SANKAR POLYTECHNIC COLLEGE [AUTONOMOUS], SANKAR NAGAR – 627357

P SCHEME - REGULATION

SEMESTER – I

S. no	Course Category	Course Type	Code	Course Title	L-T-P	Period	Credit	End Exam
1	Humanities & Social Science	Theory	P101	Tamil Marabu	2-0-0	30	2	Theory
2	Basic Science	Theory	P102	Basic Mathematics	3-1-0	60	4	Theory
3	Basic Science	Practicum	P103	Basic Physics	2-0-2	60	3	Theory
4	Basic Science	Practicum	P104	Basic Chemistry	2-0-2	60	3	Theory
5	Humanities & Social Science	Practicum	P105	Communicative English I	1-0-2	45	2	Practical
6	Engineering Science	Practicum	P106	Basic Workshop Practices	1-0-2	45	2	Practical
7	Engineering Science	Practical	P107	Digital Workplace Skills	0-0-4	60	2	Practical
8	Open Elective	Advanced Skill Certification	P108	Basic English for Employability	0-0-4	60	2	Practical
9	Humanities & Social Science	Integrated Learning Experience	-	Growth Lab	-	15	0	-
10	Audit Course	Integrated Learning Experience	-	Induction Program - I	-	40	0	-
11	Audit Course	Integrated Learning Experience		I&E/ Club Activity/ Community Initiatives	-	30	0	-
12	Audit Course	Integrated Learning Experience	-	Shop Floor Immersion	-	8	0	-
13	Audit Course	Integrated Learning Experience	-	Health & Wellness	-	30	0	-
14	Audit Course	Integrated Learning Experience	-	Student-Led Initiative	-	22	0	-
TOTAL						**565**	**20**	

Note: Test & Revisions: 60 Periods | Library Hours: 15 Periods

P101	Tamil Marabu	L	T	P	C
Theory		2	0	0	2

Introduction

This course provides an opportunity for students who have Tamil as their mother tongue and for students from other states to have multifold outcomes. Learning in the mother tongue is a key factor for inclusion and quality learning, and it also improves learning outcomes and academic performance. This is crucial, for appreciation of Tamil as a language and as a culture. It fosters mutual understanding and respect for one another and helps preserve the wealth of cultural and traditional heritage that is embedded in Tamil language around the world.

Course Objectives

The objective of this course is to enable the student to

- Appreciate Tamil art, culture and literature
- Learn the history and culture of Tamil language
- Relate to various art forms and their relevance to development
- Acknowledge the rich heritage and significant achievements of the Tamilians Appreciate the contribution of Tamilians to nation building

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Understand the significance of Tamil as a classical language
CO2: Relate the art and culture in Tamil language
CO3: Explain the importance of music, dance and martial arts that were derived from Tamil Culture
CO4: Understand the poetic mode or theme of classical language
CO5: Relate the contribution of Tamils to Nation building

Pre-requisites

Nil

P101	Tamil Marabu	L	T	P	C
Theory		2	0	0	2

CO / PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1		3			2		2
CO2		3			2		2
CO3		3			2		2
CO4		3			2		2
CO5		3			2		2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- It is advised that teachers take steps to pique pupils' attention and boost their curiosity to learn.
- Apply story telling methods to pictures the realistic situations, and real-world examples to make the sessions engaging.
- Connecting to physical spaces, renowned scholars and researchers shall help students learn from the experts.
- Throughout the course, providing pre-reading and post-reading materials/videos may help sustain the interest through class discussions and debates.

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Test	Written Test	Assignment	Quiz/MCQ/ Activity/ Assignment	Written Examination
Duration	2 hours			1 Hour	3 hours
Exam Marks	30	30	30	10	100
Converted to	15	15	15	10	60
Marks	Best of CA1 & CA2 15 Marks		CA3 & CA4 25 marks		60

P101	தமிழர் மரபு	L	T	P	C
Theory		2	0	0	2

அலகு 1 மொழி மற்றும் இலக்கியம் **6 Hours**

இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி – தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமயச் சார்பற்ற தன்மை – சங்க இலக்கியத்தில் பகிர்தல் அறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ்க் காப்பியங்கள் - தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம் : ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி – தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

அலகு 2 மரபு – பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை – சிற்பக் கலை **6 Hours**

நடுகல் முதல் நவீன சிற்பங்கள் வரை – ஐம்பொன் சிலைகள் - பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் - தேர் செய்யும் கலை – சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரிமுனையில் திருவள்ளுவர் சிலை - இசைக் கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு

அலகு 3 நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள் **6 Hours**

தெருக்கூத்து, கரகாட்டம், வில்லுபாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்

அலகு 4 தமிழர்களின் திணைக் கோட்பாடுகள் **6 Hours**

தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு – சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் - சங்ககால நகரங்களும் துறை முகங ்களும் - சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி – கடல் கடந்த நாடுகளில் சோழர்களின் வெற்றி

அலகு 5 இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு
6 Hours

இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு – கல்வெட்டுகள், கையெழுத்துப்படிகள் - தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு

Total – 30 Hours

P101	Tamil Marabu	L	T	P	C
Theory		2	0	0	2

Unit I LANGUAGE AND LITERATURE **6 Hours**

Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil

Unit II HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE **6 Hours**

Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts – Art of temple car making - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils

Unit III FOLK AND MARTIAL ARTS **6 Hours**

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

Unit IV THINAI CONCEPT OF TAMILS **6 Hours**

Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.

Unit V CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE **6 Hours**

Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil
- Contribution of Bharathiyar and Bharathidhasan.

Total – 30 Hours

Suggested List of Students Activity

- A team activity to prepare a poster on any one module
- An elocution competition in the class for 3 minutes on any particular topic/any topic from the syllabi
- An essay writing on the topic of interest

Text Books

- Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL
- Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
- Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
- The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
- Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
- Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author) Reference
- Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
- Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) ReferenceBook

P102	Basic Mathematics	L	T	P	C
Theory		3	1	0	4

Introduction

Mathematics develops analytical reasoning and critical thinking. It is an integral part of core engineering subjects. It helps to perform calculations and is used to create, test and analyze engineering models. The knowledge of Mathematics is compulsory for a better understanding of engineering and science subjects. This course is designed to give comprehensive coverage at an introductory level to Matrices, Determinants, Trigonometry, Vector Algebra, Statistical Measures and Probability.

Course Objectives

The objective of this course is to enable the students to

- acquire knowledge in basics of matrices and determinants.
- explain the trigonometric processes involved in engineering applications.
- define the essential elements to denote vectors in engineering applications.
- summarize the methods of collecting, analyzing, interpreting and presenting empirical data.
- explain the principal concepts about probability.

Course Outcomes

After successful completion of this course, the students should be able to

CO1: solve simultaneous linear equations using determinants and find the inverse of non-singular matrices.
CO2: compute the values of trigonometric ratios of compound angles and double angles.
CO3: solve problems involving the operations on vectors.
CO4: calculate the mean, variance and standard deviation of data distributions.
CO5: calculate the probability of simple and compound events.

Pre-requisites

High School Mathematics

P102	Basic Mathematics	L	T	P	C
Theory		3	1	0	4

CO/PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	2	2	1	2	3
CO2	3	3	2	2	1	1	3
CO3	3	3	2	2	1	1	3
CO4	3	3	2	2	1	2	3
CO5	3	3	2	2	1	1	3

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.
- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples from daily life, realistic situations and real-world engineering and technological applications.
- The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.
- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome-based and employability-based.
- All demonstrations/Hand-on practices are under a simulated environment (may be followed by a real environment as far as possible).

