to gravity) by using a simple Pendulum.
6. To determine the given carbon resistance using a Multimeter and to compare it with measured value with the written in Colour Code.
7. To find the angle of minimum deviation of a given glass prism.
8. To find the force constant of a helical spring by plotting a graph between load and extension.
9. To determine the value of modulus of rigidity for the material of rod by static method.
10. To convert a Weston type Galvanometer into an Ammeter of a given range.
11. To convert a Weston type galvanometer into a Voltmeter of given range.
12. To study the relation between frequency and length of a stretch string using a Sonometer.

#### REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Physics, Practical & Lab Manuals, Science	JN.Jaiswal, Dr. Rajendra Singh , Laxmi Publications	9788131801413
2.	Laboratory Manual Physics Class-XI	Poonam Singh, Rohan Srivastava, S. Singal, Avichal Publishing Company	978-81-7855-601-7
3.	Physics Manual	University Polytechnic	
4.	Nootan Isc Practical Physics Class 11	Publisher Nageen Prakashan Pvt.Ltd	ISBN-139789382319702
5.	COMPREHENSIVE PRACTICAL PHYSICS XI & XII	<a href="#">J. N. Jaiswal</a> (Author), <a href="#">Dr. Rajendra Singh</a> (Author) Laxmi Publications Pvt Ltd	ISBN:9788131801413, 8131801411 ISBN:9788131803844, 8131803848



## COMMUNICATION SKILLS

PROGRAMME: DIPLOMA IN ENGINEERING							
COURSE CODE: DHS 103			COURSE TITLE: COMMUNICATION SKILLS				
COMPULSORY / OPTIONAL: <b>COMPULSORY</b>							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
3	0	0	3	3	Q-20, TA-5, MID-25	50	100

### COURSE OBJECTIVES

This course enables the students:

1.	1. To make the students confident of speaking in English impeccably and with utmost enthusiasm.
2.	2. To familiarize the students with different styles of communication.
3.	3. To enlighten the students with the seven concepts of communication.
4.	4. To make the students understand the nuances of communication.
5.	5. To train the students and make them comprehend various aspects of Interview skills.

### COURSE OUTCOMES

After the completion of this course, students will be able to:

1.	Develop knowledge, skills, and judgment around human communication that facilitate their ability to work collaboratively with others.
2.	Understand and practice different techniques of communication.
3.	Practice and adhere to the 7Cs of Communication.
4.	Familiarize with different types of Communication.
5.	Understand and practice Interview Etiquette.

MODULE	TOPICS/SUBTOPICS
1	<p><b>Communication: An Introduction</b></p> <p>1.1 Definition, Nature, and Scope of Communication</p> <p>1.2 Importance and Purpose of Communication, 7 C's of Communication.</p> <p>1.3 Process of Communication</p> <p>1.4 Types &amp; flow of Communication</p> <p>Course Outcome: CO1      Teaching Hours : 8 hrs      Marks: 31 (PE+FINAL)</p>
2	<p><b>Understanding and Applying Vocabulary</b></p> <p>2.1 Words Often Confused-Pairs of words.</p> <p>2.2 One Word Substitutes</p> <p>2.3 Synonyms and Antonyms</p> <p>2.4 Word Formation: Prefixes, Bases, and Suffixes.</p> <p>Course Outcome: CO2      Teaching Hours : 8 hrs      Marks: 21 (PE+FINAL)</p>
3	<p><b>Effective Writing Skills</b></p> <p>2 Summarizing</p>



	3 Précis Writing 4 Paragraph Writing 5 Letter Writing (formal and informal)  Course Outcome: CO3      Teaching Hours : 8 hrs      Marks: 16 (PE+FINAL)
4	English Grammar and Usage 2 Articles 3 Parts of Speech 4 Tenses 5 Error Analysis (Correction of Errors in a given sentence)  Course Outcome: CO4      Teaching Hours : 8 hrs      Marks: 21 (PE+FINAL)
5	Presentation Skills <ul style="list-style-type: none"> <li>• Preparing a PowerPoint Presentation</li> <li>• Presenting a Paper</li> <li>• Group Discussions</li> <li>• Extempore/Debates</li> </ul> Course Outcome: CO5      Teaching Hours : 8 hrs      Marks: 11 (PE+FINAL)

**Text Books:**

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Communication Skills	Sanjay Kumar & Pushp Lata, Oxford University Press 2 <sup>nd</sup> edition	9780199457069
2.	Communication for Business	Shirley Taylor, V.Chandra, Pearson	9788131727652
3.	Communication Skills I	Archana Sharma, Dr. Gyaneshwar Pratap Singh, Dr.Ombir Singh. Asian Publications	978-93-5502-019-2
4.	Common Mistakes in English	Fitikidies, T.J – Orient Longman, 1984	978-0582344587
5.	English Grammar, Composition and Usage	NK Aggarwal and FT Wood; Published by Macmillan Publishers India Ltd; New Delhi.	<b>978-8183896160</b>



## SPORTS AND YOGA

PROGRAMME: DIPLOMA IN ENGINEERING							
COURSE CODE: DHS102			COURSE TITLE: SPORT & YOGA				
COMPULSORY / OPTIONAL: COMPULSORY							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
		2	2	1	60	40	100

### Course Objectives:

1. To make the students understand the importance of sound health and fitness principles as they relate to better health.
2. To expose the students to a variety of physical and yogic activities aimed at stimulating their continued inquiry about Yoga, physical education, health and fitness.
3. To create a safe, progressive, methodical and efficient activity- based plan to enhance improvement and minimize risk of injury.
4. To develop among students an appreciation of physical activity as a lifetime pursuit and a means to better health

### Course Outcomes:

On successful completion of the course the students will be able to:

1. Practice Physical activities and Hatha Yoga focusing on yoga for strength, flexibility, and relaxation.
2. Learn techniques for increasing concentration and decreasing anxiety which leads to stronger academic performance.
3. Learn breathing exercises and healthy fitness activities
4. Understand basic skills associated with yoga and physical activities including strength and flexibility, balance and coordination.
5. Perform yoga movements in various combination and forms.
6. Assess current personal fitness levels.
7. Identify opportunities for participation in yoga and sports activities.
8. Develop understanding of health-related fitness components: cardiorespiratory endurance, flexibility and body composition etc.
9. Improve personal fitness through participation in sports and yogic activities.
10. Develop understanding of psychological problems associated with the age and lifestyle

### Course Content:

#### I. Introduction to Physical Education

- i. Meaning & definition of Physical Education
- ii. Aims & Objectives of Physical Education
- iii. Changing trends in Physical Education

#### II. Olympic Movement

- i. Ancient & Modern Olympics (Summer & Winter)



- ii. Olympic Symbols,
- iii. Ideals, Objectives & Values
- iv. Awards and Honours in the field of Sports in India (Dronacharya Award, Arjuna Award, Dhyanachand Award, Rajiv Gandhi Khel Ratna Award etc.)

### **III. Physical Fitness, Wellness & Lifestyle**

- i. Meaning & Importance of Physical Fitness & Wellness,
- ii. Components of Physical fitness,
- iii. Components of Health-related fitness,
- iv. Components of wellness,
- v. Preventing Health Threats through Lifestyle Change,
- vi. Concept of Positive Lifestyle

### **IV. Fundamentals of Anatomy & Physiology in Physical Education, Sports and Yoga**

- i. Define Anatomy, Physiology
- ii. Its Importance
- iii. Effect of exercise on the functioning of Various Body Systems. (Circulatory System, Respiratory System, Neuro-Muscular System etc.)

