GOVERNMENT OF ASSAM
STATE COUNCIL FOR TECHNICAL EDUCATION
DIRECTORATE OF TECHNICAL EDUCATION, ASSAM

FINAL SYLLABUS OF DIPLOMA IN TEXTILE TECHNOLOGY
(2nd SEMESTER)

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Inclusion of National Education Policy, 2020:

As envisioned in the NEP 2020 the State Council for Technical Education, Assam will be responsible for mentoring its affiliated Polytechnics so that they develop capabilities and achieve minimum benchmarks in academic and curricular matters, teaching and assessment.

State Council for Technical Education (SCTE), Assam will notify the pool of MOOCs courses duly approved by its statutory bodies and map them in Academic Bank of Credits (ABC). Affiliated Polytechnics may opt for any of these courses as required. State Council for Technical Education (SCTE) will take suitable action for preparation of syllabus for thesecourses including learning objective and learning outcome.

The State Council for Technical Education (SCTE) may fix the minimum number of credits to be earned by the students from a parent institution.

All the affiliating institutions will complete Academic Bank of Credits registration through SCTE. Institute will monitor the opening of ABC account by all the students.

Salient features

Salient features that are to be considered for developing the curriculum aligned to NEP 2020 are as follows:

- Reduced number of credits.
- Introduction of Student Induction Program.
- Well defined learning objectives & outcomes for each course.
- Inclusion of courses on socially relevant topics.
- Built-in flexibility to the students in terms of professional elective and open Electivecourses.
- Mandatory internship to equip the students with practical knowledge and provide them exposure to real time industrial environments.
- Virtual Labs.
- Mapping of Courses to its equivalent NPTEL/SWAYAM Course.
- Course on 'Entrepreneurship and Startups' to encourage entrepreneurial mindset.
- Introduction of Design Thinking and Universal Human Value course.

Basic Guidelines:

The existing Credit System is revised as Choice Based Credit System (CBCS) in line with NEP guidelines, to infuse innovation and flexibility. No hard separation between streams, between curricular and extra-curricular, between Vocational and Academic, Multidisciplinary and holistic education across the disciplines, Ethics and Human & Constitutional values, Life skills, use of technology as part of all curriculum.

- An academic year is divided into two semesters as per AICTE guidelines.
- A semester consists of approximately 90 working days. One working week will have approximately 40 hours of instructional time.
- There shall also be a Winter Internship Program for duration of 4 weeks/one month from 1st January to -31st January.
- Summer term courses may be offered on a fast-track mode to enable students to complete arrears/special courses.

- Teachers may avail semester end vacations after the end of each semester. Subject to completion all kinds of examination related work.
- The Polytechnics under the Directorate of Technical Education can decide on the kind of courses to be offered in the summer term, based on the requirements and also based on the availability of teaching faculty.
- Internship/apprenticeship can be carried out during the winter term, mandatorily for regular student.
- Students who wish to exit after 1st year or 2nd year of study, have to undergo mandatory bridge courses as defined in the course structure.

Induction Program:

The Essence and Details of Induction program can be find from the 'Detailed Guide on Student Induction program', as available on AICTE Portal,
(Link: https://www.aicteindia.org/sites/default/files/Detailed%20Guide%20on%20Student%20Induction%20program.pdf),
The Induction program for students to be offered right at thestart of the first year for three-week duration.

- Physical activity
- Creative Arts
- Universal Human Values
- Literary
- Proficiency Modules
- Lectures by Eminent People
- Visits to local Areas

Mandatory Visits/ Workshop/Expert Lectures:

a) It is mandatory to arrange one industrial visit every semester for the students of eachbranch.
b) It is mandatory to conduct a One-week workshop during the winter break after fifthsemester on professional/ industry/ entrepreneurial orientation.
c) It is mandatory to organize at least one expert lecture per semester for each branch byinviting resource persons from domain specific industry

GENERAL COURSE STRUCTURE & CREDIT DISTRIBUTION

A. Definition of Credit:

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
1 Hr. Practical (P) per week	0.5 credit
2 Hours Practical (P) per week	1 credit

B. Range of Credits:

In the light of the fact that a typical Model Four-year Under Graduate degree program in Engineering has about 160 credits, the total number of credits proposed for the three-year Diploma program in Engineering & Technology is 120.

C. Structure of Diploma Engineering program:

The structure of Diploma Engineering program shall have essentially the following categories of courses with the breakup of credits as given:

Sr. No.	Category	Suggested Breakup of Credits
1.	Humanities & Social Sciences courses	8*
2.	Basic Science courses	19*
3.	Engineering Science courses	15*
4.	Program Core courses (Branch specific)	45*
5.	Program Elective courses (Branch specific)	12*
6.	Open Elective courses (from other technical and /or emerging subjects)	9*
7.	Project work, seminar and internship in industry or elsewhere	12*
8.	Audit Courses [Environmental Sciences, Induction training, Indian Constitution, Essence of Indian Traditional Knowledge etc.]	(non-credit)
	Total	**120***

**Minor variation is allowed as per need of the respective disciplines.*

D. Course code and definition:

Course code	Definitions
L	Lecture
T	Tutorial
P	Practical
HS	Humanities & Social Sciences Courses
BS	Basic Science Courses
ES	Engineering Science Courses
PC	Program Core Courses
PE	Program Elective Courses
OE	Open Elective Courses
AU	Audit Courses
SI	Summer Internship
PR	Project
SE	Seminar

E. Course level coding scheme:

Three-digit number (odd numbers are for the odd semester courses and even numbers are for even semester courses) used as suffix with the Course Code for identifying the level of the course e.g.
101, 102 … etc. for first year
201, 202 …. Etc. for second year
301, 302 … for third year

F. Evaluation Scheme for 2nd Semester of Diploma in Textile Technology under State Council for Technical Education (SCTE), Assam

For Theory Courses:
(The weightage of Internal assessment is 40% and for End Semester Exam is 60%) The student has to obtain at least 40% marks individually both in internal assessment and end semester exams to pass.

For Practical Courses:
(The weightage of Internal assessment is 60% and for End Semester Exam is 40%) The student has to obtain at least 40% marks individually both in internal assessment and end semester exams to pass.

For Summer Internship / Projects / Seminar etc.
Evaluation is based on work done, quality of report, performance in viva-voce, presentation etc.

Note: The internal assessment is based on the student's performance in mid semester tests (two best out of three), quizzes, assignments, class performance, attendance, viva-voce in practical, lab record etc.

G. Mapping of Marks to Grades
Each course (Theory/Practical) is to be assigned 100 marks, irrespective of the number of credits, and the mapping of marks to grades may be done as per the following table:

Range of Marks	Assigned Grade	Grade Point	Remarks
91-100	A^+	10	Outstanding
81-90	A	9	Excellent
71-80	B^+	8	Very Good
61-70	B	7	Good
51-60	C^+	6	Average
46-50	C	5	Below Average
40-45	D	4	Pass
< 40	F (Fail due to less marks)	-	Fail
-	F^R (Fail due to shortage of attendance and therefore, to repeat the course)	-	-

H.Credit Distribution, Mark Distribution and Break up of Internal Assessment Marks as per following table:

a) Credit Distribution:

Semester-II

S. No.	Course Code	Course Title	L	T	P	Credit
1	BS-201	Mathematics-II	3	1	0	4
2	BS-202	Applied Physics-II	2	1	0	3
3	BS-203	Applied Chemistry-II	2	0	0	2
4	ES-202	Introduction to IT Systems	2	0	0	2
5	ES-204	Fundamentals of Electrical and Electronics Engineering	2	1	0	3
6	PC-201	Textile Fibre	2	0	0	2
7	BS-207	Applied Physics Lab– II	0	0	2	1
8	ES-208	Introduction to IT Systems lab	0	0	4	2
9	ES-209	Fundamentals of Electrical and Electronics Engineering lab	0	0	2	1
10	AU-201	Environmental Science	2	0	0	0
TOTAL CREDIT=						20
Total Hours per week = 26 [L=15; T=3; P=8]						

***Note: Mandatory Skill course (4 Credits) if any student wants to exit after completion of first Year (Second Semester) courses:**

S. N	Category of Course	Code No.	Course Title	Hours per week			Credits
				L	T	P	
1.	Skill course	SC-101	Dobby Handloom Weaver	1	0	6	4
2.	Skill course	SC-102	Knitting Machine Operator	1	0	6	4
3.	Skill course	SC-103	Hand dyeing Operator	1	0	6	4
4.	Skill course	SC-104	Hand Spinning Operator	1	0	6	4
				Total			4

b) Marks Distribution

Semester – II

S. No.	Course Code	Course Title	Internal Assessment (Theory)		ESE		Internal Assessment (Practical)		Practical Test		Total Marks (Course)	Pass Marks (Course)
			Total Marks	Pass Marks	Total Marks	Pass Marks	Total Marks	Pass Marks	Total Marks	Pass Marks		
1	BS-201	Mathematics-II	40	16	60	24	-	-	-	-	100	40
2	BS-202	Applied Physics-II	40	16	60	24	-	-	-	-	100	40
3	BS-203	Applied Chemistry-II	40	16	60	24	-	-	-	-	100	40
4	ES-202	Introduction to IT Systems	40	16	60	24	-	-	-	-	100	40
5	ES-204	Fundamentals of Electrical and Electronics Engineering	40	16	60	24	-	-	-	-	100	40
6	PC-201	Textile Fibre	40	16	60	24	-	-	-	-	100	40
7	BS-207	Applied Physics Lab– II	-	-	-	-	60	24	40	16	100	40
8	ES-208	Introduction to IT Systems lab	-	-	-	-	90	36	60	24	150	60
9	ES-209	Fundamentals of Electrical and Electronics Engineering lab	-	-	-	-	90	36	60	24	150	60
10	AU-201	Environmental Science	-	-	-	-	60	24	40	16	100	40
Total											1000	

N.B: The marks of Audit Course is not included in total marks.

c) Break Up of Internal Assessment Marks

Internal Assessment for Theory (TA+HA&CT)

Component	Teacher's Assessment (TA)			Home Assignment & Class Test (HA&CT)				Total
	Attendance	Discipline	Class Participation	Home Assignment	Presentation / Seminar	Quiz	Class Test	
Maximum Marks	5	1	2	4	6	2	20	**40**
Note: Three (3) class tests must be conducted for each course. For calculation of Internal Assessment, best two (2) class tests out of the three (3) conducted is to be considered.								