P102	Basic Mathematics	L	T	P	C
Theory		3	1	0	4

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Test	Written Test	Written Test	Quiz/MCQ/ Activity/ Assignment	Written Examination
Duration	2 hours				3 hours
Exam Marks	30	30	30	10	100
Converted to	15	15	15	10	60
Marks	Best Two of CA1, CA2 & CA3 (30 marks)			10	60

P102	Basic Mathematics	L	T	P	C
Theory		3	1	0	4

Unit I	MATRICES AND DETERMINANTS	
Matrices – Types of matrices – Equality, addition, subtraction, scalar multiplication and multiplication of matrices – Transpose of a matrix – Determinants – Values of second and third order determinants – Solution of simultaneous linear equations using Cramer's rule for 2 and 3 unknowns – Singular and non-singular matrices – Minor and cofactor – Cofactor matrix – Adjoint matrix – Inverse of a matrix – Simple problems – Engineering applications (not for examinations).		9+3
Unit II	**TRIGONOMETRY**	
Degree and Radian – Relation between degree and radian – Trigonometric ratios – Trigonometric ratios of standard angles – Graphs of $\sin x$, $\cos x$, $\tan x$ and e^x – Compound angle identities – $\sin(A \pm B)$, $\cos(A \pm B)$ and $\tan(A \pm B)$ (without proof) – Double angle identities – $\sin 2A$, $\cos 2A$ and $\tan 2A$ (without proof) – Simple problems – Engineering applications (not for examinations).		9+3
Unit III	**VECTOR ALGEBRA**	
Definition, notation and rectangular resolution of a vector – Position vector – Addition and subtraction of vectors – Magnitude of a vector – Unit vector – Direction ratios – Direction cosines – Scalar product and vector product of two vectors – Projection – Angle between two vectors – Unit vector perpendicular to two vectors – Area of triangles and parallelograms using vector product – Simple problems – Engineering applications (not for examinations).		9+3
Unit IV	**STATISTICS**	
Statistical data – Ungrouped data – Grouped data – Discrete data – Continuous data – Arithmetic mean – Variance – Standard deviation – Fitting a straight line using the method of least squares – Simple problems – Engineering applications (not for examinations).		9+3
Unit V	**PROBABILITY**	
Random experiment – Outcomes – Sample space – Events – Occurrence of events – 'not', 'and' and 'or' events – Exhaustive events – Mutually exclusive events – Classical definition of probability – Axioms of probability – Probability of an event – Probability of 'not', 'and' and 'or' events – Conditional probability – Multiplication rule – Independent events – Simple problems (Combinatorial problems excluded) – Engineering applications (not for examinations).		9+3
TOTAL HOURS		**60**

P102	Basic Mathematics	L	T	P	C
Theory		3	1	0	4

Suggested List of Students Activities

Other than classroom learning, the following are the suggested student related co-curricular activities which can be undertaken to accelerate the attainment of the various outcomes in this course.

- Find the area of scalene-triangle shaped objects: Choose a scalene-triangle shaped plane object. Make a grid to cover the entire object by drawing one-unit equally spaced horizontal and vertical lines. Choose x-axis and y-axis on the grid and determine the coordinates of the vertices of the triangle. Let $A(x_1, y_1), B(x_2, y_2)$ and $C(x_3, y_3)$ be the vertices. Calculate the area of the object using the formula

$$\frac{1}{2}\begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix}$$

- Find the height of a building: Choose a building in the college campus. Mark a point on the ground and measure the shortest distance from the point to the building. Let the distance be d metres. Measure the angle of elevation of the top of the building just above the foot of the perpendicular drawn from the point to the building using a clinometer. Let the angle of elevation be θ. Calculate the height of the building using the formula $h = d\tan\theta$. Compare the result with original height of the building. Use the same technique to calculate the size of the moon or distance of the moon (necessary inputs to be given).

- Predict the amount of electrical power a solar panel can produce: Using appropriate surveying apparatus, find the position-vector representation of the four corners of a solar panel fixed on a roof-top. Let the vectors arranged in counter clockwise direction be $\overrightarrow{OP_1} = x_1\vec{\imath} + y_1\vec{\jmath} + z_1\vec{k}, \overrightarrow{OP_2} = x_2\vec{\imath} + y_2\vec{\jmath} + z_2\vec{k}, \overrightarrow{OP_3} = x_3\vec{\imath} + y_3\vec{\jmath} + z_3\vec{k}$ and $\overrightarrow{OP_4} = x_4\vec{\imath} + y_4\vec{\jmath} + z_4\vec{k}$. Find the normal vector $\vec{N}$ to the surface $P_1P_2P_3P_4$ using the vector product formula $\vec{N} = \overrightarrow{P_1P_2} \times \overrightarrow{P_1P_4}$. Measure the direction of the sun and determine the unit vector representation of the direction of the sun as $\hat{a} = a_1\vec{\imath} + a_2\vec{\jmath} + a_3\vec{k}$. Let the intensity of the sunlight be $I\ Watts/m^2$. Give a vector representation to it by $\vec{F} = I\hat{a}$. The scalar product $\vec{F}.\vec{N}$ estimates the amount of energy absorbed and converted on the solar panel. Verify the results with actual electrical power generated by the solar panel.

- Why solar panels are usually tilted? Use the knowledge of trigonometry and vectors to reason and understand whether solar panels should be tilted or not.

- Fit a straight line for height-weight chart: Suppose there are 60 students in the class. Choose 5 students randomly to form group B and form group A with the remaining 55 students. Measure the height and weight of i^{th} student in group A and denote them as x_i and y_i respectively. Create a bivariate data table consisting heights and weights of all the students in group A as follows.

Height X (in cm)	x_1	x_2	x_3	x_4	...	x_{54}	x_{55}
Weight Y (in Kg)	y_1	y_2	y_3	y_4	...	y_{54}	y_{55}

Fit a straight line of the form $y = mx + c$ using the method of least squares by taking height as independent variable and weight as dependent variable. Calculate the weights of the students in group B by inserting the heights in the formula $y = mx + c$ and compare them with their original weights.

- Monty Hall problem: For creating thought-provoking excitement in probability, students can be engaged in the famous Monty Hall problem. The problem is named after Monty Hall, a television game show host. A room is equipped with three doors. There is a car behind one of the doors, but there are goats behind the other two doors. The contestant can choose one door. The host will open one of the other two doors to reveal a goat. Then, the host will give two choices to the contestant. The contestant can stick to the original choice or switch to the other unopened door. If the contestant sticks to the original choice, the probability of winning the car is 1/3. If the contestant switches the selection to the other door, the probability of winning the car is 2/3.

References

- Higher Secondary First Year Mathematics Volume-I & Volume-II, Tamil Nadu Textbook and Educational Services Corporation, Government of Tamil Nadu, 2022.
- Higher Secondary Second Year Mathematics Volume-I & Volume-II, Tamil Nadu Textbook and Educational Services Corporation, Government of Tamil Nadu, 2022.
- John Bird, Higher Engineering Mathematics, Routledge, 9th Edition, 2021.
- Grewal, B.S., Higher Engineering Mathematics, Khanna Publishers, 42nd Edition, 2012.
- Deepak Singh, Mathematics-I, Khanna Book Publishing Co. (P) Ltd., 2021.
- Garima Singh, Mathematics-II, Khanna Book Publishing Co. (P) Ltd., 2021.