### **V. Kinesiology, Biomechanics & Sports**

- i. Meaning & Importance of Kinesiology & Biomechanics in Physical Edu. & Sports
- ii. Newton's Law of Motion & its application in sports.
- iii. Friction and its effects in Sports.

### **VI. Postures**

- i. Meaning and Concept of Postures.
- ii. Causes of Bad Posture.
- iii. Advantages & disadvantages of weight training.
- iv. Concept & advantages of Correct Posture.
- v. Common Postural Deformities – Knock Knee; Flat Foot; Round Shoulders; Lordosis, Kyphosis, Bow Legs and Scoliosis.
- vi. Corrective Measures for Postural Deformities

### **VII. Sports Activity**

#### **References:**

1. Modern Trends and Physical Education by Prof. Ajmer Singh.
2. Light On Yoga By B.K.S. Iyengar.
3. Health and Physical Education – NCERT (11th and 12th Classes)



## Engineering Graphics

PROGRAMME: DIPLOMA IN ENGINEERING							
COURSE CODE: DES 102				COURSE TITLE: Engineering Graphics			
COMPULSORY / OPTIONAL: COMPULSORY							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
		3	3	1.5	60	40	100

**RATIONALE:** Engineers effective language is an engineering graphics. It provides the basis knowledge, which strengthens the engineering & technological structure. Moreover, it is the Basic tools for cultivating ideas and understanding.

### COURSE OUTCOMES

CO1	Learn to use the drawing instruments, understand graphics standards, dimensioning, limits, fits, tolerances, symbol use in technical drawing and drawing scales, in technical drawing development.
CO2	To develop skill to visualise engineering objects and able to draw different engineering curves and know their applications.
CO3	Understand and able to draw the projections of objects in different planes and learn displaying techniques for graphical representation.
CO4	Visualise three dimensional objects and able to draw orthographic and isometric projections.
CO5	Able to visualise and draw sectional views of solid objects & develop understanding to examine industrial engineering drawing.

### COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1	<b>TITLE: Basic Elementary graphics</b> 1.1 Convention of the line and their application 1.2 Dimensioning technique as per SP-46 1.3 Concept limit, fits and Tolerance symbols 1.4 Scale (reduced, enlarged & full scale) 1.5 Geometrical Construction <b>Course Outcome: CO1      Teaching &amp; practical Hours : 8 hrs Marks: 20 (PE+FINAL)</b>
2	<b>TITLE: Engineering curves and Loci of Points</b> 2.1 To draw an ellipse by: Directrix and focus method, Rectangle method. 2.2 To draw a hyperbola and parabola by: Directrix and focus method, passing through given points. 2.3 to draw involutes of circle & polygon. 2.4 to draw cycloid, epicycloid, hypocycloid. 2.5 to draw helix & spiral. <b>Course Outcome: CO1      Teaching &amp; practical Hours: 8 hrs    Marks: 20 (PE+FINAL)</b>
3	<b>TITLE: Introduction of projection</b> 3.1 Projection of point 3.2 Projection of lines 3.3 Projection of Plane 3.4 Projection of simple Plane of circular, square, rectangular object



	3.5 Projection of Solid <b>Course Outcome: CO3      Teaching &amp; practical Hours : 8 hrs    Marks: 20</b> <b>(PE+FINAL)</b>
4	<b>TITLE Orthographic and Isometric Projection</b> 4.1 introduction to orthographic projections 4.2 Conversion of pictorial view into orthographic Views 4.3 Isometric scale 4.4 Conversion of isometric view into orthographic view 4.5 draw missing view from the given orthographic view <b>Course Outcome: CO4      Teaching &amp; practical Hours : 8 hrs    Marks: 20</b> <b>(PE+FINAL)</b>
5	<b>TITLE: Section of solids</b> 5.1 Section of solids of pyramid, Cone and tetrahedron resting on the base. 5.2 Section of solid of prism and cylinder 5.3 Section of prism and cylinder axis parallel to both the reference planes 5.4 section of prism and cylinder resting on their base  <b>Course Outcome: CO5      Teaching Hours : 8 hrs      Marks: 20</b> <b>(PE+FINAL)</b>

### REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1	Bureau of Indian Standards. Engineering Drawing Practice for Schools and Colleges IS: Sp-46	BIS. Government of India, Third Reprint, October 1998	ISBN: 81-7061-091-2.
2	Engineering Drawing	Bhatt, N. D : Charotar Publishing House, Anand, Gujrat 2010	ISBN: 978-93-80358-17-8
3	Engineering Graphics & Design	Jain &Gautam; Khanna Publishing House, New Delhi	ISBN: 978- 93-86173-478

### E-REFERENCES:

1. <https://www.youtube.com/watch?v=TJ4jGyDWCw>
2. <https://www.youtube.com/watch?v=dmt6n7Sgcg>
3. <https://www.youtube.com/watch?v=MQScnLXL0M>
4. <https://www.youtube.com/watch?v=3WXPanCq9LI>
5. <https://www.youtube.com/watch?v=fvjk7PlxAuo>
6. <http://www.me.umn.edu/coursesme2011/handouts/engg%20graphics.pdf>
7. <https://www.machinedesignonline.com>





## Engineering Workshop Practice

PROGRAMME: DIPLOMA IN ENGINEERING							
COURSE CODE: DES 104			COURSE TITLE: Engineering Workshop Practice				
COMPULSORY / OPTIONAL: COMPULSORY							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
		3	3	1.5	60	40	100

**RATIONALE:** On successful completion of the course, the students will be able to perform industry-oriented manufacturing practice with full competency: Able to transform drawing to model with the specific use of materials and tools.

### COURSE OUT COMES:

CO 1	Learn to identify and specify hand tools and machinery used in different shops according to job.
CO 2	Understand job drawing and selection of raw materials related to different manufacturing processes.
CO 3	Able to complete jobs as per specifications given in the drawing in the allotted time.
CO 4	Learn to operate and control different machines and equipment's with all safety precautions.
CO 5	Inspect the job for the desired quality and dimensions.

### COURSE CONTENT:

Sl. No.	Details of Practical Content
1.	<b>Title : Carpentry:</b> 1.1 Demonstration of different types of wood. 1.2 Wood working tools/machines. 1.3 Demonstration of different wood working processes like planing, marking, grooving etc. 1.4 One simple job using different tools of carpentry shop.
2.	<b>Title:Fitting:</b> 2.1 Demonstration of different fitting tools and drilling machines. 2.2 Demonstration of different fitting operations like chipping, filing, drilling, tapping etc. 2.3 One simple fitting job involving practice of fitting operations.
3.	<b>Title : Welding:</b> 3.1 Identification of different welding tool and machines 3.2 Demonstration of different welding methods 3.3 One simple job involving butt and lap joint.
4.	<b>Title: Sheet Metal:</b> 4.1 Demonstration of different sheet metal tools/ machines. 4.2 Demonstration of different sheet metal operations like cutting , bending, soldering ,brazing etc. 4.3 one simple job involving sheet metal operations, soldering and riveting.