Internal Assessment for Practical (PA)

(i). **For 60 marks**

Component	Maximum Marks
Teacher's Assessment (TA)	
Attendance	10
Discipline	2
Practical Assignment	
Practical Work and/or Laboratory Report	30
Presentation	10
Viva	8
Total	**60**

(ii). **For 90 marks(IT System Lab/FEEE Lab)**

Component	Maximum Marks
Teacher's Assessment (TA)	
Attendance	10
Discipline	5
Practical Assignment	
Practical Work and/or Laboratory Report	45
Presentation	15
Viva	15
Total	**90**

Note: Student must pass in Internal Assessment (Theory & Practical). If a student fails in Internal Assessment, he/she will not be allowed to appear in the End Semester Examination.

d) Grading System proposed is Absolute Grading System.

e) Conversion factor from Cumulative Grade Point Average (CGPA) to Percentage (%) is 10.

Range of Attendance with Marks (for Theory):

Sl No.	Range of Attendance	Marks
1	96% and above	5 Mark
2	91% to 95%	4 Mark
3	86% to 90%	3 Mark
4	81% to 85%	2 Mark
5	76% to 80%	1 Mark
6	75%	Only permitted to appear in the exam
7	Between 60% to 75%	NC: May appear in the exam if there are genuine reasons
8	Below 60%	DC: Cannot appear in the exam

Range of Attendance with Marks (for Practical):

Sl No.	Range of Attendance	Marks
1	96% and above	10 Mark
2	91% to 95%	9 Mark
3	86% to 90%	8 Mark
4	81% to 85%	7 Mark
5	76% to 80%	5 Mark
6	75%	Only permitted to appear in the exam
7	Between 60% to 75%	NC: May appear in the exam if there are genuine reasons
8	Below 60%	DC: Cannot appear in the exam

Valid Ground for Non-collegiate students:

1. Medical grounds.
2. Participation in a state/national level competition, including the journey period as approved by the Head of Institution.
3. Participation in a seminar of national/international level, workshop or conference, including the journey period as approved by the Head of Institution.
4. Participation in voluntary programmes conducted by the Institute/Directorate as per Government notification.
5. Any other grounds which the Examination Committee, in consultation with the Secretary, SCTE may approve.

Current Examination Fee structure:

- Non Collegiate Fees: Rs. 300/- (per subject)
- Examination Fee: Rs. 500/-
- Retest Fee: Rs. 200/- (per subject)

N.B: The rates may be changed subject to Government order.

Conditions for Dis-Collegiate (DC) student:

(i) Any candidate who is an internal student but has attended less than 60% of classes in any one or more subjects on theory and/ or practical shall not be eligible to appear in the respective semester examination and termed as Dis-collegiate student.

(ii) Dis-collegiate students will have to repeat the semester by taking admission in the next session.

Note: The above guidelines may be changed/modified as per AICTE and Government of Assam notification from time to time.

Detailed Second Semester Curriculum Contents (Textile Technology)

1. Course Title: Mathematics-II

1. **SUBJECT/ COURSE CODE: BS-201**
2. **Semester: Second semester**
3. **Objectives:** The main objectives of this course are:
   - i) To learn about the circle and conic section.
   - ii) To learn about the three dimensional Co-ordinate geometry.
   - iii) To learn about measures of central tendency of statistical Data.
   - iv) To learn about relations and functions of variables and their derivatives.
   - v) To learn about integration methods and its applications for measuring areas.

4. **Course Outcome:** On completion of the course, students will be able to

CO -1. Recognise and differentiate between closed and open curves under different conditions
CO -2. Locate and object in space and calculate its distance with reference to other objects.
CO - 3. Understand several numerical methods belonging to measure of central tendency to describe the characteristics of a data set.
CO -4. Obtain Derivative of a function and its application.
CO- 5. Obtain Integration of a function and its application using properties of Definite Integral.

5. **Teaching scheme(in hours):**

Teaching scheme(in hours)		
Lecture	Tutorial	Total per week
3	1	4

6. **Detailed course content:**

Chapter No	Chapter Title	contents	Intended learning outcomes	Hour (Theory) 45
Group - A : **CO-ORDINATE GEOMETRY (TWO and three DIMENSION)** Hours: 8 Marks: 10				
A1	**Co-Ordinate geometry of two dimensions**	1.1 Circle: Standard equation , Equation of a circle under different conditions. Introduction to the concepts of Parabola , Ellipse and hyperbola (related simple problems)	1.Define and explain the concept of a circle. 2.Define conic section.	5

A2	**Co-Ordinate geometry of three dimensions**	2.1 **Three dimensions Co- Ordinate system . Distance formulae, Section formulae, direction cosines, direction ratios.**	Locate a point in space , find its locus, distance from other points , objects(linear as well as angular)	3
GROUP- B Statistics HOURS : 4 MARKS : 5				
B1	Measure of Central Tendency .	Mean, Median and Mode. (simple problems.) Relation between mean median and Mode.	Understand Basic measures of Central Tendency.	4
GROUP- C DIFFERNTIAL CALCULUS HOURS : 19 MARKS : 25				
C1	**Function**	1.1. Definition of Function and type of functions. Odd and even function, Periodic, composite, explicit, implicit and Parametric functions 1.2. Domain , Range, and co- domain of function .	Understand the different type of functions and their Domain and Range.	3
C2	Limit of a function	2.1. Definition , standard limits . 2.2. Evaluation of limits.	Understand Limit of a function under different conditions.	3
C3	Continuity of a function .	3.1. Definition , testing of continuity problems .	Learn behaviour of continuous and discontinuous functions .	2
C4	Differentiation or Derivative of a function.	4.1.Differentiation of some Standard functions using first Principle of derivative. 4.2. Derivative of Function of a function, implicit function and Parametric Functions. Engineering application problems.	1. Understand the meaning of differentiation. Learn to obtain derivatives of different type of functions.	3 3

		4.3. Geometrical interpretation of first order derivative Equation of Tangent, normal. 4.4. Second order derivative. Maxima, Minima, Engineering application of Second order derivative .	Understand the Geometrical significance of derivatives. Learn to find higher order Derivative and their application.	2 3
GROUP- D INTEGRAL CALCULUS HOURS : 14 MARKS : 20				
D1	INTEGRATION	1.1 Integration as inverse process of differentiation. List of formulae .	Understand the meaning of integration .	2
D2	Method of Integration	Integration by method of substitution. Integration by parts. Integration by algebraic fractions.	Learn the different methods of integration.	5
D3	Definite Integral	3.1 Definition, Fundamental theorem on Definite Integral Properties of Definite Integral 3.2. Evaluation of Definite Integrals using fundamental laws and properties.	Learn and apply different properties of Definite Integral to solve problems .	5
D4	Application of Integration	4.1. Area under curve.	Know the application of Definite Integral.	2

7. Distribution of Marks :

Chapter no.	Chapter Title	Type of question			Total
		Objective Type	Short questions	Descriptive questions	
A1	**Co-Ordinate geometry of two dimensions**	1	2	3	
A2	**Co-Ordinate geometry of three dimensions**	1	……	3	
B1	Measure of Central Tendency .	2	……..	3	
C1	Functions	2	2	…….	
C2	Limit of a function	2	……..	3+3	
C3	Continuity of a function .	1	2	……..	
C4	Differentiation or Derivative of a function.	2	2	3+3+3	
D1	Integration	1	…….	……..	
D2	Method of Integration	2	2	3	
D3	Definite Integral	1	2	3	
D4	Application of Integration	……	……	3	
		15	12	33	60

9. Suggested implementation strategies: The syllabus can be completed by taking regular classes along with tutorial classes. Audio-Visual aids also can be used.