Web-based/Online Resources

https://www.khanacademy.org/math/
https://www.mathportal.org/
https://openstax.org/subjects/math
https://www.mathhelp.com/
https://www.geogebra.org/
https://www.desmos.com/
https://phet.colorado.edu/

P103	Basic Physics	L	T	P	C
Practicum		2	0	2	3

Introduction

Any technological innovation happens through a firm understanding of basic science. Knowing and developing proper understanding of the scientific principles behind every technological gadget or instrument is inevitable to a polytechnic student. This course systematically introduces the laws of physics which gives correct perspectives of dealing with technology and its societal uses.

Course Objectives

The objective of this course is to enable the student to

1. Outline the definitions of physical quantities, units, dimensions and error analysis
2. Explain the basics of vectors, forces and its vectorial properties
3. State Newton's laws and its application into day-to-day life and covers basics of periodic motion
4. Describe the elastic properties of any solid material
5. Explain the heat, work, modes of heat transfer, laws of thermodynamics

Course Outcomes

On successful completion of this course, the student will be able to

CO1: Apply the knowledge of measuring tools used in the Engineering fields
CO2: Demonstrate the applications of Lami's theorem and principle of moment into real world problems
CO3: Correlate the Newton's laws into to day-to-day applications and measure the value of g
CO4: Illustrate the elastic properties of material for engineering applications
CO5: Relate the heat and laws of thermodynamics in technological fields

Prerequisites

High School Science

P103	Basic Physics	L	T	P	C
Practicum		2	0	2	3

CO / PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3				1	1
CO2	3	3				1	1
CO3	3	3				1	1
CO4	3	3				1	1
CO5	3	3				1	1

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.
- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples from daily life, realistic situations, and real-world engineering and technological applications. Try to give source examples from where the students would be familiar - like sports, or an activity that they usually engage in frequently.
- The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.
- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome- and employability-based.
- All demonstrations/Hand-on practices are under a simulated environment (may be followed by a real environment as far as possible).
- Do not let students work on an activity or an experiment with the expected outcome, rather allow students to be honest about whatever the results of the experiment are. If the results are different from the expectations, students should do an analysis where could be the source of error, if any.

P103	Basic Physics	L	T	P	C
Practicum		2	0	2	3

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Test (Unit I & II)	Written Test (Unit III,IV & V)	Assignment	Lab Observation	Written Examination
Duration	2 Hours	2 Hours	…	…	3 hours
Exam Marks	50	50	…	…	100
Converted to	10	10	…	…	60
Marks	20		10	10	60

P103	Basic Physics	L	T	P	C
Practicum		2	0	2	3

UNIT 1 UNITS AND MEASUREMENTS **7 Hours**

Introduction – Science & Technology –Units and dimensions – definition – fundamental quantities – definition and their SI units, symbols – Derived physical quantities – Dimensional formula for length, mass and time, SI unit multiples and submultiples and prefixes of units.
Measurements: Need & limitations of measuring instruments, least count, types of measurement, – screw gauge – Vernier calliper- Applications into industries. Errors in measurement (systematic and random), absolute error, relative error, error propagation (no derivation) –precautions to avoid systematic and random errors- Engineering applications.
Physical quantities: velocity, momentum, acceleration, force, impulse, work, energy and power, Horsepower, watt, Calorie and Joule – Conversions.

Ex. 1 SCREW GAUGE: **4 Hours**
Using Screw Gauge: (i) Find the thickness and volume of given gauge wires (5,6,7,8,9) by measuring its length and diameter and error estimation (ii) Find the volume of the glass plate by measuring its thickness and area
Ex. 2 VERNIER CALIPER: **4 Hours**
Using Vernier Caliper: (i) Find the volume of a given hollow and solid cylinder by measuring its length and diameter (ii) Find the volume of a given rectangular block by measuring its length, breadth and thickness and error estimation

Unit II STATICS **6 Hours**

Scalar and vector quantities: Definition and examples – Resolution of vector into two perpendicular components – Concurrent forces & coplanar forces: Examples – Resultant and Equilibrant force – Triangle and Parallelogram law for two forces: Statement only (no derivation), Examples – Lami's theorem – statement and explanation – Experimental verification of parallelogram of forces and Lami's theorem – Engineering applications - Moment of force, Couple – Principle of moment – Determination of mass of the given body

Ex. 3 VERIFICATION OF LAMI'S THEOREM: **4 Hours**
Verification of parallelogram and
Lami's theorem for concurrent forces
Ex. 4 PRINCIPLE OF MOMENT: **2 Hours**
Using the principle of moment, determine the unknown mass of the given object

Unit III DYNAMICS
6 Hours
Newton laws, kinematic equations – Examples (horizontal, freely falling, vertically thrown) – Projectile motion (qualitative discussion) – Circular motion – angular velocity – period – frequency – relation between linear and angular velocity – centripetal and centrifugal force: application of centripetal and centrifugal forces (working of a centrifuge device) - Simple harmonic motion – amplitude – frequency – period – Simple pendulum – Acceleration due to gravity

Ex. 5 SIMPLE PENDULUM: **4 Hours**
Determination of acceleration due to gravity using simple pendulum

Unit IV ELASTIC PROPERTIES OF SOLIDS **5 Hours**

Elastic and plastic bodies – stress–strain – definitions – Hooke's law – three types of strain – stress-strain curve - elastic and plastic limit – Three modulus of elasticity and its relations (no derivation)- Uniform and non-uniform bending of beams – Experimental determination of Y by uniform bending – Poisson ratio – Engineering applications of elasticity

Ex. 6 YOUNG'S MODULUS: **4 Hours**

Determination of young's modulus of a given object (one-meter wood scale) using pin and microscope

Ex. 7 HELICAL SPRING: **4 Hours**

Verification of Hooke's law and determination of Spring constant of helical spring

Unit V HEAT **6 Hours**

Concept of heat – temperature – centigrade, Fahrenheit and Kelvin scales – conduction, convection –radiation – Good and bad thermal conductors – Properties of thermal radiation – Heat conversion – Specific heat capacity – Laws of thermodynamics – different types of process – Examples – Ideal gas – Boyle's law.

Ex. 8 BOYLE'S LAW: **4 Hours**

Verification of Boyle's law using Quill Tube

Total – 60 Hours

P103	Basic Physics	L	T	P	C
Practicum		2	0	2	3

Suggested List of Students Activity (Ungraded)

- Presentation/Seminars by students on any recent technological developments based on fundamental physics
- Periodic class quizzes conducted on a weekly/fortnightly basis to reinforce the basic physic concepts
- Micro project that shall be an extension of any practical lab exercise to real-world application
- Connecting sports to physics concepts:
- Basketball or football with vectors - projectile motion (horizontal and vertical component). Intuitive understanding of the vectors. Students try out different angles of shooting the ball. For example, asking students through different combinations what angle of throw gives the farthest range, then later compare their answer with a mathematical equation.
- Factors affecting pendulum parameters - does length or mass affect the time period of the pendulum? Does the value of g depend on the setup of the pendulum?
- For STATICS unit - understanding forces involved in the game of human pyramid - can do a demonstration or an activity where cards or paper cups can be used for constructing a pyramid and understand how each cup is in equilibrium despite.

