BIRLA INSTITUTE OF TECHNOLOGY MESRA – 835215 (RANCHI)
UNIVERSITY POLYTECHNIC

CBCS Course Structure (Diploma in Engineering-Common to all branches)

1ST 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	DHS 103	Communication Skills	HS	3	0	0	3	3
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
		Periods per week		13	4	10	**27**	
		Total credits						**22**
		Total periods per week						**27**

Signatures:

BIRLA INSTITUTE OF TECHNOLOGY MESRA – 835215 (RANCHI)
UNIVERSITY POLYTECHNIC

CBCS Course Structure (Diploma in Engineering-Common to all branches)

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:

MODULE	TOPICS/SUBTOPICS
1	**TITLE: Basic concepts of Chemistry:** **1.1 Mole concept**, Equivalent weight, Concentration terms Molarity, Normality and molality with numerical. **1.2 Atomic structure:** 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). **1.3 Periodic table** Modern periodic table, Law and structure of periodic table, Periodic properties (Atomic radius, Ionization energy, Electron affinity and Electronegativity) and its periodic trends, **1.4 Chemical bonding** : Electrovalent bond, Covalent bond with suitable examples, Lewis dot structure. Course Outcome: CO1 Teaching Hours: 10 hrs
2	**TITLE: Water Technology** 2.1 Hardness of water. Temporary & Permanent Hardness. 2.2 Water Treatment- Lime Soda, Zeolite and Ion exchange method.. 2.3 Action of Soap and detergent, Boiler feed water, 2.4 Scale & Sludge formation, Priming and foaming as troubles and remedial measures. Course Outcome: CO2 Teaching Hours: 10 hrs
3	**TITLE: Metallurgy and Polymer** 3.1 General Process of Extraction. 3.2 Definition of metallurgy related term like Ore, Mineral, Gangue (matrix), Flux, Slag. 3.3 Extraction of - Iron from haematite ore using blast furnace. (Reactions and Fig) 3.4 Extraction of Aluminium from bauxite along with reactions. (Reactions and Flowsheet) 3.5 Alloys – Definition, purposes of alloying, ferrous alloys and non-ferrous with suitable examples, properties and applications. General chemical composition, composition-based applications 3.6 Polymers , Types of polymerization, monomer. 3.7 Thermoplastics and thermosetting plastics 3.8 Application of Polymers and the uses, (Polythene,Polypropene,PVC, PS, PTFE,Buna -S, Buna-N ,nylon – 6, nylon-6,6 and Bakelite), 3.9 Rubber and vulcanization of rubber Course Outcome: CO3 Teaching Hours: 10 hrs
4	**TITLE: Fuel & Combustion** 4.1 Definition, classification of fuels . 4.2 Calorific values (HCV and LCV), calculation of HCV and LCV using Dulong's formula 4.3 Fuel Petrol and diesel, Knocking- fuel rating (octane and cetane numbers), 4.4 Proximate and Ultimate Analysis of coal. 4.5 LPG, CNG, water gas, coal gas, producer gas and biogas 4.6 Lubricant, Definition, classification with examples, and characteristic properties of good lubricant, classification with examples 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. 4.8 Flash and fire point, cloud and pour point. Course Outcome: CO4 Teaching Hours: 10 hrs
5	**TITLE: Electrochemistry and Corrossion** **5.1** Electronic concept of Oxidation,reduction and redox reactions.

	Definition of terms Electrolyte,Non-Electrolyte with sutaible examples,Faraday laws of electrolysis and simple numerical problems. 5.2 Electrometallurgy, Electroplating,and Electrolytic refining. 5.3 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 **5.4** Definition, Types of Corrossion, Hydrogen libration and Oxygen absorption mechanism of Electrochemical Corrossion,Factors affecting rate of Corrossion. 5.5 Internal Corrossion preventive measures. 5.6 Purification,Alloying and heat treatment and external corrosion preventive measure,(metal,anodic,cathodic),Coating,Organic Inhibitors. Course Outcome: CO5 Teaching Hours: 10 hrs

REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Engineering Chemistry	Shashi Chawla, Dhanpat Rai & Co.3rd edition, 2017	ASIN: B01MUBN7F2
2.	Engineering Chemistry	Jain & Jain, Dhanpat Rai, 17th 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:

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

BIRLA INSTITUTE OF TECHNOLOGY MESRA – 835215 (RANCHI)
UNIVERSITY POLYTECHNIC

CBCS Course Structure (Diploma in Engineering-Common to all branches)