10. Suggested learning resources:

Text Books (T1, T2):

1. An Introduction to Polytechnic Mathematics Vol- II by Geetali Das , Ajanta Choudhury, Parbin Ahmed.
2. Engineering mathematics by H.K Das .
3. Applied Mathematics (Vol I & II) by RD Sharma.
4. Calculus for beginners by R.K Chakravorty .

Annexure – 1

TABLE OF SPECIFICATION FOR THEORY:

Sr. no	Topic (a)	Time allotted in hours (b)	Percentage weightage(c)	k	C	A	HA
1	**CO-ORDINATE GEOMETRY (TWO and three DIMENSION)**	8	17.8%	2	2	6	

2	**Statistics**	4	8.9%	2	…	3	
3	**DIFFERNTIAL CALCULUS**	19	42.2%	7	6	15	
4	**INTEGRAL CALCULUS**	14	31.1%	4	4	9	
	Total	45	100	15	12	33	

K = knowledge C = Comprehension A = application

HA = Higher than application (Analysis , Synthesis , Evaluation). C= $\frac{b}{\sum b} \times 100$

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2. Course Title: Applied Physics-II

1.Course Title: Applied Physics - II

2.Course code: BS-202

3. Prerequisites: High School Level Physics

4. Rationale of the subject: Physics is a foundation of all core technology subjects. Study of Physics is essential for Diploma holders in engineering and technology to develop in them proper understanding of physical phenomenon, scientific temper and engineering aptitude. Curriculum of Applied Physics includes fundamental concepts used in industrial applications. So, physics is taught in the 1st and 2nd semester in all disciplines of Diploma Engineering.

5. LEARNERS OBJECTIVES: After completion of the course learners will be able to:

a) learn and understand different physical quantities.
b) learn and understand different laws of light, magnetism,
c) understand about properties of matter, transmission of heat, wave and oscillation.
d) learn about photo electric effect, radioactivity, X-ray and laser.
e) tackle engineering problems in their chosen area of application.

6. Course outcome: After completion of the course, students will be able to:

C.O.1: apply core concept in materials like properties of matter, heat transmission etc. for different engineering tasks.

C.O.2: identify different factors affecting acoustical planning of buildings

C.O.3. Develop a comprehensive understanding of the fundamental laws of light, including reflection, refraction, total internal reflection and their applications in optical fibre.

C.O.4. apply the core concept of magnetism.

C.O.5: use the properties of laser, X-rays, Becquerel rays and photoelectric effect for various Engineering applications.

7. Teaching Scheme (in hours):

Theory			**Practical**	**Total**
Lectures	**Tutorial**	**Class Test**	**30**	93
30	30	**3**		

8. Teaching scheme (in hours)/ week

Lectures	**Tutorial**	**Practical**	**Credit point**
2	1	0	3

9. Examination Scheme:

Theory				Total Marks
Examination		Internal Assessment		100
Full Marks	Pass Marks	Full Marks	Pass Marks	
60	24	40	16	

10. DETAILED COURSE CONTENTS:

Chapter	Title of Chapter	Topics and Sub-topics	Teaching Hours	Marks
1	PROPERTIES OF MATTER	1.1 Elasticity, definition of deforming force, restoring force, Elastic and plastic body stress and strain and their types, modulus of elasticity (Young's modulus, Bulk modulus and Rigidity modulus) and their units; Hooke's law, significance of stress-strain curve. (numerical problems) 1.2 Definition of thrust, pressure and their units, pressure inside a liquid, Pascal's law of transmission of liquid pressure and its application to Hydraulic press and Hydraulic brakes. Buoyancy, Archimedes principle, density and specific gravity (relative density) their relation. Determination of Specific gravity, numerical problems. 1.3 Surface Tension: Definition and its units, Viscosity: Definition, coefficient of viscosity and its unit.	4	9
2	WAVE AND OSCILLATION	2.1: Periodic motion, oscillatory motion, Definition of Simple harmonic Motion, Its geometrical representations, Expression for amplitude, velocity, acceleration, time period, frequency etc. Simple Pendulum, expression for its time (derivation not required), second's pendulum. Free and forced vibrations, Resonance. 2.2: Wave motion, Characteristics, Types of wave motions (longitudinal and transverse waves) with examples, Definitions of parameters related to wave motion (time period, frequency, amplitude, wavelength, wave velocity) and their relations. Stationary wave, properties of stationary wave, Difference between progressive and stationary wave. 2.3. Propagation of sound, Newton's formula velocity of sound in air and Laplace's correction, factors affecting velocity of sound in air. 2.4. Audible range, ultrasonic and infrasonic sound, application of	6	10

		ultrasonic to calculate the depth of an ocean. 2.5. Reflection of sound, echo, minimum distance of the reflector to produce echo, reverberation, reverberation time, Sabine's law, acoustic requirements of a good auditorium. Doppler's effect (details not required)		
3	**LIGHT**	3.1: Recapitulation of laws of light (Reflection and refraction of light), idea of real and virtual image, reflection from plane mirror and spherical mirror, mirror formula, (mirror formula to be assumed), sign convention, ray diagram, nature, position and size of images for different positions of object. Applications of mirrors. Refractive index, apparent depth, critical angle, total internal reflection, relation between critical angle and refractive index, 3.2: Optical Fiber: Introduction, Basic principle of optical fibre, structure and classification, acceptance angle and numerical aperture, applications of optical fibres. 3.3: Refraction through prism, minimum deviation. Relation between R.I. and angle of minimum deviation, numerical. 3.4: Refraction through lens, lens formula (to be assumed), sign convention, magnification, nature, position and size of images for different positions of object, power of a lens, numerical. Optical instruments: Telescope (Terrestrial and Astronomical), magnifying power.	6	10
4	**MAGNETISM**	4.1: Recapitulation of magnetism, properties of magnet, magnetic field, and magnetic lines of force, theory of magnetism, induced magnetism, properties of magnetic lines of force. 4.2: Inverse Square law of magnetism, its explanation with mathematical expression, permeability, types of substances (paramagnetic,		

		diamagnetic and ferromagnetic), magnetic potential & magnetic intensity, calculation of magnetic intensity due to a dipole on end-on & broad-side on position, magnetic moment, couple on a magnet in a uniform magnetic field, Tangent law and its mathematical expression, Deflection Magnetometer. 4.3: Terrestrial magnetism, elements of terrestrial magnetism, explanation of declination, dip/inclination, and horizontal component of earth's magnetic field.	3	**8**
5	**MODERN PHYSICS**	5.1. Photo Electric Emission: Planks quantum theory, photo electric effect, Characteristics of photoelectrons, Einstein Photo Electric equation, Photo electric cells (Photo emissive cell, Photo-Conductive cell and photo voltaic cell) and its applications 5.2. Radioactivity, Becqueral Rays, Binding Energy and Mass Defect, natural and artificial radioactivity, Radioactive Disintegration, Applications of radioactivity (nuclear fission, nuclear fusion, and nuclear fuel) 5.3.X-rays, properties, application in industry and medical field (Production apparatus not necessary). 5.4. LASER, Stimulated or induced absorption, spontaneous and stimulated or induced emission, principle of laser, metastable state, population inversion and pumping, components of laser, Properties of laser, different types of lasers (details not required), applications of laser.	4	9
		6.1: Concept of heat and temperature and their units, heat capacity, specific heat, water equivalent; Principle of calorimetry, measurement of specific heat of a substance. (numerical problems) 6.2: Different scales of temperature measurement, their relationship and numerical examples, thermometers (Mercury thermometer, Platinum resistance thermometer & Pyrometer) basic idea.		

6	HEAT AND THERMODYNAMICS	6.3: Modes of heat transfer (conduction, convection, and radiation with examples), thermal conductivity, its unit. 6.4: Change of state of a body, Fusion/melting, laws of fusion, effect of pressure on melting point, Regelation, Vaporization, boiling point, Laws of ebullition, latent heat, numerical problems. Evaporation, difference between vaporization and evaporation, factors on which rate of evaporation depend. 6.5: Expansion of solids, liquids and gases; coefficient of linear, areal and cubical expansions and relation amongst them (deduction not required), expansion of liquid, co-efficient of real and apparent expansion, Anomalous expansion of water (experiment determination not necessary). Expansion of gases, gas laws, Boyle's law, verification of Boyle's law 6.6: Thermodynamic system, Zeroth law of thermodynamics, Thermal equilibrium, Concept of heat; internal energy, First and Second law of thermodynamics significances and limitations, basic idea of heat engines.	6	12
7	Nano physics	7.1. Introduction to nanomaterial, nature and types of nanomaterials and their applications.	1	2

11. Distribution of Marks:

Chapter No.	Chapter Title	Hours	Type of Question			Total Marks
			Objective type Compulsory	Short Question	Descriptive Question/numerical	
1	Properties of matter	4	3	2	4	9
2	Wave and Oscillations	6	3	1	6	10

3	LIGHT	6	2	2	6	10
4	MAGNETISM	3	2	2	4	8
5	MODERN PHYSICS	4	2	2	5	9
6	Heat and Thermodynamics	6	2	3	7	12
7	Nano physics	1	1	1	-	2
TOTAL:		30	15	13	32	60

12. DETAILED TABLE OF SPECIFICATIONS FOR THEORY

NO. Sr.	Topic	OBJECTIVE TYPE				SHORT ANSWER TYPE					ESSAY TYPE				
		K	C	A	T	K	C	A	HA	T	K	C	A	HA	T
1	Properties of matter	1	1	1	3	1	1	-	-	2	1	1	2	-	4
2	Wave and Oscillations	1	1	1	3	-		1	-	1	2	1	3	-	6
3	LIGHT	1	1	-	2	1	-	1	-	2	1	2	3	-	6
4	MAGNETISM	1	1	-	2	1	-	1	-	2	1	1	2	-	4
5	MODERN PHYSICS	1	-	1	2	1	1	-	-	2	2	1	2	-	5
6	Heat and Thermodynamics	1	-	1	2	1	1	1	-	3	2	2	3	-	7
7	Nano physics	1	-	-	1	-	-	1	-	1	-	-	-	-	-

K=Knowledge, C= Comprehension, A= Application, HA= Higher than application ((analysis, synthesis, Evaluation) and T=Total.