Reference

- XIth standard Tamilnadu State Board Physics Text Book, 2023 edition, Textbook Corporation Tamilnadu
- H.C.Verma, Concepts of Physics Vol 1 & Vol 2, Bharathi Bhavan Publishers, 1st edition, 2021

Web Reference

https://www.youtube.com/@Ch22PhysicsIITP

AL
https://www.youtube.com/playlist?list=PLyQSN7X0ro203puVhQsmCj9qhlFQ-As8e
https://youtube.com/playlist?list=PLFE3074A4CB751B2

P104	Basic Chemistry	L	T	P	C
Practicum		2	0	2	3

Introduction

Engineering is the application of the principles of basic science. The present syllabi of Basic Chemistry compiled for Diploma Engineering students restricts itself to certain limits, where it concentrates on basic concepts and useful applications viz. solution chemistry, surface chemistry, engineering polymeric materials like plastics, rubbers and electrochemistry, types of battery, preventions of corrosion. Enriching social awareness is an important component of education, hence, environmental chemistry aspects like air pollution, solid waste management and green chemistry are also included.

Course Objectives

The objective of this course is to enable the student to

1. Outline the importance of acids, base pH Indicators with industrial applications.
2. Illustrate the adsorption properties of colloidal particles, catalyst and their application.
3. Examine the engineering polymeric materials like rubber & plastics.
4. Explain about electrochemistry, electrochemical cells, batteries and to know about corrosion and prevention.
5. Appreciate the importance of Environmental Chemistry.

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Enumerate the concentration, strength & pH of acids & base.
CO2: Demonstrate the catalytic & colloidal principles & properties
CO3: Elucidate the composite & usage of plastics and polymer products
CO4: Articulate the principles in electroplating, batteries and corrosion.
CO5: Interpret the effect of environmental hazards and the need of Green Chemistry.

Pre-requisites

High School Science

P104	Basic Chemistry	L	T	P	C
Practicum		2	0	2	3

CO / PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	2		2	1	1
CO2	3	3	2		2	1	1
CO3	3	3	2		2	1	1
CO4	3	3	2		2	1	1
CO5	3	3	2		2	1	1

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.
- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples from daily life, realistic situations, and real-world engineering and technological applications.
- The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.
- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome- and employability-based.
- All demonstrations/Hand-on practices are under a simulated environment (may be followed by a real environment as far as possible).

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Written Test (Unit I & II)	Written Test (Unit III,IV & V)	Assignment	Lab Observation	Written Examination
Duration	2 Hours	2 Hours	…	…	3 hours
Exam Marks	50	50	…	…	100
Converted to	10	10	…	…	60
Marks	20		10	10	60

P104	Basic Chemistry	L	T	P	C
Practicum		2	0	2	3

Unit I SOLUTION CHEMISTRY **6 Hours**

Solution –Solute, Solvent - dilute and concentrated solution – methods of expressing the concentration of the solution – molality – molarity – normality(simple numerical problems only). Properties of acids and bases -Lewis concept of acids and bases – advantages - pH and pOH – Definition – Indicator – Definition – Buffer solution – Definition – Types of buffer solution with examples – Application of pH in industries.

Ex 1. Estimation of sulphuric acid **3 Hours**
Ex 2. Estimation of strong acid by pH metry **3 Hours**

Unit II SURFACE CHEMISTRY **6 Hours**

Colloids – Definition – True solution and Colloidal solution – Differences – lyophilic colloids and lyophobic colloids (definitions only) – Properties – Tyndall effect – Brownian movement – Industrial applications of colloids. Smoke Precipitation by Cottrell's method, Purification of water, Catalyst – Definition – Positive – Negative catalyst – Definition – Types of catalysis – Homogeneous and Heterogeneous catalysis examples– Characteristics of a catalyst – Industrial applications of catalysts.

Ex 3. Preparation of lyophilic colloids and lyophobic colloids **6 Hours**

Unit III POLYMER CHEMSITRY **6 Hours**

Plastics – types – Types of Polymerization-Addition and condensation polymerization Thermoplastics and Thermoset plastics – Differences – Mechanical properties of plastics – Advantages of plastics over traditional materials-Natural polymer – Rubber – Extraction of rubber from latex - defects of natural rubber – Vulcanization – Compounding of rubber – Ingredients and their functions.

Ex 4. Preparation of thermosetting resin-Urea-formaldehyde resins **6 Hours**

Unit IV ELECTRO CHEMISTRY **6 Hours**

Electronic concept of oxidation and reduction– electrolytes -classification-strong, weak and non-electrolyte – examples – electrolysis – definition – Mechanism – Industrial applications of Electrolysis - Chrome plating - Primary Battery – Secondary Battery – Definition, examples & construction of Li-ion Battery. Corrosion (Definition)– Differential aeration theory only – Factors Influencing Rate of Corrosion. – Methods of Prevention of Corrosion (qualitative).

Ex. 5. Estimation of Mohr's salt by per manganometry **3 Hours**
Ex. 6. Comparison of strength of two KMnO4 solutions **3 Hours**

Unit V ENVIRONMENTAL CHEMISTRY **6 Hours**

Air pollution – Definition – Air pollutants (SO_2, H_2S, HF, CO and Dust) – Sources and Harmful effects – Formation of Acid Rain – Harmful effects – Green House Effect – Causes – Ozone layer depletion and its harmful effects- Global warming – Harmful effects – Control of Air Pollution. Solid Waste – Definition – Problems – Types of Solid waste methods of Disposal – Land fill and Incineration – Recycling – Definition – Examples – Advantages of Recycling (Basic ideas) Green Chemistry Definition – Goals of Green Chemistry.

Ex 7. Crystallization of copper sulphate and identification of ions **3 Hours**
Ex 8. Decolorization of clayey water using sand bed. **3 Hours**

TOTAL HOURS 60

P104	Basic Chemistry	L	T	P	C
Practicum		2	0	2	3

Suggested List of Students Activity

- Mini Projects like working model of experiments like chrome plating, tinning and sand bed
- Better understanding through work sheets / Quiz/Oral Testing
- Crossword puzzles and poster making

Reference

- Textbook on Chemistry for XI standard (TN State Board)
- Textbook on Chemistry for XII standard (TN State Board)
- Essentials of Physical Chemistry, Bahl & Tuli, 28th edition, S.Chand Publishing House.
- A textbook of Engineering Chemistry, Dr.Sunita Rattan, 2020 reprint, S.K.Kataria&Sons
- Textbook of Physical Chemistry, P.L Soni,O.P.Dharmarha & U.N.Dash,2022 edition, S.Chand Publishing House.

Web Reference

https://libguides.lib.msu.edu/chemistry/teacholine
https://www.khanacademy.org/science/chemistry
https://phet.colorado.edu/
https://www.sciencebysimulation.com/chemreax/Faq.aspx

P105	Communicative English I	L	T	P	C
Practicum		1	0	2	2

Introduction

Language is a means of self-expression and one of the prime tools of communication. Communicative fluency augments one's personal, academic, social and professional life. The present syllabus focuses on four Communication Skills, viz. Listening, Speaking, Reading and Writing and enables the students at the Diploma level to gain confidence and fluency in communication which in turn would enhance them to face their career commitments with globalized standards.