**References:**

1. S.K. Hajara Chaudhary, Workshop Technology, Media Promoters and Publishers, New Delhi, 2015
2. B.S. Raghuwanshi, Workshop Technology, Dhanpat Rai and sons, New Delhi 2014
3. K. Venkat Reddy, Workshop Practice Manual, BS Publications, Hyderabad 2014
4. Kents Mechanical Engineering Hand book, John Wiley and Sons, New York



**2<sup>ND</sup> SEMESTER**  
**DIPLOMA IN ENGINEERING**



## APPLIED PHYSICS-II

PROGRAMME: DIPLOMA IN ENGINEERING							
COURSE CODE: DBS 201			COURSE TITLE: APPLIED PHYSICS - II				
COMPULSORY / OPTIONAL: COMPULSORY							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
2	1		3	3	QUIZ- 20, TA- 5, MID- 25	50	100

### COURSE OUTCOMES

**This paper Applied Physics-II enables the students to understand**

CO1	<p><b><i>Waves and Sound</i></b></p> <p>In this Module to be able to understand the Types of waves, Terminology, Speed of sound in a gaseous medium-Newton's Formula and Laplace's correction (Derivation), Definition of Doppler Effect, Acoustics of Buildings, Reverberation, Pitch, Echoes, Loudness, Beats.</p>
CO2	<p><b><i>Light</i></b></p> <p>In this Module helps us study the Reflection &amp; Refraction of light, Derivation of prism formula, To understand the concepts of Dispersion of Light, interference, Photometry, To study the Speed of light in vacuum and media.</p>
CO3	<p><b><i>Current Electricity</i></b></p> <p>To introduce the knowledge on Conductor, Semiconductor, Insulator, Electric charge, current, Resistance, e.m.f., To understand the Ohm's Law, Galvanometer, Ammeter, Voltmeter, Joule's law, Wheatstone bridge, Definition of Electric power and energy.</p> <p>To study <b><i>Electrostatics</i></b>- Coulomb's Law, Electric field and Potential difference.</p>
CO4	<p>This Module enable the students to understand the <b><i>Magnetism and Electromagnetic induction</i></b> - Magnet and their properties, Biot-Savart's law, Magnetic field due to infinitely long straight conductor, Solenoid, Earth's magnetic field and its three parameters, Faraday laws of Electromagnetic induction.</p>
CO5	<p><b><i>In this Module</i></b> To be able to understand the concepts of <b><i>Modern Physics</i></b>- Plank's hypothesis, properties of photons, Photoelectric effect, X-rays, Radioactivity, Laser.</p> <p>Related Problem of All Module</p>



## COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1	<p><b>Waves and Sound</b> Types of waves-Electromagnetic waves &amp; Mechanical wave, transverse waves and longitudinal waves, Terminology-Amplitude, Wave Length, Time period, frequency, crest and trough, relation between frequency &amp; Wave length, Superposition of waves, Speed of sound in a gaseous medium-Newton's Formula and Laplace's correction (Derivation), Definition of Doppler Effect, Acoustics of Buildings, Reverberation, Pitch, Echoes, Loudness, Beats, Related problems. Course Outcome: CO1 Teaching Hours : 8 hrs Marks: 20 (PE+FINAL)</p>
2	<p><b>Light</b> Reflection &amp; Refraction of light, Laws of reflection and refraction, critical angle, Total Internal Reflection, Derivation of prism formula, Dispersion with a prism, Interference of light-Path difference, Expression for fringe width in Young's double slit experiment, Photometry (Intensity of illumination, Luminous Flux, Inverse square law), Speed of light in vacuum and media, Related Problem. Course Outcome: CO2 Teaching Hours : 8 hrs Marks: 20 (PE+FINAL)</p>
3	<p><b>Current Electricity</b> Definitions of Conductor, Semiconductor, Insulator, Electric charge, current, Resistance, e.m.f., Ohm's Law, Resistances connected in series and parallel, Galvanometer, Ammeter, Voltmeter, Conversion (galvanometer to ammeter and galvanometer to voltmeter), Heating effect of current (Joule's law of heating), Wheatstone bridge, Electric power and energy, Related Simple Problem. <b>Electrostatics</b> Coulomb's Law, Electric field and Potential difference, Electrical field due to a point charge and a line charge, Electric dipole and Electric dipole moment, Simple Problem. Course Outcome: CO3 Teaching Hours : 8 hrs Marks: 20 (PE+FINAL)</p>
4	<p><b>Magnetism and Electromagnetic induction</b> Magnet and their properties, Magnetic moment, Magnetic field and lines of force, Magnetic force on a current carrying wire, Biot-Savart's law, Magnetic field due to infinitely long straight conductor, Magnetic field due to a circular current-carrying coil and solenoid, Earth's magnetic field and its three parameters, Faraday laws of Electromagnetic induction, Related Simple Problem. Course Outcome: CO4 Teaching Hours : 8 hrs Marks: 20 (PE+FINAL)</p>
5	<p><b>Modern Physics</b> Plank's hypothesis, properties of photons, Photoelectric effect, X-rays (Production and applications), Radioactivity (Alpha, Beta and Gamma rays), Laser (Introduction, Characteristics and Applications). Related Problem. Course Outcome: CO5 Teaching Hours : 8 hrs Marks: 20 (PE+FINAL)</p>

## REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	1.Physics Part-II Textbook for Class XI	National Council of Educational Research and Training (NCERT)	ISBN-97881745056719



2.	2. Concepts of Physics by H C Verma Part-II	H.C Verma, Bharati Bhawan.	ISBN-10 : 8177092324 ISBN-13 :978-8177092325
3.	Question Bank Physics For Class XII	Tata McGraw-Hill, publisher, McGraw-Hill Education(India) Pvt Limited.	ISBN-
4.	Modern ABC of Physics - Class XII	Modern Publishers Satish K. Gupta	ISBN-13 :978812450015
5.	S. Chand's Principles of Physics - XII	S. Chand & Company LTD., V.K. Mehta, Rohit Mehta,	ISBN:8121917697,978811917698

### **E-REFERENCES:**

1. <https://e-booksdirctory.com>
2. <http://www.freebookcentre.net>
3. e-books/e-tools/ learning physics software/websites etc.
4. <https://www.infobooks.org>



## MATHEMATICS-II

<b>PROGRAMME: DIPLOMA IN ENGINEERING</b>							
COURSE CODE: DBS 203			COURSE TITLE: <b>MATHEMATICS-II</b>				
<b>COMPULSORY / OPTIONAL: COMPULSORY</b>							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
3	1	0	4	4	Q-20, TA-5, MID-25	50	100

L= Lecture, T= Tutorial and P= Practical, Q= Quiz, TA= Teacher Assesment, MID= Mid Semester Exam

**RATIONALE:** Provide basic mathematics knowledge for understanding engineering and technology concepts.

### COURSE OUTCOMES

CO1	Students are going to learn the fundamentals of Inverse Trigonometric and Complex Functions.
CO2	The students will be introduced to Continuity and Differentiability and derivatiooves of various functions required for various fields of engineering and allied sciences.
CO3	The students will learn and understand the essential Indefinite Integral and how to integrate various functions.
CO4	The students are going to learn and understand the essential Definite Integral and how to integrate various functions and find the area under a curve
CO5	The students get a basic knowledge of First Order Ordinary Differential Equations (ODE) and their application.