13. TABLE OF SPECIFICATIONS FOR THEORY

Sl. No:	Topics (a)	Time allotted in hours (b)	Percentage Weightage (c) %	K	C	A	HA
1	Properties of matter	4	13.33	4	3	3	
2	Wave and Oscillations	6	20	2	2	5	
3	LIGHT	6	20	3	3	4	
4	MAGNETISM	3	10	3	2	3	
5	MODERN PHYSICS	4	13.33	3	3	3	
6	Heat and Thermodynamics	6	20	4	3	5	

7	Nano physics	1	3.33	1	-	1	
TOTAL		30 □ b	100%	20	16	24	

K=Knowledge, C= Comprehension, A= Application, HA= Higher than application
(analysis, synthesis, Evaluation)

Suggested learning Resource:

A. Book list:

Sl. No.	Title	Author	Publisher
I	Modern Approach to Physics Part I & II	Dilip Sarma, N G Chakraborty, K N Sharma	Kalyani Publishers- New Delhi
2	Applied Physics Part I	Manpreet Singh, Dr. Major Singh, Mrs. Hitashi Gupta	S K Kataria & Sons- New Delhi
3	Applied Physics Part II	Manpreet Singh, Dr. Major Singh, Mrs. Hitashi Gupta	S K Kataria & Sons- New Delhi
4	Basic Applied Physics	R K Gaur	Dhanpat Rai Publication- New Delhi
5	Physics- Std XI, Std XII	-	HSC board/CBSE Board
6	Concept of physics Part I & II	H.C Verma	Bharati Bhawan-New Delhi
7	Introduction to nano technology	C. P. Poole, Jr., and Frank. J. Owens,	Wiley- Interscience.

B. Websites:

I.http://hyperphysics.phy-astr.gsu.edu/
C:\Users\HP\Downloads\II.http://physics.info

C. By using Models, Video etc.

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3. Course Title: Applied Chemistry-II

1. **Course Title:** Applied Chemistry - II
2. **Course code:** BS-203
3. **Prerequisites:** High School Level Chemistry
4. **Rationale of the subject:**
5. **COURSE OUTCOME**: After completion of the course learners will be able to:
   C.O1: Classify organic compounds, explain homologous series, functional groups, and isomerism, and apply IUPAC nomenclature to name organic compounds.
   C.O2: Classify polymers and explain the process of polymerization, differentiate between thermoplastic and thermosetting plastics, and identify the monomers of commercially important plastics and fibers.

   C.O3: Understand the concepts of lubricants and lubrication, classify different types of lubricants, and describe the characteristics of good lubricating oil, including viscosity, pour point, and precipitation number.

   C.O4: Define and classify dyes with examples and identify the raw materials used in their manufacture.
   C.O5: Understand the chemical structures of natural and synthetic fibers, analyze the properties that make fibers suitable for specific applications, and explain the molecular interactions that influence dye binding to different fibers.

6. Teaching Scheme (in hours):

Theory			Practical	Total
Lectures	**Tutorial**	**Class Test**	**0**	48
42		**3**		

7. Teaching scheme (in hours)/ week

Lectures	Tutorial	Practical	Credit point
2	0	0	2

8. Examination Scheme:

Theory				Total Marks
End Semester Examination		**Internal Assessment**		100
Full Marks	**Pass Marks**	**Full Marks**	**Pass Marks**	
60	24	40	16	

9. DETAILED COURSE CONTENTS:

Chapter	Title of Chapter	Topics and Sub-topics	Teaching Hours	Marks
1	**Organic chemistry (Hydrocarbons)**	1.1 Classification of Hydrocarbons, Homologous series, IUPAC nomenclature of hydrocarbons and compounds containing functional groups, Isomerism, aromatic hydrocarbons, structure of benzene, preparation and properties of benzene. 1.2 General methods of preparation and properties: alcohol, phenol, ether, aldehydes, ketones, carboxylic acids. 1.3 Introduction to Bio-organic chemistry: Amino Acids, Proteins, Carbohydrates.	12	17
2	**Polymers and Fiber**	2.1 Definition, Classification of polymers, methods of polymerization 2.2 Properties of fiber forming polymers: Polyethylene, polypropylene, polyvinyl alcohol, Nylon, terylene, acrylic fiber, polyester	12	15
3	**Lubricants and Lubrication**	3.1 Definition, Classification, lubrication oil, greases, solid lubricants and lubricating emulsion with their application	5	8
4	**Dyes**	4.1 Definitions and classification of Dyes-examples 4.2 Raw materials for manufacture of dyes, Non-textile uses of dyes	6	8
5	**Fibers**	4.1 Chemical structure of fibers 4.2 Natural fibers: Cotton, Jute, Mulbery silk, Muga Silk, Eri silk, Wool. 4.3 Synthetic fibers: Polyester, Nylon, Acrylic, Nylon-6, Nylon 6,6 4.4 Bond formation between dyes and fibers	10	10

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4.Course Title: Introduction to IT Systems

Course Code : ES – 202
Credits- 2 (L: 2, T: 0, P: 0)

Course Objectives:

- This course is intended to make new students comfortable with computing environment
- Learning basic computer skills
- Learning basic application software tools
- Understanding Computer Hard-ware and Cyber security awareness

Course outcomes (Theory):

At the end of the course student will be able to

CO 1 Explain the basic components and functions of computer hardware and software.
CO 2 Solve problems related to number systems.
CO 3 Design static web pages using HTML and CSS .
CO-4 Familiarize with Open office writer, calc and Impress.
CO-5 Explain the different threats and security measures related to protection of computer systems.

Detailed Course Content

Unit	Unit Title	Content	Hours
I	**Introduction to computer systems:**	Definition of Computer System, Block Diagram of Computer System. Component of Computer System - Hardware and Software. Hardware components – CPU, Memory (types), Display Units (types), Key-board, Mouse, HDD, SSD and other Peripheral Devices. Software: Types of Software – Application Software, System Software and Utilities Software. Overview of Operating Systems - What is an OS? OS Functions, Brief history on Evolution of OS. Types of OS. OS Processing – (Batch, Multi-programming, Multitasking, Real-time, Timesharing), Operating System Structures.	7
II	**Basics of Number system and codes**	Binary, octal, hexadecimal and decimal Number systems and their inter conversion, Different types of Codes - BCD Code, Gray Code, ASCII Code, EBCDIC Code, Unicode, ISCII.	4
III	**Basic Internet skills**	Understanding browser, types and efficient use of search engines, IP address, http, https, Cookies, how to delete browser data, downloads, emails and Awareness about Digital India portals (state and national portals) and college portals.	3

IV	**HTML 4, CSS basics**	HTML – Introduction HTML – Elements HTML – Tags HTML – Text HTML – Formatting HTML – Pre HTML – Attributes HTML – Font HTML – Text Links HTML – Comments HTML – Lists HTML – Images HTML – Image Links HTML – Tables HTML – Bgcolor HTML – Color Codes HTML – Color Chart HTML – Background Web Forms HTML – Forms HTML – Input HTML – Text Fields Hidden Fields HTML – Password HTML – Reset • HTML – Submit HTML – Checkboxes HTML – Radio HTML – Select HTML – Hidden Fields HTML – Upload HTML – Textarea Special Tags HTML – Body HTML – Meta HTML – Style HTML – Div HTML – Layouts HTML – Frames Formatting Tags HTML – Bold HTML – Paragraphs HTML – Headings HTML – Line Breaks CSS: CSS Introduction CSS Syntax CSS Id & Class CSS Styling Styling Backgrounds Styling Text Styling Fonts Styling Links Styling Lists • Styling Tables CSS Border CSS Margin CSS Display CSS Positioning CSS Align CSS Types - Inline, Internal and External.	7
V	**Office Tools**	OpenOffice Writer, OpenOffice Spreadsheet (Calc), OpenOffice Impress. Open Office Tools: Writer – Page setup, Table, Insertion of Pictures, Page Layout, Bullets, Insertion of objects and symbols, Header, Footer, Page Number, etc., Calc-format cell properties, formula, sort and filters, chart. Impress – Addition and Deletion of Slides, Design, Animation, Slide Show etc.	3
VI	**Information security best practices**	What is Information Security & Why do you need it? – Basics Principles of Confidentiality, Integrity and Availability Concepts, Policies, procedures, Guidelines, Standards Administrative Measures and Technical Measures, People, Process, Technology. Threats to Cybersecurity - Viruses, Worms, Phishing, Malware, Trojans, Spyware, Adware, Rootkits, Email hijacking. Methods to protect your personal computers – What is Antivirus? Types of Antivirus. Firewalls.	6