Course Objectives

The objective of this course is to enable the student to

1. Use English confidently for practical purposes across the curriculum.
2. Express ideas in clear and grammatically correct usage
3. Plan, organize and present ideas coherently using cohesive devices.
4. Analyze, interpret, infer and evaluate ideas and respond appropriately.
5. Enable learners to communicate effectively and appropriately in real-life situations.

Course Outcomes

After successful completion of this course, the students should be able to

CO 1: Apply spoken English in various contexts, including conversations, lectures, and audio recordings.

CO 2: Demonstrate fluently and accurately in spoken English, using Appropriate vocabulary & grammar, and engage in conversations discussions, and presentations.

CO 3: Communicate effectively in English, demonstrating coherence, organization, and clarity in their spoken / written communication.

CO 4: Develop critical thinking skills by analyzing and evaluating the information presented in English, expressing opinions, and supporting arguments in a logical and coherent manner.

CO 5: Practice the language learning process, identify areas for improvement, and seek opportunities for further language development outside the classroom.

P105	Communicative English I	L	T	P	C
Practicum		1	0	2	2

CO / PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1						3	2
CO2						3	2
CO3						3	2
CO4						3	2
CO5						3	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

The instructional strategy for Communicative English classes employs a learner-centred and communicative approach that focuses on active student participation and engagement. Here are some key strategies to be followed:

- Communicative Activities: Design and facilitate activities that encourage students to actively use the language in meaningful and authentic contexts. This can include role plays, language games, discussions, debates, group projects, and problem- solving tasks.
- Pair and Group Work: Incorporate pair and group work opportunities to promote student interaction and collaboration. This allows them to practice and reinforce their language skills through communication with their peers.
- Authentic Materials: Utilize authentic materials such as news articles, videos, podcasts, and real-life texts to expose students to genuine language use and cultural contexts. This helps develop their comprehension and critical thinking skills while expanding their vocabulary and cultural awareness.
- Task-Based Learning: Implement task-based learning activities where students work on specific tasks or projects that require them to use English for a real-world purpose. This approach fosters language acquisition through meaningful communication and problem-solving.
- Language Input and Output Balance: Ensure a balance between language input (exposure to new vocabulary, grammar structures, and examples) and language output (opportunities for students to produce language). This balance allows students to build both receptive (Listening & Reading) and productive language skills (Speaking & Writing)

- Use of Technology: Incorporate technology tools and resources, such as language learning apps, online platforms, interactive multimedia, and virtual communication tools, to enhance engagement and provide additional language practice opportunities.
- Multimodal Approaches: Engage students through a variety of modalities, including listening, speaking, reading, and writing, as well as incorporating visual aids, gestures, and real-life examples. This caters to different learning styles and reinforces language learning through multiple channels.
- Regular Assessment and Reflection: Incorporate formative and summative assessments to gauge student progress and provide targeted feedback. Encourage students to reflect on their language learning journey, set goals, and actively monitor their own progress.

Assessment Methodology

<table>
<tr><td rowspan="2"></td><td colspan="4">Continuous Assessment (40 marks)</td><td colspan="2" rowspan="2">End Semester Examination (60 marks)</td></tr>
<tr><td>CA1</td><td>CA2</td><td>CA3</td><td>CA4</td></tr>
<tr><td>Mode</td><td>Written Test</td><td>Written Test</td><td>Lab Test</td><td>Quiz/MCQ/ Activity/ Assignment</td><td>Written Exam</td><td>Practical Exam</td></tr>
<tr><td>Duration</td><td colspan="3">2 hours</td><td>1 Hour</td><td>1½ hours</td><td>1½ hours</td></tr>
<tr><td>Exam Marks</td><td>30</td><td>30</td><td>30</td><td>10</td><td>50</td><td>50</td></tr>
<tr><td>Converted to</td><td>15</td><td>15</td><td>15</td><td>10</td><td colspan="2">60</td></tr>
<tr><td>Marks</td><td colspan="2">Best of CA1 & CA2 15 marks</td><td>15</td><td>10</td><td colspan="2">60</td></tr>
</table>

P105	Communicative English I	L	T	P	C
Practicum		1	0	2	2

Unit I EXPRESSIVE ENGLISH **3 Hours**

THEORY: 'Night of the Scorpion' by Nizim Ezekiel

FOCUS ON: Differentiating Open Class Words - (Noun, Verb, Adjective, Adverb) (Based on the poem)

PRACTICAL: (Lab / Activity) **6 Hours**

LISTENING: Simple and short poems on NATURE (Selected poems will be given) Identification: Nouns, Adjectives, Rhyming Words

Ex. 1 Listening to poems on NATURE and Identifying Nouns, Adjectives and Rhyming Words
A Short poem on Nature of 8 – 10 to be given. Students will be asked to listen to the audio played / poem read and identifies the nouns, adjectives and rhyming words used in the poem. Listening practice is to be given.
(To Be Recorded in the Record Note Book)

SPEAKING: Word Game (Essential words to be given) (Nouns, Verbs, Adjectives, Adverbs) Oral practice is to be given.

READING: Tongue Twisters (Selected 20 sentences will be given) Oral practice is to be given.

WRITING: Academic Letters (Model Letters to be given) Written practice is to be given.

Unit II CREATIVE ENGLISH **3 Hours**

THEORY: 'The River' by A.K.Ramanujam

FOCUS ON: Usage of Main Verb / Auxiliary Verb/ Modal Verb and Tenses

PRACTICAL: (Lab / Activity) **6 Hours**

LISTENING: General simple/short poems on MOTIVATION / SOFT SKILLS (Selected poems will be given). Fill ups: a) Information Gaps, b) Main Verbs/Modal Verbs. Listening practice is to be given.

SPEAKING: Useful Expressions (Greetings, Requesting. Asking / Eliciting information, Offering Suggestions / Opinions)

Ex. 2 Speaking - Useful Expressions - Students will be asked to give suitable expressions according to the context given. Speaking practice is given
(To Be Recorded in the Record Note Book)

READING: Comic Strips, Small Conversations. Oral practice is to be given.

WRITING: Sentence Making using Substitution Table (Based on Tenses)
Writing practice is given.

Unit III EFFECTIVE ENGLISH **3 Hours**

THEORY: PROSE COMBINED WITH LSRW SKILLS

FOCUS ON: Linkers & Connectives

PRACTICAL: (Lab / Activity) **6 Hours**

LISTENING: Short Story on Moral Value (Identifying Linkers). Listening practice is to be given.

SPEAKING: Just a Minute Talk (JAM) (Selected Topics can be given). Speaking practice is to be given

READING: General Paragraph on Moral Values (Selected passages given)

Ex. 3 Reading General Paragraph on Moral Values. Students will be asked to read the given passage on Moral Values with proper Stress and Intonation. Reading practice is to be given. (To Be Recorded in the Record Note Book)
WRITING: Note Taking/Summarization (Based on the General Paragraph given). Written practice is to be given.

Unit IV SITUATIONAL ENGLISH **3 Hours**
THEORY: PROSE COMBINED WITH LSRW SKILLS
FOCUS ON: Spotting the Errors in the given sentences
PRACTICAL: (Lab / Activity) **6 Hours**
LISTENING: General Conversations. Framing Sentences (Based on the words used in the conversation). Listening practice is to be given.
SPEAKING: Introducing Oneself / Others.