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	**Measurement of Physical Quantities & Dimensions:** In this Module helps us study the Classification of Physical quantities, Scalar & Vector quantities, System of units, To study about Dimensions of the physical quantities, Order of magnitude, Significant figures, Error, Differential & Integral calculus (Introduction only).
CO2	**Force and Motion** 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.
CO3	**Gravity and Planetary Motion:** 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 ***Work, Energy and Power***
CO4	**Mechanical Properties of Matter:** To be able analyse and explain ***Elasticity*****:** Stress, Strain, Hooke's law, Modulus of elasticity. ***Surface Tension,*** Surface Tension, Surface energy, Determination of surface tension by capillary rise method. ***Fluids -***To study Density and Pressure, Fluid at rest (Pascal Principle, Archimedes's Principle), Bernoulli's Theorem. ***Viscosity-*** Newton's law of viscosity, Stoke's law, Poiseiulle's formula.
CO5	**Heat and Thermodynamics:** To make the students understanding the fundamental aspects of three modes of transmission of heat , good and bad conductor, expansion of solid. To study Boyle's Law, Charles's law and Gay-Lussac's law, Avogadro's Number, Ideal Gas equation, Zeroth law, First law of Thermodynamics,

BIRLA INSTITUTE OF TECHNOLOGY MESRA – 835215 (RANCHI)
UNIVERSITY POLYTECHNIC

CBCS Course Structure (Diploma in Engineering-Common to all branches)

COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1	***Measurement of Physical Quantities & Dimensions:*** Classification of Physical quantities (Fundamental & Derived with their Units), Scalar & Vector quantities, System of units (M.K.S., C.G.S., F.P.S. & 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 & Integral calculus (Introduction only). Course Outcome: CO1 Teaching Hours : 8 hrs Marks: 20 (PE+FINAL)
2	***Force and Motion:*** Definitions of Distance, Displacement, Velocity, Speed and Acceleration, Momentum, Force, Torque, Moment of Inertia, Motion in straight line, Circular motion, Equations of Motion- $\boldsymbol{v = u + at}$, $\boldsymbol{S = ut + \frac{1}{2}at^2}$, $\boldsymbol{v^2 = u^2 + 2as}$, Distance travelled by particle in n^{th} second, Equations of motion for motion under gravity. Statements of Newton's laws of motion, Motion of lift, **Projectile motion**-Time of flight, Vertical height and Horizontal range, Simple problems. Course Outcome: CO2 Teaching Hours : 8 hrs Marks: 20 (PE+FINAL)
3	***Gravity and Planetary Motion:*** 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. ***Work, Energy and Power:*** 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)
4	***Mechanical Properties of Matter:*** ***Elasticity*:** Stress, Strain, Hooke's law, Modulus of elasticity (Young's Modulus, Bulk's Modulus and Modulus of rigidity). ***Surface Tension:*** 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. ***Fluids (At rest and motion):*** Density and Pressure, Fluid at rest (Pascal Principle, Archimedes's Principle), Bernoulli's Theorem (Without Proof) ***Viscosity*:** Newton's law of viscosity, Coefficient of viscosity, Streamline and turbulent flow, Critical velocity and Reynold's number, Stoke's law, Poiseiulle's formula for steady flow (Without proof), Simple Problem. Course Outcome: CO4 Teaching Hours : 8 hrs Marks: 20 (PE+FINAL)
5	***Heat and Thermodynamics:*** 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)

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.

BIRLA INSTITUTE OF TECHNOLOGY MESRA – 835215 (RANCHI)
UNIVERSITY POLYTECHNIC

CBCS Course Structure (Diploma in Engineering-Common to all branches)

MATHEMATICS-I

PROGRAMME: DIPLOMA IN ENGINEERING							
COURSE CODE: DBS 105			COURSE TITLE: **MATHEMATICS-I**				
COMPULSORY / OPTIONAL: **COMPULSORY**							
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:

MODULES WITH TOPICS

1. MODULE-I Basic Algebra

1.1. Definition and algebra of complex numbers, conjugate, modulus, and their properties.
1.2. Nature of roots of quadratic equations. Solution of quadratic equations with complex roots.
1.3. Definition of factorial notation, the formula of permutation and combinations. Binomial theorem for positive index. General terms and related problems.
1.4. Definition of A.P., G.P. Finding nth term and sum to n terms of A.P. and G.P.

Course Outcome: CO1 Teaching Hours: 12 hrs

2. MODULE-II Coordinate Geometry:

2.1. Cartesian Coordinates, Distance formulae, section formulae, midpoint, centroid of triangle, area of a triangle.
2.2. General equation of a straight line and its standard forms. Length of perpendicular.
2.3. Equation of circle, circle through three points, the circle with a given diameter.
2.4. Standard equations and properties of ellipse, parabola, and hyperbola.