Teaching Scheme

Teaching Scheme		
Lecture	**Tutorial**	**Total**
2	**-**	**2**

Total No. Of classes	**30**
Lecture	**30**
Tutorial	**-**

Assessment Scheme

	Internal	**ESE**	**Total**
Full Marks	**40**	**60**	**100**
Pass Marks	**16**	**24**	**40**

Distribution of marks

Unit No.	Unit Title	Type of Question			Total marks
		Objective	Short	Descriptive	
I	**Introduction to computer systems**	4	5	5	14
II	**Basics of Number system and codes**	2	2	4	08
III	Basic Internet skills	1	2	3	06
IV	HTML 4, CSS basics	4	5	5	14
V	Office Tools	1	2	3	06
VI	Information security best practices	3	4	5	12
	Total	15	20	25	60

References:

- R.S. Salaria, Computer Fundamentals, Khanna Publishing House
- Introduction to IT Systems (with Lab Manual) – By Prashant Joshi.
- Introduction to IT Systems – By P. Mondal (Bhagabati Publication)
- Web Design With HTML & CSS - by Prem Kumar
- HTML & CSS Easy learn in 7 Days Paperback – by Albert Irudaya Raj
- Mastering HTML, CSS & JavaScript Web Publishing - by Laura Lemay
- HTML and CSS: Design and Build Websites - by Jon Duckett

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5.Course Title: Fundamentals of Electrical and Electronics Engineering

Course Code	:	ES 204
Course Title	:	Fundamentals of Electrical and Electronics Engineering
Number of Credits	:	3 (L: 2, T: 1, P: 0)
Prerequisites	:	NIL
Course Category	:	ES

Aim:
To equip students with fundamental knowledge of electrical and electronic concepts, necessary parts, and circuit analysis methods so they can comprehend and know how basic systems work and get ready for more complex engineering coursework.

Course Objectives:

- To give students a foundational understanding of the various electrical and electronic engineering concepts and elements,
- To provide information on active and passive electronic components, signals, digital electronics, and their uses,
- To assist them in navigating the principles and applications of electrical and electronics engineering in various industrial processes.

COURSE OUTCOME (CO):
On completion of the course, the student will be able to:

CO1- Understand the different electrical and electronics circuit elements, signal waveform, logic gates.

CO2- Classify different electrical and electronic circuits.
CO3– Solve basic problems related to electrical circuits and digital electronics.
CO4- Compare the various types of wiring systems and analyze different digital logic gates.

Course Content:

ELECTRICAL ENGINEERING			
Chapter No.	***Chapter Title***	***Course Content***	***Duration Hours***
1.	Fundamentals of Power generation Sources	A brief idea on: Conventional Power- Hydro, Thermal and Nuclear power generation Non-Conventional Power- Solar, Wind, Ocean Energy, Bio-Mass and Geo-thermal	02
2	Electric and Magnetic Circuits	Ohm's Law, Definition of EMF, Current, Potential Difference, Power and Energy; M.M.F, magnetic force, permeability, Idea on hysteresis loop, reluctance, leakage factor and BH curve; Analogy between electric and magnetic circuits.	05
3	AC circuits	Introduction to Cycle, Frequency, Periodic time, Amplitude, Angular velocity, RMS value, Average value, Form Factor, Peak Factor, impedance, phase angle, and power factor; j-	08

		operator; Mathematical and phasor representation of alternating emf and current; Basics of A.C circuits (purely R, L, C, R-L series, R-C series, R-L-C series and parallel circuits); Power in A. C. Circuits, Power, Voltage and Impedance triangle.	
4	Transformer and Electrical Machines	General construction and working principle of transformer; Core and Shell type transformers; Transformation ratio; Auto- transformers; Construction and Working principles of DC & AC machines	06
5	House wiring	Introduction to Internal House Wiring; Methods of house wiring and comparison; Wires and Cables; Electrical hazards and Safety measures.	04
ELECTRONICS ENGINEERING			
6	Basics of Electronics	Energy band diagram, intrinsic and extrinsic semiconductor, doping, P- type & N-type semiconductor, PN junction diode, forward bias & reverse bias characteristics of PN junction diode, introduction to half and full wave rectifier circuits, filter circuits. Transistor: Physical construction of bipolar PNP and NPN transistor, biasing circuit configuration (CE, CB, CC) and comparison. Elementary idea of LED, LCD, 7-segment display	08
7	Fundamentals of Digital Electronics	Difference between Analog and Digital signals, Introduction to Boolean Algebra, Electronic Implementation of Boolean Operations, Logic Gates, Introduction to Combinational circuit, Sequential circuit and Storage elements (Flip Flops & Counters)	05
8	Micro-electronic Technology	Introduction to Integrated Circuits – advantages and disadvantages, Uses of IC. Types of ICs-Linear and Digital, Monolithic and Hybrid. Overview of IC manufacturing process – Wafer processing, Photolithography, Etching, Ion Implementation, Doping, Testing, Packaging, packaging types	04
9	Class Test		03

Distribution of Marks/ Table of specifications

TABLE OF SPECIFICATIONS FOR THEORY

Sl. No	**Topic (a)**	**Time allotted in hours (b)**	**Percentage Weightage (c)**	**K**	**C**	**T**
1	Fundamentals of Power generation Sources	02	01	2	-	2
2	Electric and Magnetic Circuits	05	11	5	3	8
3	AC circuit	08	18	8	4	12

4	Transformer and Machines	06	13	5	3	8
5	House wiring	04	9	3	3	6
6	Basics of Electronics	08	18	8	3	11
7	Fundamentals of Digital Electronics	05	11	6	2	8
8	Micro-electronic Technology	04	09	4	1	5
9	Class test	3	7	-	-	-
	Total	45	100	41	19	60

K = Knowledge C = Comprehension
A = Application
HA =Higher Than Application (Analysis, Synthesis, Evaluation)

Details Table of Specification for Theory

Sr. No	**Topic** (a)	Objective Type			Short Answer Type			Long Answer Type		
		K	C	T	K	C	T	K	C	T
1	Fundamentals of Power generation Sources	-	-	-	2	-	2	-	-	-
2	Electric and Magnetic Circuits	2	-	2	2	-	2	-	4	4
3	AC circuit	2	-	2	4	2	6		4	4
4	Transformer and Machines	2	-	2	-	2	2	4	-	4
5	House wiring	2	-	2	2	2	4	4	-	4
6	Basics of Electronics	2	-	2	4	-	4	-	5	5
7	Fundamentals of Digital Electronics	2	-	2	2	-	2	-	4	4
8	Micro-electronic Technology	3	-	3	-	2	2	-	-	-
	Total	15	00	15	16	08	24	08	17	25

K = Knowledge C = Comprehension
A = Application
T = Total
N.B.:- 1. The question pattern will be as per the instruction of SCTE or as per existing rules.

2. The objective type questions may be in the form of multiple choice, fill up the blanks, write in one sentence and match the following type.

Suggested Implementation Strategies:- Teacher will use Black board, OHP, LCD Projector, Smart board, Video etc for effective teaching learning process .

References:

1. Ritu Sahdev, Basic Electrical Engineering, Khanna Publishing House
2. Mittle and Mittal, Basic Electrical Engineering, McGraw Education, New Delhi, 2015, ISBN : 978-0-07-0088572-5
3. Saxena, S. B. Lal, Fundamentals of Electrical Engineering, Cambridge University Press, latest edition ISBN : 9781107464353
4. Theraja, B. L., Electrical Technology Vol – I, S. Chand Publications, New Delhi, 2015, ISBN: 9788121924405
5. Theraja, B. L., Electrical Technology Vol – II, S. Chand Publications, New Delhi, 2015, ISBN: 9788121924375
6. Jegathesan, V., Basic Electrical and Electronics Engineering, Wiley India, New Delhi, 2015, ISBN : 97881236529513
7. Sedha, R.S., A text book of Applied Electronics, S.Chand, New Delhi, 2008, ISBN-13: 978-8121927833
8. Malvino, Albert Paul, David, Electronics Principles, McGraw Hill Education, New Delhi,2015, ISBN-13**:** 0070634244-978
9. Mehta, V.K., Mehta, Rohit, Principles of Electronics, S. Chand and Company, New Delhi, 2014, ISBN-13-9788121924504

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6.Course Title: Textile Fibre

COURSE CODE	PC-201				
CATEGORY	PROGRAMME CORE				
COURSE TITLE	TEXTILE FIBRE				
SCHEME AND CREDITS	L	T	P	CREDITS (C)	SEMESTER
	2	0	0	2	II
PRE-REQUISITES (IF ANY)	NA				

Rationale of the subject/ Courses:- This subject provides knowledge regarding various textile fibres, their classification, physical property and manufacturing process of Man Made fibre which is very essential for yarn spinning, weaving and processing also.