### COURSE CONTENT DETAILS:

<b>MODULES WITH TOPICS</b>
<p><b>1. MODULE-I Trigonometric and Complex Functions</b>            1.1. Definition and Identities of Inverse Trigonometric Functions.            1.2. Polar from of Complex Numbers, De-Moivre's theorem, and related problems.            1.3. Exponential and Circular functions of Complex variables, and Euler's Theorem.  <i>Course Outcome: CO1      Teaching Hours: 8 hrs</i></p>
<p><b>2. MODULE-II Continuity and Differentiability with Applications</b>            2.1. Continuity and differentiability, the derivative of composite functions, chain rule.            2.2. Derivatives of inverse trigonometric functions.            2.3. Derivative of implicit, logarithmic, and exponential functions.            2.4. Logarithmic differentiation, derivative of functions expressed in parametric forms.            2.5. Second-order derivatives.            2.6. Rate of change of bodies, increasing/decreasing functions, maxima, and minima (first derivative test motivated geometrically and second derivative test)  <i>Course Outcome: CO2      Teaching Hours: 14 hrs</i></p>
<p><b>3. MODULE-III Indefinite Integral</b>            3.1. Integration as inverse of differentiation. Integration of algebraic and trigonometric functions.            3.2. Integration by substitution,</p>





<p>3.3.Integration by Partial Fractions.</p> <p>3.2. Integration by Parts.</p> <p>3.3. Integrals of the following special type:</p> $\int \frac{dx}{(x^2 \pm a^2)}; \int \frac{dx}{\sqrt{(x^2 \pm a^2)}}; \int \frac{dx}{\sqrt{(a^2 - x^2)}}; \int \frac{dx}{(ax^2 + bx + c)}; \int \frac{dx}{\sqrt{(ax^2 + bx + c)}}; \int \frac{(px+q)dx}{(ax^2 + bx + c)}; \int \frac{(px+q)dx}{\sqrt{(ax^2 + bx + c)}}; etc$ <p>Course Outcome: CO3      Teaching Hours: 12 hrs</p>
<p><b>4. MODULE-IV Definite Integral</b></p> <p>4.1.Fundamental theorem of calculus (without proof), basic properties of definite integral, and evaluation.</p> <p>4.2.Application of finding the area of simple curves.</p> <p>Course Outcome: CO4      Teaching Hours: 6 hrs</p>
<p><b>5. MODULE-V Differential Equations</b></p> <p>5.1. Definition of a differential equation's order, degree, general and particular solutions. Formation of a differential equation whose general solution is given.</p> <p>5.2. Solution of differential equations by the method of separation of variables, homogeneous differential equations of the first order and first degree.</p> <p>5.3. Solutions of linear differential equation</p> <p>Course Outcome: CO5      Teaching Hours: 8 hrs</p>

## TEXT AND REFERENCE BOOKS

S. N.	Title	Author, Publisher, Edition, and Year of publication	ISBN
1.	Senior Secondary School Mathematics for Class 11	R. S. Agarwal, Bharati Bhavan Publishers & Distributors. 2020	<b>ISBN-13 :</b> 978-9350271476
2.	Senior Secondary School Mathematics for Class 12	R. S. Agarwal, Bharati Bhavan Publishers & Distributors. 2020	<b>ISBN-13 :</b> 978-9350271247
3.	ISC Mathematics Book 1 XI	O.P. Malhotra & S. K. Gupta & Anubhuti Gangal, S Chand Publishing, 2020	<b>ASIN :</b> B0B2W2DXGM
4.	ISC Mathematics Book 2 XII	O.P. Malhotra & S. K. Gupta & Anubhuti Gangal, S Chand Publishing, 2020	<b>ISBN-10 :</b> 9352532422

## E-REFERENCES:

1. [NCERT \(Mathematics for Class-XI\)](#)
2. [NCERT \(Mathematics for Class-XII Part-1\)](#)
3. [NCERT \(Mathematics for Class-XII Part-2\)](#)
4. [SWAYAM Lecture on Mathematics XI Part-I](#)
5. [SWAYAM Lecture on Mathematics XI Part-II](#)
6. [SWAYAM Lecture on Mathematics XII Part-I](#)



## FUNDAMENTALS OF ELECTRICAL & ELECTRONICS ENGINEERING

PROGRAMME: DIPLOMA IN ENGINEERING										
COURSE CODE: DES 205			COURSE TITLE: FUNDAMENTALS OF ELECTRICAL & ELETRONICS ENGINEERING							
COMPULSORY / OPTIONAL: COMPULSORY										
Teaching Scheme and Credits					EXAMINATION SCHEME					
L	T	P	HOURS/WEE K	CREDI T	QUI Z I	MI D	QUIZI I	ASSESSMEN T	FINA L	TOTA L
3			3	3	10	25	10	05	50	100

### COURSE OUTCOMES

CO1	Solve electrical circuits using Kirchoff's laws and apply concepts of in electrical systems.
CO2	Analyse A.C. electrical circuits having dependent and independent sources for computation of responses such as voltage, current, power.
CO3	Evaluate the advantages of 3 phase system in electrical industrial applications.
CO4	Assess the applicability and characteristics of semiconductors, PN junction, Diode, and Zener diode and BJTs
CO5	Analyse logic of Basic Gates, Universal Gates & Special Gates and its truth tables

### COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1	<b>INTRODUCTION TO DC CIRCUITS</b> 1.1 Electrical elements, 1.2 properties and their classification, 1.3 Ideal, Real, Independent and Dependent Sources, Source Conversion, 1.4 Star-Delta conversion. 1.5 KCL and KVL, 1.6 Loop current and Nodal voltage method for D.C circuit Course Outcome: CO1      Teaching Hours : 7 hrs      Marks:31(PE + FINAL)
2	<b>CIRCUIT THEOREMS</b> 2.1 Superposition theorem, 2.2 Thevenin's Theorem, 2.3 Norton's Theorem, 2.4 Maximum Power Transfer theorem for Independent and Dependent Sources for DC circuits. Course Outcome: CO2      Teaching Hours : 7 hrs      Marks:21(PE + FINAL)
3	<b>Single-phase and Three-phase AC Circuits</b> 3.1 AC single phase circuit: Common signals & their wave form.