Course Outcome: CO2 Teaching Hours: 10 hrs

3. MODULE-III Trigonometry

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	**ISBN-13 :** 978-9350271476
6.	Senior Secondary School Mathematics for Class 12	R. S. Agarwal, Bharati Bhavan Publishers & Distributors. 2020	**ISBN-13 :** 978-9350271247
7.	ISC Mathematics Book 1 XI	O.P. Malhotra & S. K. Gupta & Anubhuti Gangal, 2020	**ASIN :** 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

BIRLA INSTITUTE OF TECHNOLOGY MESRA – 835215 (RANCHI)
UNIVERSITY POLYTECHNIC

CBCS Course Structure (Diploma in Engineering-Common to all branches)

Introduction to IT Systems

PROGRAMME: DIPLOMA IN ENGINEERING							
COURSE CODE: **DES 101**			COURSE TITLE: **Introduction to IT Systems**				
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	TITLE **Introduction to Computer Hardware and Software** 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	TITLE **Computer Codes and Data Representation** 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	TITLE **Computer Network and Internet** 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	TITLE **Information and Network Security** 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	TITLE **Emerging Areas** 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:

3. Jaiswal. S., "Information Technology Today", Galgotia Publication.

BIRLA INSTITUTE OF TECHNOLOGY MESRA – 835215 (RANCHI)
UNIVERSITY POLYTECHNIC

CBCS Course Structure (Diploma in Engineering-Common to all branches)

APPLIED PHYSICS LAB

PROGRAMME: DIPLOMA IN ENGINEERING							
COURSE CODE: **DBS 104**			COURSE TITLE: **APPLIED PHYSICS 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

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	PublisherNageen Prakashan Pvt.Ltd	ISBN-139789382319702
5.	COMPREHENSIVE PRACTICAL PHYSICS XI & XII	J. N. Jaiswal (Author), Dr. Rajendra Singh (Author) Laxmi Publications Pvt Ltd	ISBN:9788131801413, 8131801411 ISBN:9788131803844, 8131803848

BIRLA INSTITUTE OF TECHNOLOGY MESRA – 835215 (RANCHI)
UNIVERSITY POLYTECHNIC

CBCS Course Structure (Diploma in Engineering-Common to all branches)

COMMUNICATION SKILLS

PROGRAMME: DIPLOMA IN ENGINEERING							
COURSE CODE: DHS 103			COURSE TITLE: COMMUNICATION SKILLS				
COMPULSORY / OPTIONAL: **COMPULSORY**							
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	**Communication: An Introduction** 1.1 Definition, Nature, and Scope of Communication 1.2 Importance and Purpose of Communication, 7 C's of Communication. 1.3 Process of Communication 1.4 Types & flow of Communication Course Outcome: CO1 Teaching Hours : 8 hrs Marks: 31 (PE+FINAL)
2	**Understanding and Applying Vocabulary** 2.1 Words Often Confused-Pairs of words. 2.2 One Word Substitutes 2.3 Synonyms and Antonyms 2.4 Word Formation: Prefixes, Bases, and Suffixes. Course Outcome: CO2 Teaching Hours : 8 hrs Marks: 21 (PE+FINAL)
3	**Effective Writing Skills** 2 Summarizing 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 • Preparing a PowerPoint Presentation • Presenting a Paper • Group Discussions • Extempore/Debates 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 2nd 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.	**978-8183896160**

BIRLA INSTITUTE OF TECHNOLOGY MESRA – 835215 (RANCHI)
UNIVERSITY POLYTECHNIC

CBCS Course Structure (Diploma in Engineering-Common to all branches)

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, Dhayanchand 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)

BIRLA INSTITUTE OF TECHNOLOGY MESRA – 835215 (RANCHI)
UNIVERSITY POLYTECHNIC

CBCS Course Structure (Diploma in Engineering-Common to all branches)

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	**TITLE: Basic Elementary graphics** 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 **Course Outcome: CO1 Teaching & practical Hours : 8 hrs Marks: 20 (PE+FINAL)**
2	**TITLE: Engineering curves and Loci of Points** 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. **Course Outcome: CO1 Teaching & practical Hours: 8 hrs Marks: 20 (PE+FINAL)**
3	**TITLE: Introduction of projection** 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 **Course Outcome: CO3 Teaching & practical Hours : 8 hrs Marks: 20 (PE+FINAL)**

4	**TITLE Orthographic and Isometric Projection** 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 **Course Outcome: CO4 Teaching & practical Hours : 8 hrs Marks: 20 (PE+FINAL)**
5	**TITLE: Section of solids** 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 refrence planes 5.4 section of prism and cylinder resting on their base **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	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=dmt6 n7Sgcg
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

BIRLA INSTITUTE OF TECHNOLOGY MESRA – 835215 (RANCHI)
UNIVERSITY POLYTECHNIC

CBCS Course Structure (Diploma in Engineering-Common to all branches)

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.	**Title : Carpentry:** 1.1 Demonstration of different types of wood. 1.2 Wood working tools/machines. 1.3 Demonstration of different wood working processes like plaining, marking, grooving etc. 1.4 One simple job using different tools of carpentry shop.
2.	**Title:Fitting:** 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.	**Title : Welding:** 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.	**Title: Sheet Metal:** 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