Course Outcome

After completion of the course the students will be able to-

CO-1 Classify the different textile fibres

CO-2 Enlist the physical, chemical properties and uses of different textile fibres.

CO-3 Illustrate the production methods for synthetic and regenerated fibers, such as melt spinning, wet-spinning and dry spinning.

CO-4 Explain the manufacturing process of different Man-Made fibres.

CO-5 Enlist the different stages of extraction of bast and animal fibres and grade them.

1. Teaching Scheme (in hours) :-

Lecture	Tutorial	Total
45	0	45

2. Examination Scheme :

ESE		Internal Assessment		TOTAL MARKS
Full Marks	Pass Marks	Full Marks	Pass Marks	
60	24	40	16	100

3. Detailed Course Content :

Chapt No	Chapter Title	Content	Duration (in hours)
1	Introduction to Textile Fibre	Define fibre, textile fibres, filament Classification of Textile Fibres: As per source of availability. As per chemical composition. Essential and desirable properties of textile fibres. Orientation and Crystalinity, degree of polymerization. Advantages and disadvantages of disadvantages of natural & manmade fibres.	5

2	Growth, Harvesting, properties of vegetable and bast fibres	2.1. Vegetable fibres: → Cotton fibre - Cultivation and harvesting, Ginning process, Morphological structure →Bast fibres - Retting and extraction process of Bast fibres –Jute, Ramie and linen. 2.2 Physical, chemical properties and uses of * Cotton * Jute * Ramie. * Linen	10
3	Production and properties of animal fibres	3.1. Animal Fibres: → Silk-Types of Silk fibre, Life cycle of silk, Morphological structure, reeling and spinning of silk fibre. → Wool-Grading of wool, Extraction process, Morphological structure 3.2 Physical, chemical properties and uses of-. * Wool * Silk	8
4	Manufacturing, physical and chemical properties of Regenerated fibres	4.1 Techniques for manufacturing Man-Made Fibres: i.e. melt spinning, dry spinning and wet spinning 4.2 Process of Manufacturing of Regeneraed fibres: Viscose, Cuprammonium, acetate rayon etc. 4.3 Physical and chemical properties and uses of : * Viscose Rayon * Cuprammonium * Acetate Rayon	10
5	Manufacturing, physical and chemical properties of Synthetic fibres	5.1 Manufacturing process of Synthetic fibres: Polyester, Nylon, Acrylic, Polyurathane, Polypropylene fibre. 5.2 Physical and chemical properties and uses of : * Nylon * Acrylic * Polyester * Polyurethane	8
6	Introduction to new fibres.	6.1. Introduction, Physical Properties & Uses of-Kevlar, Twaron, Carbon, Spandax	4
6	Introduction to new fibres.	6.1. Introduction, Physical Properties & Uses of-Kevlar, Twaron, Carbon, Spandax	4

4. Distribution of Marks :

Chapter No	Chapter Title	Type of Question			Total Marks
		Objective Type (Compulsory)	Short Questions	Descriptive Questions	
1	Introduction to Textile Fibre (5)	2	3	4	9
2	Natural fibres (10)	3	3	7	13
3	Physical and chemical properties of textile fibres (8)	3	3	6	12
4	Physical and chemical properties of important Man-Made Fibres.(10)	3	3	7	13
5	Physical and chemical properties of important High Performance Fibre.(8)	3	2	4	9
6	Introduction to new fibres. (4)	1	3	0	4
		15	17	28	60

5. Suggested implementation Strategies :
6. Suggested learning Resource :
7. Books list:

Sl.No	Name of Book	Author
1	Textile Fibre	Moncriff
2	Textile Fibre	Mathews
3	Textile Fibre	ATA (Textile Association- India)
4	Textile Fibre, vol-1	V.A. Shenai
5	Handbook of Textile Fibre (CTRL)	Ayangar
6	Physical Properties of Textile Fibre	Gulantee
7	Introduction to Textile Fibres	H.V.Sreenivasmurthy

8. List of Journals :

- Textile Research Journal,
- Textile Trend
- Textile Asia
- Indian Textile Journal

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7.Course Title: Applied Physics Lab-II

COURSE TITLE: APPLIED PHYSICS LAB-II
COURSE CODE: BS-207
Total Marks:100
Practical Examination:40
Practical Sessional Marks:60

Learning Objectives: The main objectives are:

(i) To provide an experimental foundation for the theoretical concepts introduced in the theory class.

(ii) Demonstrate the principles taught in the class.

(iii) Develop the habit of honesty, patience and teamwork.

Course Outcomes: On completion of this practical course, the students will be able to:

CO1: demonstrate the laws of light, find refractive index of material and focal length of lense.

CO2: find out magnetic poles and draw magnetic lines of force of bar magnet.

CO3: apply different apparatuses to find the values of different physical quantities (acceleration due to gravity, specific gravity, atmospheric pressure, water equivalent, velocity of sound and frequency of tuning fork).

Examination scheme:

Practical				Total Marks
Practical Test		Internal Assessment		100
Full Marks	Pass marks	Full Marks	Pass Marks	
40	16	60	24	

Chapter Title	Content
Properties of Liquid	1.Measurement of Specific gravity of solid, liquid, using Nicolson hydrometer, Hare's apparatus and specific gravity bottles etc.
Simple Harmonic Motion	2.To determine the value of acceleration due to gravity (g) of a place with Simple pendulum.
Wave & Sound	3. To measure the velocity of sound in Resonance tube. 4. To determine the frequency of a tuning fork using a Sonometer.
Light	5.0 To verify the laws of reflection using a plane mirror and to study the characteristics of image formed.
	6.0 To determine the refractive index of the material of the glass slab by pin method.
	7.0 To determine the focal length of a convex lens by U-V method.
	8.0 To determine the focal length of a convex lens by plane mirror method.

	9.0 To draw I-D curve and to determine the refractive index of the material of a prism.
MAGNETISM	10.0 To locate the poles of a bar magnet and to measure the magnetic length.
	11. To plot magnetic lines of force of a bar magnet with north pole pointing north and to locate the neutral point/to plot magnetic lines of force of a bar magnet with south pole pointing north and to locate the neutral point.
Heat	12. To determine the atmospheric pressure by using Boyle's law apparatus. 13. To determine water equivalent of a calorimeter by method of mixture.

Suggested learning Resource:

D. Book list:

Sl. No.	Title	Author	Publisher
I	Modern Approach to Physics Part I & II	Dilip Sarma, N G Chakraborty, K N Sharma	Kalyani Publishers- New Delhi
2	Applied Physics Part I	Manpreet Singh, Dr. Major Singh, Mrs. Hitashi Gupta	S K Kataria & Sons- New Delhi
3	Applied Physics Part II	Manpreet Singh, Dr. Major Singh, Mrs. Hitashi Gupta	S K Kataria & Sons- New Delhi
4	Basic Applied Physics	R K Gaur	Dhanpat Rai Publication- New Delhi
5	Physics- Std XI, Std XII	-	HSC board/CBSE Board
6	Concept of physics Part I & II	H.C Verma	Bharati Bhawan-New Delhi
7	Introduction to nano technology	C. P. Poole, Jr., and Frank. J. Owens,	Wiley- Interscience.

E. Websites:

I.http://hyperphysics.phy-astr.gsu.edu/
C:\Users\HP\Downloads\II.http://physics.info

F. By using Models, Video etc.

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8. Course Title: Introduction to IT Systems Lab

Course : Introduction to IT Systems Lab
Course Code: ES-208
Credits -2 (L: 0, T: 0, P: 4)

Course outcomes:

At the end of the course student will be able to
1: Search information effectively.
2: Connect peripherals and install device drivers.
3: Create static web pages using HTML and CSS
4: Create documents, spreadsheets and presentations.
5: Implement basic security measures to protect computer system.

Course Content:

Sl. No.	Topics for Practice
1	Browser features, browsing, using various search engines, writing search queries
2	Visit various e-governance/Digital India portals, understand their features, services offered
3	Read Wikipedia pages on computer hardware components, look at those components in lab, identify them, recognize various ports/interfaces and related cables, etc.
4	Install Linux and Windows operating system on identified lab machines, explore various options.
5	Connect various peripherals (printer, scanner, etc.) to computer, explore various features of peripheral and their device driver software.
6	Practice HTML tags-(HTML, HEAD, TITLE, BODY, TABLE, UL, OL, FORM, IMG, A, FONT etc. and their attributes). CSS Syntax □ CSS Id & Class □ CSS Styling □ Styling Backgrounds □ Styling Text □ Styling Fonts □ Styling Links □ Styling Lists Styling Tables □ CSS Border □ CSS Margin□ CSS Display □ CSS Positioning □ CSS Align □ CSS Types - Inline, Internal and External. Make your own Webpage.
7	Open Office Tools: Writer – Page setup, Table, Insertion of Pictures, Page Layout, Bullets, Insertion of objects and symbols, Header, Footer, Page Number, etc., Calc-format cell properties, formula, sort and filters, chart. Impress – Addition and Deletion of Slides, Design, Animation, Slide Show etc.
8	Explore security features of Operating Systems and Tools, try using them and see what happens. Explore the setting of Antiviruses and Firewalls.