Ex. 4 Speaking - Introducing Oneself / Others. Students will be asked to Introduce himself/herself and their family members/friends. Speaking practice is to be given. (To Be Recorded in the Record Note Book)
READING: Reading General Paragraphs and identifying main points (Skimmimg). Reading practice is to be given.
WRITING: General Paragraph Writing (5 lines) (Hints to be given). Writing practice is to be given.

Unit V FUNCTIONAL ENGLISH **3 Hours**
THEORY: PROSE COMBINED WITH LSRW SKILLS
FOCUS ON: Passive Voice

PRACTICAL: (Lab / Activity) **6 Hours**
LISTENING: General passages related to technology (Comprehension Questions). Listening practice is to be given.
SPEAKING: Product description (Model exercises based on their respective branches to be given). Speaking practice is to be given.
READING: Reading technical passages and identifying specific points (Scanning) (Model passages for reading are given). Reading practice is to be given.
WRITING: Paragraph Writing (6 - 8 lines) Writing with a suitable Topic Sentence, Explanatory Sentences, Examples and using Link words (TEEL Model)

Ex. 5 Writing paragraph using TEEL model. Students will be asked to write a paragraph using the TEEL model of giving the Topic Sentence, Explanatory Sentences, Examples and using Link words. Writing practice is to be given. (To Be Recorded in the Record Note Book)

TOTAL HOURS – 45

P105	Communicative English I	L	T	P	C
Practicum		1	0	2	2

Suggested List of Students Activity

- Role Plays: Assign students different roles or scenarios and have them engage in conversations or situations to practice speaking and listening skills.
- Information Gap Activities: Create activities where students need to exchange information with each other to complete a task or solve a problem. This encourages communication and collaboration.
- Descriptive Presentations: Ask students to give presentations about a specific topic, describing it in detail and using appropriate vocabulary and language structures.
- Language Games: Incorporate language learning games like word puzzles, vocabulary quizzes, charades, or language board games to make learning enjoyable and interactive.
- Problem-Solving Tasks: Provide real-life or hypothetical problems that students must solve through discussion and collaboration. This encourages critical thinking and effective communication.
- News Discussions: Bring in current news articles or videos for students to discuss and express their opinions on various topics.
- Collaborative Writing: Assign group writing tasks where students collaborate to create a story, report, or presentation. This promotes teamwork and helps improve writing skills.
- Simulations: Create simulated scenarios or real-life situations where students must use English to navigate and interact, such as ordering food in a restaurant or booking a hotel room.

Text Books

- "Cambridge English Skills: Real Listening and Speaking" by Miles Craven
- "Writing Better English for ESL Learners" by Ed Swick
- "English Grammar in Use" by Raymond Murphy

Reference

- "Practical English Usage" by Michael Swan
- "Oxford Basics – Simple Reading Activities" by Jill Hadfield, Charles Hadfield
- "Oxford Basics – Simple Speaking Activities" by Jill Hadfield, Charles Hadfield

Web-based / Online Resources

https://www.bbc.co.uk/learningenglish/
https://www.fluentu.com/
https://www.englishclub.com/

P106	Basic Workshop Practices	L	T	P	C
Practicum		1	0	2	2

Introduction

Basic Workshop Practices help to develop the technical hands-on skills required by the technicians working in various Engineering sectors. This course intends to impart the basics of hand tools and their uses in different sections of manufacturing. The topics covered are based on the syllabus for diploma studies in Engineering. The course is planned to include basic practical experience in Fitting, Wiring and Plumbing. The courses are arranged in sequence, that starts from the basic concepts on safety rules followed in Industries, Dimensioning system, Basic Measuring instruments & basic tools used for Manufacturing processes. In this course, it is expected that the students would be able to get workshop experience, which helps to build an understanding of the complexity of the industrial job and the skills requirement of the jobs.

Course Objectives

The objective of this course is to enable the student to

1. Understand the importance of safety & Precautions in Industries.
2. Understand and practice the 5S system in Industries.
3. Identify suitable marking and measuring tools for materials.
4. Read the drawing and understand the dimensioning system.
5. Practical skills on Fitting, Plumbing & Wiring trades.

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Illustrate the safety aspects and 5s system in Industry.
CO2: Identify & select the appropriate tools required for specific operations.
CO3: Prepare the jobs according to the drawing for Fitting, Plumbing and Wiring.
CO4: Produce jobs as per specified dimensions and inspect the job for quality
CO5: Demonstrate the Fitting, Wiring and plumbing practices for house wiring practice, install and test a battery with hydrometer.

Pre-requisites

Nil

P106	Basic Workshop Practices	L	T	P	C
Practicum		1	0	2	2

CO / PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1						3	2
CO2						3	2
CO3						3	2
CO4						3	2
CO5						3	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

Instructional Strategy

- It is advised that teachers take steps to pique pupils' attention and boost their learning confidence.
- To help students learn and appreciate numerous concepts and principles in each area, teachers should provide examples from daily life, realistic situations, and real-world engineering and technological applications.
- The demonstration can make the subject exciting and foster in the students a scientific mindset. Student activities should be planned on all the topics.
- Throughout the course, a theory-demonstrate-practice-activity strategy may be used to ensure that learning is outcome- and employability-based.
- All demonstrations/Hand-on practices are under a simulated environment (may be followed by a real environment as far as possible).

P106	**Basic Workshop Practices**	L	T	P	C
Practicum		1	0	2	2

Assessment Methodology

	Continuous Assessment (40 marks)				End Semester Examination (60 marks)
	CA1	CA2	CA3	CA4	
Mode	Lab Assessment (Ex. 1, 2, 4, 7 & 8)	Lab Assessment (Ex. 3, 5, 6, 9 & 10)	Model Exam (Ex 1 to 10)	Class Assessment	Practical Examination
Duration	2 hours		3 hours	During Practice Hours, every exercise should be evaluated to	3 hours
Exam Marks	80	80	100	100	100
Converted to	10	10	10	10	60
Marks	20		20		60

P106	Basic Workshop Practices	L	T	P	C
Practicum		1	0	2	2

THEORY

Unit I SAFETY **3 Hours**

Introduction to safety – safety slogans – personal safety – personal protective Equipment - safety signs – caution sign, fire safety sign – sign posters – Industrial safety – machine safety rules – safety working practices, precaution to be taken to prevent electric shock-5S Principle – Sort, Set in order, Shine, Standardize and Sustain

Unit II DIMENSIONING SYSTEM **3 Hours**

Limits - fits – tolerances – Allowances - types of fits – hole basis system - shaft basis system – simple examples – difference – geometric dimensioning – flatness, straightness, circularity, concentricity, run out, parallelism, perpendicularity, Angularity, cylindricity

Unit III BASIC MEASURING INSTRUMENTS **3 Hours**

Basic instruments – steel rule, divider, calliper, try square, measuring tape, vernier calliper, micrometer - inside micrometer, outside micrometer - protractor- height gauge - dial gauge - V block, surface plate radius gauge, sine bar, slip gauge set, feeler gauge, wire gauge, Voltmeter, Ammeter, Multimeter.

Unit IV BASIC TOOLS **3 Hours**

Fitting : Work holding devices – bench vice, machine vice, fixture - tool holding devices – hacksaw frame, drill chuck, sleeve – fitting tools – files - types – punches - center, dot punches – hammer – types - claw hammer- scribers – chisel - drill bit - straight shank - Tapper shank-hand reamer -hand taps. Screwdriver – types, uses - cutting pliers-types, uses, hand drilling machine.