	<p>3.2 Basic electrical quantities and their definitions: RMS &amp; Average value, form factor, phasor quantities, impedance, power, power factor, active, reactive and apparent power.</p> <p>3.3 AC three phase system-Introduction.</p> <p>3.4 Line and Phase relation for Star and Delta Connection.</p> <p>3.5 Comparison between single phase and three phase with specific emphasis to applications.</p> <p>Course Outcome: CO3      Teaching Hours : 6 hrs      Marks: 16(PE + FINAL)</p>
4	<p><b>INTRODUCTION TO SEMICONDUCTOR MATERIALS &amp; COMPONENTS</b></p> <p>4.1 Classification of materials: Energy bands, Forbidden band, Conductor, Semiconductor, Insulator, Intrinsic &amp; Extrinsic semiconductors.</p> <p>4.2 Diode: PN junction, Diode characteristics. DC load line, AC load line.</p> <p>4.3 Zener Diode: V-I characteristics, Applications of Zener diode.</p> <p>4.4 Introduction to BJT: Concept of transistors as two junctions, three terminal devices with two current carriers.</p> <p>4.5 Types and working of BJT: PNP and NPN transistors, their symbols and mechanism of current flow;</p> <p>4.6 Explanation of fundamental current relation.</p> <p>Course Outcome: CO4      Teaching Hours : 10 hrs      Marks: 21(PE + FINAL)</p>
5	<p><b>INTRODUCTION TO DIGITAL ELECTRONICS</b></p> <p>5.1 Concept of positive logic and negative logic.</p> <p>5.2 Basic Gates: Definition, Symbol and Truth Table.</p> <p>5.3 Universal Gates: Definition, Symbol and Truth Table.</p> <p>5.4 Special Gates: Definition, Symbol and Truth Table.</p> <p>5.5 Construction of basic gates using universal gates.</p> <p>Course Outcome: CO5      Teaching Hours : 10 hrs      Marks: 11(PE + FINAL)</p>

#### REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1	Basics of Electrical, Electronics and Communication Engineering	K.A.NAVAS & T.A.Suhail , Rajath Publishers, Kochi.	978-8192189475
2	Fundamental Electrical and Electronic Principles (Third Edition)	Christopher R Robertson, Newnes, Elsevier	978-0750687379
3	Basic Electronics & Linear Circuits	N.N.Bhargava, D.C. Kulashreshtha, S.C. Gupta- TTTI Chandigarh, TMH.	978-1259006463
4	Electronic Devices & Components	Allen Mottershead, PHI	978-8120301245

#### E-REFERENCES:

4. [www.circuitglobe.com](http://www.circuitglobe.com)
5. [www.courses.lumenlearning.com](http://www.courses.lumenlearning.com)
6. [www.allaboutcircuits.com](http://www.allaboutcircuits.com)



## ENGINEERING MECHANICS

<b>PROGRAMME: DIPLOMA IN ENGINEERING</b>							
COURSE CODE: DES 203			COURSE TITLE: <b>Engineering Mechanics</b>				
COMPULSORY / OPTIONAL: COMPULSORY							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
2	1		3	3	Q-20, TA-5, MID-25	50	100

L= Lecture, T= Tutorial and P= Practical, Q= Quiz, TA= Teacher Assessment, MID= Mid Semester Exam

**RATIONALE:** Provide basic concept and knowledge of Engineering Mechanics and its application in real world application of engineering and technology.

### COURSE OUTCOMES

CO1	Able to understand and analyse the condition of equilibrium of a particle.
CO2	Able to analyse the condition of equilibrium of rigid bodies.
CO3	Able to apply the concepts of friction in real world applications.
CO4	Able to calculate centroid and moment of inertia of a given plane area
CO5	Able to analyse the dynamic equilibrium conditions of a body

### COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1	<p><b>TITLE: - BASICS &amp; STATICS OF PARTICLES</b></p> <p>Introduction - Units and Dimensions - Laws of Mechanics – Vectors - Vectorial representation of forces and moments - Vector operations, Coplanar Forces, triangular, Parallelogram and Polygonal Law of forces, Resolution and Composition of forces, Equilibrium of a particle, Lame's theorem, Forces in space - Equilibrium of a particle in space - Equivalent systems of forces - Principle of transmissibility - Single equivalent force.</p> <p>Course Outcome: CO1          Teaching Hours: 8 hrs</p>
2	<p><b>TITLE: - EQUILIBRIUM OF RIGID BODIES</b></p> <p>Free body diagram - Types of supports and their reactions - Requirements of stable equilibrium, Static determinacy - Moments and Couples - Moment of a force about a point and about an axis, Vectorial representation of moments and couples - Scalar components of a moment - Varignon's theorem - Equilibrium of Rigid bodies in two dimensions - Equilibrium of Rigid bodies in three dimensions. Suggested Reading: Equilibrium of Rigid bodies in three dimensions</p> <p>Course Outcome: CO2          Teaching Hours: 8 hrs</p>
3	<p><b>TITLE: FRICTION</b></p> <p>Frictional force - Laws of Coulomb friction - Simple contact friction - Belt friction - Transmission of power through belts - Wedge Friction - Screw Jack. Suggested Reading: Rolling resistance and rolling friction</p> <p>Course Outcome: CO3          Teaching Hours: 8 hrs</p>
4	<p><b>TITLE: - CENTROID AND MOMENT OF INERTIA</b></p>



	Determination of centroid of areas, first moment of area, Centroid of regular sections and composite sections, Second and product moments of plane area, solids. Parallel axis theorem and perpendicular axis theorem - Polar moment of inertia - Product moment of inertia Course Outcome: CO4 Teaching Hours: 8 hrs
5	<b>TITLE: - DYNAMICS OF PARTICLES</b> Displacements, Velocity and acceleration, their relationship - Relative motion – Rectilinear motion, Curvilinear motion, Newton's law of motion - Work Energy Principle - Impulse and Momentum - Impact of elastic bodies Course Outcome: CO5 Teaching Hours: 8 hrs

### REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
8.	Hibbeler, R.C., Engineering Mechanics, Vol. 1 Statics, Vol. 2 Dynamics, Pearson Education Asia Pvt. Ltd., 2010.	Vol. 1 Statics, Vol. 2 Dynamics, Pearson Education Asia Pvt. Ltd., 2010.	0134082443
9.	Beer, F.P and Johnson Jr. E.R, Vector Mechanics for Engineers	Vol. 1 Statics and vol. 2 Dynamics, McGraw-Hill International Edition, 2012	978-0073380315
10	Irving H. Shames, Engineering Mechanics - Statics and Dynamics,	IV Edition - Pearson Education Asia Pvt. Ltd., 2013	0133569241
11	Engineering Mechanics	R.K Bansal, Laxmi Publications	978-8131806531
12	<b>A Textbook of Applied Mechanics</b>	R. K. RAJPUT, Laxmi Publications,	8131809056, 9788131809051
13	<i>Applied Mechanics</i> Dynamics and Statics	<i>I.B. Prasad</i> , KHANNA PUBLISHERS	8174090681

### E-REFERENCES:

- E BOOKS 1  
<https://drive.google.com/open?id=0B9bpsTYXP4ceTnBneXhzRV96dWs>
- <https://drive.google.com/open?id=0B9bpsTYXP4ceSUZLaEYyNDRGMWs>
- <https://drive.google.com/open?id=0B9bpsTYXP4ceRjBJQjd1UTVmNHM>



## ENVIRONMENTAL SCIENCES

PROGRAMME: DIPLOMA IN ENGINEERING							
COURSE CODE: DAU 201				COURSE TITLE: Environmental Sciences			
COMPULSORY / OPTIONAL: COMPULSORY							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
2	-	-	2	2	Q-20, TA-5, MID-25	50	100

L= Lecture, T= Tutorial and P= Practical, Q= Quiz, TA= Teacher Assesment, MID= Mid Semester Exam

**RATIONALE:** The main aim of environmental education at the diploma level course is to succeed in making individuals and communities understand the complex nature of the natural and the built environments. Further, to acquire the knowledge, values, attitudes, and practical skills to participate in a responsible and effective way in anticipating and solving social problems, and in the management of the quality of the environment.