This is a skill course. More you practice, better it will be.

References:

- R.S. Salaria, Computer Fundamentals, Khanna Publishing House
- Introduction to IT Systems (with Lab Manual) – By Prashant Joshi.
- Introduction to IT Systems – By P. Mondal (Bhagabati Publication)
- Web Design With HTML & CSS - by Prem Kumar
- HTML & CSS Easy learn in 7 Days Paperback – by Albert Irudaya Raj
- Mastering HTML, CSS & JavaScript Web Publishing - by Laura Lemay
- HTML and CSS: Design and Build Websites - by Jon Duckett

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9.Course Title: Fundamentals of Electrical and Electronics Engineering Lab

Course Code	:	ES 209
Course Title	:	Fundamentals of Electrical and Electronics Engineering Lab
Number of Credits	:	1 (L: 0, T: 0, P: 2)
Prerequisites	:	NIL
Course Category	:	ES

Learning Objective:
The main objectives are:

(i) To provide an experimental foundation for the theoretical concepts introduced in theory classes.

(ii) Demonstrate the principles taught in the classes.

Course (Practical) Outcomes:
After successful completion of this course students will able to
CO1: Identify and use different electrical and electronics instruments
CO2: Apply and examine the theoretical knowledge to perform basic electrical and electronics experiments

S. No.	Name of Experiments	Approx. Hrs.	Electrical (EL) / Electronics (ET)	COs
1	Measure voltage, current and power in 1-phase circuit with resistive load.	02	EL	CO1, CO2
2	Measure voltage, current and power in R-L series circuit.	02	EL	CO1, CO2
3	Determine the transformation ratio (K) of 1-phase transformer.	02	EL	CO1, CO2
4	Connect single phase transformer and measure input and output quantities.	02	EL	CO1, CO2
5	Study the different parts of DC machines	02	EL	CO1
6	Identify and draw the figure of various wiring materials	02	EL	CO1, CO2
7	Identify various active and passive electronic components in the given circuit	02	EL	CO1
8	Connect resistors in series and parallel combination on bread board and measure its value using digital multimeter	02	ET	CO1, CO2
9	Connect capacitors in series and parallel combination on bread board and measure its value using multimeter	02	ET	CO1, CO2
10	Determine the value of a given resistor using digital multimeter and calculate the value with colour code.	02	ET	CO1, CO2

11	Test the PN-junction diode using digital multimeter.	02	ET	CO1, CO2
12	Identify three terminals of a transistor using digital multimeter	02	ET	CO1, CO2
13	Familiarization of different types of PCB and Soldering / Desoldering Practice	02	ET	CO1, CO2
	Total	**28**		

References:

1. Ritu Sahdev, Basic Electrical Engineering, Khanna Publishing House, 2018
2. Mittle and Mittal, Basic Electrical Engineering, McGraw Education, New Delhi, 2015, ISBN : 978-0-07-0088572-5
3. Saxena, S. B. Lal, Fundamentals of Electrical Engineering, Cambridge University Press, latest edition ISBN : 9781107464353
4. Theraja, B. L., Electrical Technology Vol – I, S. Chand publications, New Delhi, 2015, ISBN: 9788121924405
5. Theraja, B. L., Electrical Technology Vol – II, S. Chand publications, New Delhi, 2015, ISBN: 9788121924375
6. Jegathesan, V., Basic Electrical and Electronics Engineering, Wiley India, New Delhi, 2015, ISBN : 97881236529513
7. Sedha, R.S., A text book of Applied Electronics, S.Chand ,New Delhi, 2008, ISBN-13: 978-8121927833
8. Mehta, V.K., Mehta, Rohit, Principles of Electronics, S. Chand and Company, New Delhi, 2014, ISBN-13-9788121924504

Suggested software/ Learning Websites:

a. en.wikipedia.org/wiki/Transformer
b. www.animations.physics.unsw.edu.au//jw/AC.html
c. www.alpharubicon.com/altenergy/understandingAC.htm
d. www.electronics-tutorials
e. learn.sparkfun.com/tutorials/transistors
f. www.pitt.edu/~qiw4/Academic/ME2082/Transistor%20Basics.pdf
g. www.technologystudent.com/elec1/transis1.htm
h. www.learningaboutelectronics.com
i. www.electrical4u.com

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10.Course Title: Environmental Science

Course Code	AU-201				
Course Title	Environmental Science				
Scheme and Credits	L	T	P	Credits, C	Semester- II
	2	0	0	0	
Pre-requisites	High School Chemistry/Basic science				

Learning Objectives:

LO-1	Acquire knowledge for solving various engineering problems by applying ecosystem to produce eco – friendly products.
LO-2	Gain fundamental knowledge of air, noise, radiation, water and soil pollution control methods for solving domestic and industrial problems.
LO-3	To recognize relevant energy sources required for domestic and industrial applications.
LO-4	Gain skills for solving local solid and e-waste problems.

Course Outcomes: After the completion of the course the student will be able to understand:

CO-1	The ecosystem and terminology for solving various engineering problems applying ecosystem knowledge to produce eco – friendly products.
CO-2	The air, radiation and noise pollution along with their control measures and acts for solving domestic and industrial problems.
CO-3	The water and soil pollution along with their control measures and acts for solving domestic and industrial problems.
CO-4	Different renewable energy resources and efficient process of harvesting.
CO-5	Solid Waste Management, ISO 14000 & Environmental Management.

Detailed Course Content:

Unit	Topic/Sub-Topics	Hours
UNIT-I	**1.0. Introduction to Environmental Studies and Ecosystems** 1.1. Scope and importance of Environmental Science, environmental components. 1.2. Definition, principle and scope of ecology, definition and concept of Ecosystem, Structure of ecosystem, Biotic & Abiotic components. 1.3. Functions of Ecosystem: Physical (energy flow), Biological	**5**

	(food chains, food web, ecological succession), and Biogeochemical (nutrient cycling) processes. 1.4. Types of Ecosystems - Freshwater ecosystem (Lentic and Lotic) and terrestrial ecosystem (Forest, Grassland, Desert and **Mountain Ecosystem**	
UNIT-II	**2.0. Air, Noise and Radiation Pollution** 2.1. Air Pollutions: Definition, types and sources of air pollution, air pollutant and its types, impact of air pollution on human health, environment and assets. 2.2. Global warming and greenhouse effect, ozone layer depletion and acid rain. 2.3. Air quality standards – NAAQS, AQI, Bharat Stage - VI Emission standards, Air pollution control measures. Air quality standards – NAAQS, AQI, Bharat Stage - VI Emission standards. Air pollution control measures. 2.4. Radiation pollution: Definition and types of radiation, sources, effects and control of radiation pollution. 2.5 Noise pollution: Definition, types, sources of pollution, measurement of pollution level, Effects of Noise pollution.	**6**
UNIT-III	**3.0. Water and Soil Pollution** 3.1. Definition, properties and Sources of freshwater. 3.2. Definition, Sources of water pollution, Types of water pollutants. 3.3. Characteristics of water pollutants, Physical, chemical and biological parameters for assessment of water quality. 3.4. Effect of water pollution on human health and environment. 3.5. Control of water pollution 3.6. Waste water treatment – Primary, secondary and tertiary methods. 3.7. Soil pollution - Causes, Effects and Preventive measures of Soil Pollution.	**7**

UNIT-IV	**4.0. Renewable sources of Energy** 4.1. Definition and type of renewable energy sources. 4.2. Solar Energy: Basics of Solar energy. Flat plate collector (Liquid & Air). Theory of flat plate collector. Importance of coating. Advanced collector. 4.3. Solar pond, Solar water heater, solar dryer, Solar stills. 4.4. Biomass: Overview of biomass as energy source. Thermal characteristics of biomass as fuel, Anaerobic digestion. Biogas production mechanism. Utilization and storage of bio-gas. 4.5. Wind energy: Current status and future prospects of wind energy. Wind energy in India. Environmental benefits and problem of wind energy. 4.6. New Energy Sources: Need of new sources. Different types new energy sources. 4.7. Applications of (Hydrogen energy, Ocean energy resources, Tidal energy conversion.) 4.8. Concept, origin and power plants of geothermal energy.	**7**
UNIT-V	**5.0. Solid Waste Management, ISO 14000 & Environmental Management** 5.1. Definition and type of waste. 5.2. Solid waste generation- Sources and characteristics of: Municipal and domestic solid waste, electronic waste (E-waste): Sources and types, constituents of e-wastes, recycling of e-waste and its environmental consequences, biomedical waste. Metallic wastes and Non-Metallic wastes (lubricants, plastics, rubber) from industries. 5.3. Collection and disposal of different types of solid wastes. 5.4. Waste Air quality act 2004, air pollution control act 1981, water pollution and control act1996. Noise pollution (Regulation and Control) Rules, 2000. 5.5. Environmental management in fabrication industry. ISO14000: Implementation in industries, Benefits.	**5**
	Total contact Hours	**30**