Wiring : Types of electrical wiring system – Single phase wiring - Three phase wiring – differences & applications

Plumbing : Pipe vice, wrenches- types - pipe wrench, adjustable wrench, chain wrench, pipe cutter, Solution to join pipes, thread sealing tape for pipe fitting- screws-types.

Unit V BASIC PRACTICES **3 Hours**

Fitting - Tools - Cutting practice – Filing practice. Wiring – Tools - wiring symbols - Circuit – Connection practice. Plumbing – Tools – type of joints - Joint practice.

Note: 1 Mark questions should be prepared unit wise (I to IV) as a question bank, the same can be used for the end semester examinations for 20 marks

TOTAL HOURS - 45

P106	**Basic Workshop Practices**	L	T	P	C
Practicum		1	0	2	2

PRACTICAL		
Ex.No	Name of the Exercise	Hours
1	Fitting - Cutting & Filing of a profile	2
2	Fitting - Drilling, Reaming, Tapping	2
3	Fitting - L-Mating	2
4	Wiring – Draw the circuit diagram and connect for the connection of Two lamp, two switch with socket – parallel and series connection.	2
5	Wiring - Draw the circuit diagram and connect the connection for Fan-switch-regulator.	2
6	Wiring - Draw the circuit diagram and connect for the Stair case wiring	2
7	Installation of a battery, Charging and testing a Battery with hydrometer	2
8	Plumbing - Connect a tap using - PVC pipe, fittings and a tap	2
9	Plumbing – Connect the pipe line for the Sink / wash basin	2
10	Plumbing - Connect the pipe line for the connection for Rain water harvesting	2
Practice + Continuous Test + Revision		10
TOTAL HOURS		30

Allocation of Marks

Part	Description	Marks
Fitting / Wiring / Plumbing		
A	Marking / Circuit diagram	25
B	List of tools	10
C	Cutting and Filing / Circuit / Pipe Connection	25
D	Dimension / Verification of Connection	20
E	Written Test (Theory Portion)	20
TOTAL MARKS		100

Note: Two Mark questions shall be given from the Theory Portions. 10 X 2 = 20 Marks

P106	Basic Workshop Practices	L	T	P	C
Practicum		1	0	2	2

Suggested list of students activity

Prepare/Download a specification of the following:

- Various tools & Equipment in various shops.
- Precision equipment in the workshop.
- Various machinery in the workshop.
- Visit any fabrication/woodworking workshop and prepare a report.
- Prepare a 5S chart for each machine in your workshop and maintain this report during your Lab hours.

Text Books

- A Textbook of Manufacturing Process, Gupta, J.K., Khurmi, R.S. S.Chand and Co. New Delhi ISBN:81-219-3092-8 (Workshop Tech.) Publication.
- A Text Book of Electrical Technology B.L.Theraja, A.K.Theraja – S.Chand& CompanyLtd.

Reference Books

- Basic Manufacturing “Roger Timings” Third Edition – Newnes, An imprint of
- Elsevier.
- Industrial Organisation and Engineering Economics – “T.R. Banga, S.C.Sharma”- Khanna Publishers
- Industrial Engineering and Management “O.P.Khana” – Dhanbat Rai Publications.
- Machine Drawing -K.L.Narayana, P.kannaiah, K.Venkatareddy – New Age
- International Publishers.
- Workshop practices, H S Bawa, Tata McGraw-Hill, 2009
- Elements of workshop Technology, Hajra Choudhury S. K., Hajra Choudry A.K. and Nirjhar Joy.
- Workshop Technology by Chapman W.A.J and Arnold E.

Web-based/Online Resources

https://onlinecourses.nptel.ac.in

Additional Instructions

- For the record of work done notebook or manual may be used. In this, the student should draw a diagram, and mention the readings/observations, calculations and result manually. The same has to be submitted for the end-semester examination on the first attempt.
- The proper safety procedure and norms should be followed with proper uniform with safety shoes during the practices.
- All the Exercise should be completed.

P107	Digital Workplace Skills	L	T	P	C
Practical		0	0	4	2

Introduction

Being able to embrace new technology in the workplace helps to streamline working processes. Digital workplace skills provide knowledge for sharing and collaboration in many new and effective ways. It is used in a connected digital environment providing access to share, present, and report information effectively and efficiently to increase productivity in a safe & secure environment.

Course Objectives

The objective of this course is to enable the student to

1. Introduce the basics of computer hardware, operating systems, and Internet usage.
2. Explore various office productivity tools and text processing.
3. Apply various information analysis tools with the help of spreadsheets.
4. Understand the effective presentation of information.
5. Identify the communication and security tools for information protection.

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Demonstrate the ability to use various operating systems and internet utilities.
CO2: Experiment various office productivity tools.
CO3: Analyze the information gathered with the help of spreadsheet
CO4: Explore the various communication tools available
CO5: Identify the appropriate tools for securing the information.

Pre-requisites: Nil

CO / PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3	3	3			3	1
CO2	3	3	3			3	2
CO3	3	3	3			3	1
CO4	3	3	3			3	2
CO5	3	3	3			3	2

Legend: 3-High Correlation, 2-Medium Correlation, 1-Low Correlation

P107	Digital Workplace Skills	L	T	P	C
Practical		0	0	4	2

Assessment Methodology

	Continuous Assessment (40 marks)			End Semester Examination
	CA1	CA2	CA2	
Mode	Practical Test (Ex. 1 to 5)	Practical Test (Ex. 6 to 10)	Practical Record Submission	Practical Examination
Duration	2 hours		--	3 hours
Exam Marks	40	40	20	100
Converted to	10	10	20	60
Marks	40			60

P107	Digital Workplace Skills	L	T	P	C
Practical		0	0	4	2

Unit I INTRODUCTION TO DIGITAL WORKPLACE **2 Hours**

Basics of computer - understanding of various computer hardware components (CPU, Memory unit, Display, keyboard, mouse, hard disk and other peripheral devices) and operating systems (Windows, Linux)

Ex No 1 **4 Hours**

a) Basic Navigations in Operating Systems - Windows, Ubuntu etc

b) Usage of Browsers (Edge, chrome etc)

c) Usage of search engines (Google, Bing etc)

(Students have to use any one tool in End Examination for each of above exercise)

Unit II BASIC PRODUCTIVITY TOOLS **2 Hours**

Exploring office tools- word document creation, basic editing, formatting, Tables, Page Break, Equations, Hyperlinks, and Pictures.

Ex No 2 **4 Hours**

Create a document with basic editing, formatting options, Tables, Equations, Hyperlinks, Pictures

Ex No 3 **4 Hours**

Create a standard covering letter and use mail merge to generate customized letters and generate labels by creating a database.

Unit III INFORMATION ANALYSIS **2 Hours**

Sorting, Filtering, and creation of different charts. Print Preview, Printing, Shortcuts and Exercises. –using Excel /Google Sheets.

Ex No 4 **4 Hours**

Spreadsheet creation, data handling, formatting, calculations using formulae and functions using Excel / Google Sheets. (Students have to use any one tool in Board Examination)

Ex No 5 **4 Hours**

Sorting, Filtering, and creation of different charts. Print Preview, Printing-Using Excel / Google Sheets. (Students have to use any one tool in Board Examination)

Unit IV INFORMATION PRESENTATION

Creation of presentation, formatting, video and sound, slide animation, shortcuts – MS Power point, Google slides. Canva, Figma –designing.