**COURSE OUTCOMES:** Students will be able to understand about

CO1	Importance of environmental science and concept of ecology, biogeochemical cycle, and food chain
CO2	Water pollution, sources and types of pollutants, their toxic effect and water treatment process
CO3	Classification, toxic effects and control measures of air pollutants
CO4	<b>brief introduction to Noise Pollution, Soil Pollution, and radiation pollution</b>
CO5	To recognize relevant energy sources required for domestic and industrial applications. Solve local solid and e-waste problems.

### COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1	<b>TITLE: Multidisciplinary nature of environmental Science and Ecology</b> 1.1 Definition, scope, importance and need for public awareness. 1.2 <b>Ecosystem, basic structure of an ecosystem (abiotic and biotic components),</b> 1.3 <b>Biogeochemical cycles (carbon cycle, oxygen cycle, nitrogen cycle and hydrological cycle),</b> 1.4 <b>Food chain, food web,</b> 1.5 <b>Ecological pyramid.</b> Course Outcome: CO1      Teaching Hours : 4 hrs
2	<b>TITLE: Water Pollution and waste water treatment</b> 2.1 Water resources, 2.2 <b>Sources of water pollution, various pollutants, their toxic effect</b> 2.3 <b>Potability of water (Indian standard of drinking water),</b> 2.4 primary and secondary waste water treatment 2.5 Tricking filter & Activated sludge process Course Outcome: CO2      Teaching Hours : 4 hrs
3	<b>TITLE: Air Pollution</b> 3.1 Introduction, classification of air pollutants, 3.2 Toxic effects of air pollutants, sources and their control measure 3.3 ESP, catalytic converter, and bag house filter, 3.4 Greenhouse effect, Global warming,



	3.5 Ozone depletion. Course Outcome: CO3      Teaching Hours : 4 hrs
4	<b>TITLE: A brief introduction to Noise Pollution, Soil Pollution, and radiation pollution</b> 4.1 Noise Pollution (Introduction & sources) 4.2 Effects and control measures of noise pollution 4.3 Soil Pollution (Introduction & sources) 4.4 Effects and control measures of soil pollution 4.5 Radiation pollution Course Outcome: CO4      Teaching Hours : 4 hrs
5	<b>TITLE: Renewable sources of Energy &amp; Solid Waste Management</b> 5.1 Solar Energy: Basics of Solar energy. Flat plate collector 5.2 Current status and prospects of wind energy. Wind energy in India. Environmental benefits and problem of wind energy. 5.3 Solid waste generation- Sources and characteristics of : Municipal solid waste, 5.4 E-waste and biomedical waste 5.5 Collection and disposal: MSW (3R, principles, energy recovery, sanitary landfill), Hazardous waste Course Outcome: CO5      Teaching Hours : 4 hrs

### REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication
1.	Environmental chemistry	A. K. Dey
2.	A basic course in Environmental studies	Deswal & Deswal
3.	Environmental pollution and control	- C. S. Rao
4.	Essentials of ecology & environmental Sciences	S.V.S. Rana

### E-REFERENCES:

1. Website : <http://cgwb.gov.in/Documents/WQ-standards.pdf>





## APPLIED CHEMISTRY LAB

PROGRAMME: DIPLOMA IN ENGINEERING							
COURSE CODE: DBS 202				COURSE TITLE: APPLIED CHEMISTRY LAB			
COMPULSORY / OPTIONAL: COMPULSORY							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
		2	2	1	60	40	100

### COURSE OUTCOMES

CO1	To acquire skills in quantitative pathological parameters ,handling of apparatus frequently used in Acidimetry-alkalimetry & Redox Titrations ,
CO2	To understand the quality and importance of water for health & hygiene of humans and animals (Biotic sector)
CO3	To learn about Characteristic of oil (viscosity.) and determination of pH of Buffer solution
CO4	To understand about the weight related reactions (Gravimetry) and calculations, used in pathological laboratories.
CO5	To acquire the skills for purification of compounds by crystallization method and qualitative analysis (anions &cations) of salt

### COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1	<p>TITLE Quantitative Analysis</p> <p>1.1 To find the volume of one drop of water.</p> <p>1.2 Preparation of standard solution of Oxalic acid.</p> <p>1.3 Preparation of standard solution of Sodium Carbonate.</p> <p>1.4 Standardisation of Sodium Hydroxide with the help of Oxalic acid</p> <p>1.5 Determination of strength of a given solution of Hydrochloric acid by titrating it against standard Sodium Carbonate solution.</p> <p style="text-align: center;">Teaching Hours : 8 hrs</p>
2	<p>TITLE Water Analysis.</p> <p>2.1 To determine the Carbonate Hardness of a given sample of water.</p> <p>2.2 To determine the Non Carbonate Hardness of a given sample of water</p> <p>2.3 To determine the Total Hardness of a given sample of water by EDTA method.</p> <p>2.4 To determine the PH of given solution by the colourimetry method.</p> <p>2.5 To determine the Carbonate Hardness of a given sample of water.</p> <p>2.6 To determine the hydroxyl , carbonate, and bicarbonate alkalinity separately of the given sample of water.</p> <p style="text-align: center;">Teaching Hours : 8 hrs</p>
3	<p>TITAL Titration related to Redox Reaction, characteristic of oil (viscosity) and Analysis of Coal.</p> <p>3.1 Estimation of Mohr's salt using standard <math>KMnO_4</math>.</p>



	<p>3.2 To determine the strength of a given Potassium dichromate solution with N/20 sodium thiosulphate (Hypo) solution.</p> <p>3.3 To determine the viscosity of heavy oil with the help of Redwood Viscometer.</p> <p>3.4 To determine moisture, V.C.M, Ash, and Fixed Carbon content in given sample of coal.</p> <p style="text-align: center;">Teaching Hours : 6 hrs</p>
4	<p>TITLE Gravimetric Practical</p> <p>4.1.To determine the strength of silver ions in a given solution of AgNO<sub>3</sub> using chloride ion.</p> <p>4.2. Estimation of Barium as Barium Sulphate.</p> <p style="text-align: center;">Teaching Hours : 4 hrs</p>
5	<p>TITLE Qualitative Analysis.</p> <p>5.1 Crystallisation of impure sample of any one of the following: Alum, Copper Sulphate, Benzoic acid.</p> <p>5.2 Determination of one anion and one cation in a given salt. Cation- Pb<sup>2+</sup>, Cu<sup>2+</sup>, Al<sup>3+</sup>, Fe<sup>3+</sup>, Mn<sup>2+</sup>, Ni<sup>2+</sup>, Zn<sup>2+</sup>, Co<sup>2+</sup>, Ca<sup>2+</sup>, Sr<sup>2+</sup>, Ba<sup>2+</sup>, Mg<sup>2+</sup>, NH<sub>4</sub><sup>+</sup> Anion- (CO<sub>3</sub>)<sup>2-</sup>, S<sup>2-</sup>, NO<sub>2</sub><sup>-</sup>, SO<sub>3</sub><sup>2-</sup>, SO<sub>4</sub><sup>2-</sup>, NO<sub>3</sub><sup>-</sup>, Cl<sup>-</sup>, Br<sup>-</sup>, I<sup>-</sup>, PO<sub>4</sub><sup>3-</sup>, C<sub>2</sub>O<sub>4</sub><sup>2-</sup>, CH<sub>3</sub>COO<sup>-</sup>.</p> <p style="text-align: center;">Teaching Hours : 4 hrs</p>

6

### REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication
1.	Laboratory Manual on Engineering Chemistry	S.K Bhasin, Sudha Rani(Author) Dhanpat Rai Publishing Company.(New Edition)
2.	The Language of Chemistry or Chemical Equation	G.D Tuli & P.L.Soni



## FUNDAMENTALS OF ELECTRICAL & ELECTRONICS ENGINEERING LAB

PROGRAMME: DIPLOMA IN ENGINEERING							
COURSE CODE: DES 202		COURSE TITLE: Fundamentals of Electrical & Electronics Engineering Lab					
COMPULSORY / OPTIONAL: COMPULSORY							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	END	TOTAL
		2	2	1	60	40	100

**RATIONALE:** Electrical and electronic engineering work forms the forefront of practical technology, improving the devices and systems we use every day. Hence this lab. course serves as a foundation course to the budding diploma engineers.