Table of Specification for Environmental science (Theory)															
Sl No	**Contact Hours**	**Units**	**Objective**			**Short Answer Type**				**Long Answers Type**					**Total Marks**
			R	U	AP	R	U	AP	AN	R	U	AP	AN	E	C	
1	5	Unit I	1	1	1	2	1	0	0	0	2	2	0	0	0	10
2	6	Unit II	1	1	1	2	1	0	0	0	2	2	0	0	0	10
3	7	Unit III	1	1	0	0	3	2	1	0	3	3	0	0	0	14
4	7	Unit IV	1	1	0	0	0	2	1	3	3	3	0	0	0	14
5	5	Unit V	1	1	1	0	2	0	1	0	3	3	0	0	0	12
	30	Total marks	5	5	3	4	7	4	3	3	13	13	0	0	0	60

NB: R: Remember, **U:** Understand, **AP:** Apply, **AN:** Analyze, **E:** Evaluate, **C:** Create

	Annexure-I: Environmental science (Theory)									
Sl No.	**Units**	**Time Allotted (Hrs)**	**Percentage Weightage**	**R**	**U**	**AP**	**AN**	**E**	**C**	**Total Marks**
1	**I**	**5**	**16.67**	**3**	**4**	**3**	**0**	**0**	**0**	**10**
2	**II**	**6**	**20.00**	**3**	**4**	**3**	**0**	**0**	**0**	**10**
3	**III**	**7**	**23.33**	**1**	**7**	**5**	**1**	**0**	**0**	**14**
4	**IV**	**7**	**23.33**	**4**	**4**	**5**	**1**	**0**	**0**	**14**
5	**V**	**5**	**16.67**	**1**	**6**	**4**	**1**	**0**	**0**	**12**
Total		**30**	**100.00**	**12**	**25**	**20**	**03**	**00**	**00**	**60**

Reference Book List:

Sl No	Book Name	Author Name	Publisher
1	Environmental Studies	S.C. Sharma & M.P. Poonia	Khanna Publishing House, New Delhi
2	Understanding Chemistry	C.N. R. Rao	Universities Press (India) Pvt. Ltd., 2011
3	Elements of	O.P. Gupta,	Khanna Publishing House, New

	Environmental Pollution Control		Delhi
4	Air Pollution & Control	Keshav Kant	Khanna Publishing House, New Delhi (Edition 2018)
5	Waste Water Treatment for Pollution Control and Re-use	Arceivala, Soli Asolekar, Shyam	Mc-Graw Hill Education India Pvt. Ltd., New York, 2007, ISBN:978-07-062099
6	Environmental Engineering Science	Nazaroff, William, Cohen, Lisa	Willy, New York, 2000, ISBN 10: 0471144940.
7	Environmental Pollution Control and Engineering	Rao, C. S.,	New Age International Publication, 2007, ISBN: 81-224-1835-X.
8	Air Pollution	Rao, M. N. Rao	Tata Mc-Graw Hill Publication, New delhi, 1988, ISBN: 0-07-451871-8.
9	Principles of Solar Engineering	Frank Kreith, Jan F Kreider	McGraw-Hill, New York ; 1978, ISBN: 9780070354760.
10	Fundamentals of renewable energy processes	Aldo Vieira, Da Rosa	Academic Press Oxford, UK; 2013. ISBN: 9780123978257.
11	Industrial Solid Waste	Patvardhan, A. D	Teri Press, New Delhi, 2013, ISBN:978-81-7993-502-6
12	Waste Water Engineering	Metcalf & Eddy	Mc-Graw Hill, New York, 2013, ISBN: 077441206
13	Perspective in Environmental Studies	Anubha Kaushik and C P Kaushik	New Age International Publisher, New Delhi ISBN: 978-93-86418-63-0
14	National Environmental Policy 2006	Govt. of India, Ministry of Environment and Forest.	Approved by the Union Cabinet on 18 May, 2006
15	National Green Tribunal Act, 2010	Ministry of Law and Justice (Legislative Dept.),	The Gazette of India New Delhi, Wednesday, June 2, 2010.

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Curriculum Development cell, State Council for Technical Education, Directorate of Technical Education, Assam

Sl. No.	Name	Designation
1	Shri Dhrubajyoti Borah, ACS	Director of Technical Education, Assam
2	Dr. Indrani Gogoi	Joint Director, DTE, Assam
3	Dr. Mrinalini Das	Controller of Examinations, State Council for Technical Education, DTE, Assam
4	Shri Ankush Borgohain	Training cum Placement Officer, DTE, Assam
5	Shri Ashok Das	Principal, Assam Textile Institute
6	Dr. Utpal Baruah	Principal, Kamrup Polytechnic
7	Shri Boobool Sarma	Assistant Controller of Examinations, SCTE, DTE, Assam

Subject-wise Committees for Curriculum of Diploma in Textile Technology (2nd Semester)

Fashion/Garment/Textile Technology:

Sl No.	Name	Institute	Designation
1	Mr. Tanmai Das, HoD	Assam Textile Institute, Guwahati	Member Secretary
2	Mr. Ashok Das, Principal (i/c)	Assam Textile Institute, Guwahati	Member
3	Mrs. Tanushree Das, Lecturer	Residential Girls' Polytechnic, Golaghat	Member
4	Ms Anusmita Buragohain, Lecturer	Assam Textile Institute, Guwahati	Member

Textile Technology:

Sl No.	Name	Institute	Designation
1	Mr. Nila Kr Singha, Lecturer (SG)	Assam Textile Institute, Guwahati	Member Secretary
2	Mrs. Moni Chetia, Principal (i/c)	Residential Girls' Polytechnic, Golaghat	Member
3	Mrs. Tanushree Das, Lecturer	Residential Girls' Polytechnic, Golaghat	Member

Textile Design:

Sl No.	Name	Institute	Designation
1	Mrs. Tanushree Das, Lecturer	Residential Girls' Polytechnic, Golaghat	Member Secretary
2	Smt. Anu Devi, Lecturer	Assam Textile Institute, Guwahati	Member
3	Mrs. Moni Chetia, Principal (i/c)	Residential Girls' Polytechnic, Golaghat	Member

Mathematics:

Sl No.	Name	Institute	Designation
1	Dr. Geetali Das, Lecturer(SG)	Assam Engineering Institute, Guwahati	Member Secretary
2	Dr. Parbin Ahmed, Lecturer(SG)	Assam Textile Institute, Guwahati	Member
3	Dr. Sampa Das, Lecturer (SG)	Dibrugarh Polytechnic, Dibrugarh	Member
4	Mrs. Gayatree Kakati Boruah.	PCPS Girls' Polytechnic, Guwahati	Member

Physics:

Sl No.	Name	Institute	Designation
1	Dr.TulikaTamuly, Lecturer	Dibrugarh Polytechnic, Dibrugarh	Member Secretary
2	Dr. Snigdha Bhattacharjee, Lecturer	Karimganj Polytechnic, Karimganj	Member
3	Mr. Monzurul Kader Ahmed, Lecturer	Goalpara Polytechnic, Goalpara	Member

4	Mr. Prokash Pegu, Lecturer	Dibrugarh Polytechnic, Dibrugarh	Member

Sub-Committee for Applied Physics:

Sl No.	Name	Institute	Designation
1	Dr. Purabi Gogoi, Assistant Professor	DUIET, Dibrugarh University	Member
2	Mr. Jyotinav Mudiar, Assistant Manager	IOCL, Bongaigaon Refinery	Member
3	Dr. Samiran Hazarika, Lecturer	Bongaigaon Polytechnic	Member
4	Mr. Sanjeeb Kalita, Lecturer	Baksa Polytechnic	Member
5.	Himanshu Sharma Pathok, Lecturer	POWIET, Jorhat	Member

Introduction to IT Systems:

Sl No.	Name	Institute	Designation
1	Smt. Plabita Borbora, HoD, Computer Engineering	Assam Engineering Institute	Member Secretary
2	Maushumi Lahon, Lecturer (SG)	Assam Engineering Institute	Member
3	Sankha Pani Bharali, Lecturer (SG)	PCPS Girls Polytechnic	Member

Fundamentals of Electrical and Electronics Engineering:

Sl No.	Name	Institute	Designation
1	Shri Bhupati Das, Principal (i/c)	Nalbari Polytechnic	Member Secretary
2	Dr. Mitali Chakravorty, HOD (i/c)	Assam Engineering Institute	Member
3	Shri Bubumani Kalita, Lecturer (PT)	Nalbari Polytechnic	Member

Environmental Science:

Sl No.	Name	Institute	Designation
1	Smt. Anita Saikia, Lecturer (SG)	Assam EngineeringInstitute	Member Secretary
2	Shri Ramen Bharali, Lecturer (SG)	Nowgong Polytechnic	Member
3	Shri Bedanta Barhoi, Lecturer (PT)	Lakhimpur Polytechnic	Member
4	Shri Pankaj Goswami, Lecturer (SG)	Silchar Polytechnic	Member
5	Mr. Tayab Ali, Lecturer (SS)	POWIET, Jorhat	Member
6	Shri DebabrataTalukdar, Lecturer (SG)	Silchar Polytechnic	Member

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