Ex No 6 **4 Hours**

Creation of Presentation, editing, saving, Slide creation, Charts, Tables, Pictures, Smart Art, Slide Number, Header, Footer, Date, Shapes, Video and Sound. Slide Animation, Running a slide show, Print Preview. –PowerPoint, Google slides etc (Students have to use any one tool in Board Examination)

Ex No 7. **4 Hours**

Designing with Canva, Figma.

(Students have to do any one tool in End Examination)

Unit V COMMUNICATION TOOLS AND INTRODUCTION TO INFORMATION SECURITY **3 Hours**

Introduction to email and usage, overview of video and web conferencing tools, texting tools. Productivity tools in the browser-extension, Introduction to cyber security. Information management-Create a repository using Google Drive.

Ex No 8 **4 Hours**

a. Scheduling–meetings–Google Calendar. b. Mail–Gmail c. Information management-Collection of student Bio data using google forms

Ex No 9 **4 Hours**

Hands-on Video Conferencing Experience with Webex, zoom ,Google Meet etc (Any one tool for board practical examination).

Ex No 10 **4 Hours**

Password protection for sheets, Google drive sharing–permission.

Internal Assessment - **4 Hours**

Total Hours **60 Hours**

Text Books

- NCERT, Chapter 1-3: Computer System, Encoding Scheme and Number Systems, Emerging Trends, Class XI, 2023.
- Carey, P., Des Jardins, C., Shaffer, A., Shellman, M. and Vodnik, S., New Perspectives Microsoft Office 365 & Office 2019: Introductory. Cengage Learning. ISBN:978-0357025741

Reference Book

- LawrenceMiller,KevinStrohmeyer,andMarkMargevicius,DigitalWorkspace,2019 by John Wiley & Sons Inc., Hoboken, NewJersey
- AnandShinde , Introduction to Cyber Security : Guide to the World of Cyber Security, Notion Press, 1st edition, 2021, ISBN:978-1637816424.

Web-based/Online Resources

https://www.futurelearn.com/info/blog/the-complete-guide-to-digital-skills
https://applieddigitalskills.withgoogle.com/
https://resources.owllabs.com/blog/video-conferencing-tools
https://www.canva.com/
https://www.figma.com/

P107	Digital Workplace Skills	L	T	P	C
Practical		0	0	4	2

Allocation of Marks for End Semester Examinations

Part	Description	Marks
A	Aim	10
B	Procedure	40
C	Execution	35
D	Result	10
E	Viva-voce	5
TOTAL MARKS		100

P108	Basic English for Employability	L	T	P	C
Practical		0	0	4	2

Course Objectives

This course has two parts. A 20-hour exercise-based course and 40-hour face-to-face course.

The aim of the face-to-face course is to help develop their English language, communicative and allied skills through a series of reading, listening, grammar, speaking and topical lessons. The methodology through which the lessons are facilitated provide more opportunities for the learners to use the language they have acquired with constant monitoring and feedback.

The exercise-based course is a series of lessons which will be monitored by the faculty of the college. Each lesson focuses on reading, writing, listening, speaking, grammar and vocabulary.

Course Outcomes

Students will be able to:

1. Read and understand routine information and instructions, and the basic meaning of non-routine information only in a familiar area and re-reading as required.
2. Understand phrases and expression related to areas of personal, social and professional domains provided speech is clearly articulated.
3. Have basic conversations in English - in person and over the telephone
4. Successfully manage group discussion
5. Deliver short talks on familiar topics with confidence
6. Complete short essays on familiar topics
7. Use better and more varied vocabulary

P108	Basic English for Employability	L	T	P	C
Practical		0	0	4	2

Course Content

UNIT 1

Functional language (speaking) - Greetings, Introductions and Farewell - Reading (posters) - for gist and for detail - Grammar refresher - Functional language (writing) - likes and dislikes Listening (monologue) - for gist and for detail - Reading (catalogues) - for gist and for detail Grammar - Present simple (Be verb)

UNIT 2

Functional language (speaking) - Habits & routines using frequency - Functional language (Writing) - culture of a place - Listening (conversation)- gist and detail - Functional language (speaking) - Time References - Reading (news using past tense) - for gist and for detail - Grammar - Simple past - Functional language (Writing) - Describing past experiences - Listening (news using past tense) - gist and details

UNIT 3

Reading (newspaper article) - for gist and for detail - Grammar - Simple future - Functional language (speaking) - future plans - Functional language (Writing) - Making choices - Listening (newspaper article)- for gist and detail - Reading (signs and notices) - for gist and for detail - Grammar – Articles - Listening (announcements) - for gist and for detail

UNIT 4

Functional Language (speaking) - Expressing Opinions - Functional language (speaking) - Likes and dislikes - Reading (job advertisements) - for gist and for detail - Grammar – Pronouns - Listening (news)- gist and detail Functional language (speaking) – Thanks and apologies Functional language (speaking) – agree and disagree - Reading (email) – for gist and for detail

UNIT 5

Grammar – Prepositions - Listening (directions) - gist and details - Functional language (speaking) – Giving directions - Functional language (speaking) - enquiring/asking questions - Reading (newspaper article) - for gist and for detail - Grammar – modals Listening (conversation)- for gist and detail - Functional language (speaking) - day to day transactions (banks, post office, shops)

P108	Basic English for Employability	L	T	P	C
Practical		0	0	4	2

EXERCISE BASED COURSE

UNIT 1
Reading (descriptive) - for gist and detail - Grammar - Adjectives - Mind-mapping and writing structure - Listening (descriptive) - for gist & detail

UNIT 2
Functional Language (writing) - Describe personal experiences - Reading (prospectus) - for locate and isolate - Grammar - Conjunctions - Functional language (speaking) - Making comparisons

UNIT 3
Listening (prospectus) - for locate and isolate - Functional Language (speaking) - expressing feelings and emotions - Reading (geographical information) - for gist and detail – Punctuations

UNIT 4
Functional Language (speaking) - giving reasons and explanations - Listening (geographical information) - for gist & detail - Functional Language (writing) - Making appointments & reservations - Reading (rules & regulation) - for gist and detail

UNIT 5
Grammar – Adverbs - Functional Language (Speaking) - Accepting & Rejecting offers and invitations - Listening (rules and regulations) - for gist & detail - Phonics - Commonly Made Speaking Errors

For Further Reading

- English Grammar and Composition – Wren and Martin
- The Elements of Style – Strunk and White
- The Elevate Series (Improve English skills) – Shefali Ray, Samathmika Balaji and
- Simran Luthra
- Common Errors in Everyday English – Saumya Sharma
- Spoken English for My World – Sabina Pillai
- Email Writing for Beginners: Examples, Etiquette, and Mistakes – Yogesh Vermani
- Malgudi Days – RK Narayan
- Time Stops at Shamli – Ruskin Bond
- The Blue Umbrella – Ruskin Bond

Reference
A workbook will be provided to each student for future reference.
Software Requirement

- Chrome version 52+, or Firefox version 50+, or Edge Windows 10 build 15019
- Operating System – Windows7+, Ubuntu
- Access to You Tube
- Access to https://english.steptest.in/
- Stable internet connection with 2Mbps speed via Wi-Fi or Ethernet or 4G hotspot

Hardware Requirement

- Desktop or laptop
- Compatible speakers or headphones with microphone
- Projector