### COURSE OUTCOMES

CO1	Develop the essential skills for understanding and interpreting DC circuits
CO2	Learn and analyse AC circuits.
CO3	Learn and appreciate the operation and applications of electrical safety systems.
CO4	Acquire necessary ability to distinguish between various semiconductor materials and devices.
CO5	Learn and apply logic gates to realize simple digital operations.

### COURSE CONTENT DETAILS:

EXPERIMENT	TOPICS
1	To verify KCL & KVL for a given electrical circuit  Course Outcome: CO1,CO3      Teaching Hours : 2 hrs    Marks: 10(PE+ FINAL)
2	To verify Thevenin's & Norton's Theorem for a given electrical circuit  Course Outcome: CO1,CO3      Teaching Hours : 2 hrs    Marks: 10(PE+ FINAL)
3	(a) To obtain the current and voltage distribution in AC R-L-C Series circuit. (b) To draw the phasor diagram.  Course Outcome: CO2,CO3      Teaching Hours : 2 hrs    Marks: 06 (PE+ FINAL)
4	(a) To find the condition of resonance in an AC RLC parallel circuit (b) Draw the different phasor diagrams.  Course Outcome: CO2,CO3      Teaching Hours : 2 hrs    Marks: 06(PE+ FINAL)
5	(a) To obtain the relation between line and phase quantity in 3-phase star connection. (b) To obtain the phasor diagram.



	Course Outcome: CO2,CO3      Teaching Hours : 2 hrs    Marks: 08(PE+ FINAL)
6	(a) To obtain the relation between line and phase quantity in 3-phase delta connection. (b) To obtain the phasor diagram.  Course Outcome: CO1,CO3      Teaching Hours : 2 hrs    Marks: 10(PE+ FINAL)
7	Forward & Reverse characteristics of diode  Course Outcome: CO4      Teaching Hours : 2 hrs      Marks: 10(PE+ FINAL)
8	Forward & Reverse characteristics of Zener diode.  Course Outcome: CO4      Teaching Hours : 2 hrs      Marks: 10(PE+ FINAL)
9	Zener Diode as a Voltage Regulator.  Course Outcome: CO4      Teaching Hours : 2 hrs      Marks: 06(PE+ FINAL)
10	Identification of Transistors.  Course Outcome: CO4      Teaching Hours : 2 hrs      Marks: 06(PE+ FINAL)
11	Study of transistors using data sheets.  Course Outcome: CO1,CO3      Teaching Hours : 2 hrs    Marks: 08(PE+ FINAL)
12	Verification of Logic gates.  Course Outcome: CO1,CO3      Teaching Hours : 2 hrs    Marks: 10(PE+ FINAL)

## REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1	Basics of Electrical, Electronics and Communication Engineering	K.A.NAVAS & T.A.Suhail , Rajath Publishers, Kochi.	
2	Fundamental Electrical and Electronic Principles (Third Edition)	Christopher R Robertson, Newnes, Elsevier	
3	Basic Electronics & Linear Circuits	N.N.Bhargava, D.C. Kulashreshtha, S.C. Gupta- TTTI Chandigarh, TMH.	
4	Electronic Devices & Components	Allen Mottershead, PHI	

## E-REFERENCES:

1. [www.circuitglobe.com](http://www.circuitglobe.com)
2. [www.courses.lumenlearning.com](http://www.courses.lumenlearning.com)
3. [www.allaboutcircuits.com](http://www.allaboutcircuits.com)



## ENGINEERING MECHANICS LAB

PROGRAMME: DIPLOMA IN ENGINEERING							
COURSE CODE: <b>DES 204</b>			COURSE TITLE: <b>Engineering Mechanics Lab</b>				
COMPULSORY / OPTIONAL: COMPULSORY							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
0	0	2	2	1	60	40	100

### COURSE OBJECTIVES

Experimental verification of principles of Engineering Mechanics and analytical solutions.

### COURSE OUTCOMES

**CO1:** Simplify mechanics problems using free body diagrams and explain the concept of equilibrium to the force for rigid bodies 2 dimensional systems.

**CO2:** Apply the concept of bending moment and shear force diagrams for design of beam and to analyze simple statically determinate structures such as beams, uniform distributed load and frames subject to various loading and support.

**CO3:** Determine the centroid and moment of inertia for design of components.

**CO4:** Apply the knowledge of kinetics and kinematics in solving the real time problems.

**CO5:** Estimate and design structural members subjected to tension, compression, torsion, bending and combined stresses using the fundamental concepts of stress, strain and elastic behavior of materials.

### The term work shall consist of

1. Graphical solutions for the following problems
  - a. Resultant of Coplanar Non-Concurrent force system:
    - i. At least one problem with resultant as a force
    - ii. At least one problem with resultant as a couple
  - b. Equilibrium of Coplanar Non-Concurrent force system: At least one Problem
  - c. Friction: At least one Problem
2. Following experiments shall be conducted.
  - a. Polygon law of forces
  - b. Law of moments
  - c. Jib crane
  - d. Beam Reaction



e. Friction

f. Screw Jack

g. Fly wheel

3. Tutorial Problem

a. At least three problem each on unit of the theory course.

b. The tutorial problem needs to be solved by the student during the practical hours only.



## Introduction to IT Systems Lab

PROGRAMME: DIPLOMA IN ENGINEERING							
COURSE CODE: <b>DES 206</b>				COURSE TITLE: <b>Introduction to IT Systems Lab</b>			
COMPULSORY / OPTIONAL: COMPULSORY							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
0	0	2	2	1	60	40	100

### COURSE OUTCOMES

CO1	Student should be acquainted with the Windows GUI, and some simple Windows-based applications.
CO2	Students should be able to work with Microsoft Word and be able to create and edit any document as per requirement.
CO3	Students should be able to work with Microsoft Excel and use its mathematical functions to create a spreadsheet.
CO4	Students should be able to create presentations using Microsoft PowerPoint.
CO5	Students should be familiar with some common DOS commands and their syntax.

### COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1	<p><b>TITLE</b> Demo of Computer Start-up and Shutdown operations. Demo of Graphical and Command-based user interfaces. Acquaintance with Windows Desktop items.</p> <p>Windows folder hierarchy- Desktop, My Computer, My Documents, Recycle Bin, My Network Places, Windows Accessories- Notepad, Word pad, Paint, Calculator. Content creation and editing. Creating files in any of these applications and Saving it in the desired folder.</p> <p>Windows Explorer- Various file and folder operations- Copying, Moving, Renaming, Delating. Restoring files and folders from Recycle Bin.</p> <p>Course Outcome: CO1      Teaching Hours : 4 hrs      Marks: 20 (PE+FINAL)</p>
2	<p><b>TITLE</b> Microsoft Word- Typing and Editing, Formatting text, Format Painter, Inserting Shapes, Graphics, Text, Equations to Word Document.</p> <p>Document Layout- Page Setup (Margins, Orientation, Page Size), Paragraph Formatting options (Text Alignment, Line Spacing, spacing between paragraphs, Tabs and Indents, Columns), Page breaks, Printing Documents, Converting to PDF.</p> <p>Creating table, Row, Column and Cell operations, Mail Merge.</p> <p>Course Outcome: CO2      Teaching Hours : 4 hrs      Marks: 20 (PE+FINAL)</p>
3	<p><b>TITLE</b> Microsoft Excel- Table and Cell Formatting, Format Painter, Document Layout, Page Breaks, Printing Documents and Converting to PDF.</p>



	<p>Referencing Cells- Relative, Absolute, Local, 3-D, Remote, Working with Arithmetic Operators and Formula (Mathematical, Text and Date functions). Logical Function AND(), OR(), NOT(), IF () and nested IF()</p> <p>Sorting and Filtering. Creating Charts- Column or Bar Chart, Pie Chart, Line Chart.</p> <p>Course Outcome: CO3      Teaching Hours : 8 hrs      Marks: 20 (PE+FINAL)</p>
4	<p>TITLE</p> <p>Microsoft PowerPoint- Creating a slide with text, graphics, animation, and other objects. Adding slides to a presentation, Using Animation Effects, Using Slide Transition.</p> <p>Course Outcome: CO4      Teaching Hours : 4 hrs      Marks: 20 (PE+FINAL)</p>
5	<p>TITLE</p> <p>MS DOS Commands- General Commands- CLS, DATE, TIME, PATH, Directory Management commands- DIR, CD, MD, RD, File Management Commands- COPY CON, TYPE, COPY, MOVE, REN, DEL, EDIT</p> <p>Course Outcome: CO5      Teaching Hours : 4 hrs      Marks: 20 (PE+FINAL)</p>

### REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	“Fundamental of Computers”	V. Rajaraman, PHI	
2.	“Fundamental of Computers”	E. Balagurusamy, Mc Graw Hill	9780070141605

### E-REFERENCES:

1. Jaiswal. S., “Information Technology Today”, Galgotia Publication.





## SPORTS AND YOGA

PROGRAMME: DIPLOMA IN ENGINEERING							
COURSE CODE: DHS202				COURSE TITLE: SPORT & YOGA			
COMPULSORY / OPTIONAL: COMPULSORY							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
		2	2	1	60	40	100

### Course Objectives:

1. To make the students understand the importance of sound health and fitness principles as they relate to better health.
2. To expose the students to a variety of physical and yogic activities aimed at stimulating their continued inquiry about Yoga, physical education, health and fitness.
3. To create a safe, progressive, methodical and efficient activity- based plan to enhance improvement and minimize risk of injury.
4. To develop among students an appreciation of physical activity as a lifetime pursuit and a means to better health

### Course Outcomes:

On successful completion of the course the students will be able to:

1. Practice Physical activities and Hatha Yoga focusing on yoga for strength, flexibility, and relaxation.
2. Learn techniques for increasing concentration and decreasing anxiety which leads to stronger academic performance.
3. Learn breathing exercises and healthy fitness activities
4. Understand basic skills associated with yoga and physical activities including strength and flexibility, balance and coordination.
5. Perform yoga movements in various combination and forms.
6. Assess current personal fitness levels.
7. Identify opportunities for participation in yoga and sports activities.
8. Develop understanding of health-related fitness components: cardiorespiratory endurance, flexibility and body composition etc.
9. Improve personal fitness through participation in sports and yogic activities.
10. Develop understanding of psychological problems associated with the age and lifestyle

### Course Content:

#### I. Yoga

- i. Meaning & Importance of Yoga
- ii. Elements of Yoga
- iii. Introduction - Asanas, Pranayama
- iv. Meditation & Yogic Kriyas,
- v. Yoga for concentration & related Asanas (Sukhasana; Tadasana; Padmasana & Shashankasana),
- vi. Relaxation Techniques for improving concentration - Yog-nidra



## **II. Yoga & Lifestyle Asanas as preventive measures.**

- i. Hypertension: Tadasana, Vajrasana, Pavanuktasana, Ardha Chakrasana, Bhujangasana, Sharasana.
- ii. Obesity: Procedure, Benefits & contraindications for Vajrasana, Hastasana, Trikonasana, Ardh Matsyendrasana.
- iii. Back Pain: Tadasana, Ardh Matsyendrasana, Vakrasana, Shalabhasana, Bhujangasana.
- iv. Diabetes: Procedure, Benefits & contraindications for Bhujangasana, Paschimottasana, Pavanuktasana, Ardh Matsyendrasana.
- v. Asthma: Procedure, Benefits & contraindications for Sukhasana, Chakrasana, Gomukhasana, Parvatasana, Bhujangasana, Paschimottasana, Matsyasana.

## **III. Training and Planning in Sports**

- i. Meaning of Training,
- ii. Warming up and limbering down,
- iii. Skill, Technique & Style,
- iv. Meaning and Objectives of Planning.
- v. Tournament – Knock-Out, League/Round Robin & Combination.

## **IV. Psychology & Sports**

- i. Definition & Importance of Psychology in Physical Edu. & Sports
- ii. Define & Differentiate Between Growth & Development
- iii. Adolescent Problems & Their Management
- iv. Emotion: Concept, Type & Controlling of emotions
- v. Meaning, Concept & Types of Aggressions in Sports.
- vi. Psychological benefits of exercise.
- vii. Anxiety & Fear and its effects on Sports Performance.
- viii. Motivation, its type & techniques.
- ix. Understanding Stress & Coping Strategies.

## **V. Doping**

- i. Meaning and Concept of Doping,
- ii. Prohibited Substances & Methods,
- iii. Side Effects of Prohibited Substances

## **VI. Sports Medicine**

- i. First Aid – Definition, Aims & Objectives.
- ii. Sports injuries: Classification, Causes & Prevention.
- iii. Management of Injuries: Soft Tissue Injuries and Bone & Joint Injuries

## **VII. Sports / Games**

Following sub topics related to any one Game/Sport of choice of student out of: Athletics, Badminton, Basketball, Chess, Cricket, Kabaddi, Lawn Tennis, Swimming, Table Tennis, Volleyball, Yoga etc.

- i. History of the Game/Sport.
- ii. Latest General Rules of the Game/Sport.
- iii. Specifications of Play Fields and Related Sports Equipment.
- iv. Important Tournaments and Venues.
- v. Sports Personalities.
- vi. Proper Sports Gear and its Importance.



## **VIII. Sports Activity**

### **References:**

1. Modern Trends and Physical Education by Prof. Ajmer Singh.
2. Light On Yoga By B.K.S. Iyengar.
3. Health and Physical Education – NCERT (11th and 12th Classes)

