

Name of the Course : All Branches in Diploma in Engineering and Technology (Development of Life Skills - II)		
Course code : CE/ME/IE/EJ/DE/ET/EX/EE/EP/CO/IF/IS/ CO/CM/IF/CV/MH/FE/IU/CD/ED/EI		Semester : FOURTH
Duration: One Semester (16 hours)		Maximum Marks: 50
Teaching Scheme		Examination Scheme:
Theory: 01 hrs / week		Internal Sessional: 25
Tutorial: -- hrs / week		External Sessional : 25
Practical: 02 hrs / week		
UNITS	CONTENTS	Hours
Unit - 1	Interpersonal Relation Importance, Interpersonal conflicts, Resolution of conflicts, Developing effective interpersonal skills - communication and conversational skills, Human Relation Skills (People Skills)	5
Unit - 2	Problem Solving I) Steps in Problem Solving (Who? What? Where? When? Why? How? How much?) 1. Identify, understand and clarify the problem 2. Information gathering related to problem 3. Evaluate the evidence 4. Consider feasible options and their implications 5. Choose and implement the best alternative 6. Review II) Problem Solving Technique 1. Trial and Error, 2. Brain Storming 3. Thinking outside the Box	8
Unit - 3	Presentation Skills Concept, Purpose of effective presentations, Components of Effective Presentations : understanding the topic, selecting the right information, organising the process interestingly, Good attractive beginning, Summarising and concluding, adding impact to the ending, Use of audio-visual aids - OHP, LCD projector, White board, Non-verbal communication : Posture, Gestures, Eye-contact and facial expression, Voice and Language - Volume, pitch, Inflection, Speed, Pause, Pronunciation, Articulation, Language Handling questions - Respond, Answer, Check, Encourage, Return to presentation Evaluating the presentation - Before the presentation, During the presentation, After the presentation	8

Unit - 4	Looking for a Job Identifying different sources announcing Job vacancies, Skim, scan and read advertisements in detail, write efficacious CVs, write covering letters to accompany CVs, write Job Application Letters - in response to advertisements and self-applications	5
Unit - 5	Job Interviews Prepare for Interviews : Intelligently anticipating possible questions and framing appropriate answers, Do's and don'ts of an interview (both verbal and non-verbal), Group Discussion: Use of Non-verbal behaviour in Group Discussion, Appropriate use of language in group interaction, Do's and don'ts for a successful Group Discussion	10
Unit - 6	Non-verbal - graphic communication Non - verbal codes: A - Kinesics, B - Proxemics, C- Haptics, D - Vocalics, E- Physical appearance, F- Chronemics, G - Artifacts Aspects of Body Language	6
Unit - 7	Formal Written Skills: Memos, E-mails, Netiquettes, Business correspondence - Letter of enquiry, Letter of Placing Orders, Letter of Complaint	6
Total		48

Sessional Activities	
Unit - 1 Interpersonal Relation	Case Studies: 1. from books 2. from real life situations 3. from students' experiences Group discussions on the above and step by step write of any one or more of these in the sessional copies
Unit - II Problem Solving	Case Studies: 1. from books 2. from real life situations 3. from students' experiences Group discussions on the above and step by step write of any one or more of these in the sessional copies
Unit - III Presentation Skills	Prepare a Presentation (with the help of a Powerpoint) on a Particular topic. The students may refer to the Sessional activity (sl. No. 8) of the Computer Fundamental syllabus of Semester 1. For engineering subject-oriented technical topics the co-operation of a subject teacher may be sought. Attach handout of PPT in the sessional copy
Unit - IV Looking for a job	Write an effective CV and covering letter for it. Write a Job Application letter in reponse to an advertisement and a Self Application Letter for a job.

Unit - V Job Interviews & Group Discussions	Write down the anticipated possible questions for personal interview (HR) along with their appropriate responses Face mock interviews. The co-operation of HR personnels of industries may be sought if possible Videos of Mock Group Discussions and Interviews may be shown
Unit - 7 Formal Written Skills	write a memo, write an effective official e-mail, write a letter of enquiry, letter of placing orders, letter of complaint



West Bengal State Council of Technical Education

(A Statutory Body under West Bengal Act XXI of 1995)
Kolkata Karigori Bhavan, 2nd Floor, 110 S. N. Banerjee Road, Kolkata - 700 013.

Syllabus for : PROCESS HEAT TRANSFER

Name of the Course: PROCESS HEAT TRANSFER			
Course Code:		Semester: 4th	
Duration: : Seventeen weeks		Maximum Marks: 150	
Teaching Scheme		Examination Scheme	
Theory: 3 hrs./week		Mid Semester Exam.:20Marks	
Tutorial: Nil hrs./week		Attendance & Teacher's Assessment 10 Marks	
Practical: hrs./week		End Semester Exam.:70Marks	
Credit: 5		Practical : 50	
Aim:			
Sl. No.			
1.	Understand the basic principles of heat transfer.		
2.	Analyze logically the different types of heat transfer.		
3.	Solve different problems using mathematics as a tool.		
4.	The knowledge of heat transfer is essential in understanding the mechanism of transfer of heat in chemical process plant & equipment.		
5.	The subject would help in design and performance evaluation of the heat exchangers, evaporators.		
Objective:			
Sl. No.			
1.	Basic ideas on heat transfer types.		
2.	Detailed description of Conduction , Convection and Radiation.		
3.	Fundamental concept of Heat exchanger and Evaporator with problems.		
Pre-Requisite:			
Sl. No.			
1.	Elementary knowledge on physics and mathematics		
2.	Basic knowledge in Algebra and Differential Calculus		
Contents :		TOTAL PERIODS: 51 hrs /week	
		Hrs./Unit	Marks
Unit: 1	MECHANISM OF HEAT TRANSFER	Conduction — Convection — Radiation — Concept of steady & unsteady state heat transfer process	6

Unit: 2 CONDUCTION	One-dimensional Fourier's equation — Steady state heat transfer through single material, composite material, composite cylinders and spheres — Heat loss through pipe walls & concept of critical insulation thickness — Simple problems	12	
Unit: 3 CONVECTION	Basic concept of natural & forced convection — Importance of dimensionless numbers involved in convective heat transfer process: Reynolds's number — Prandtl number — Nusselt number — Grashoff number — Forced convection inside tube — Simple problems	8	
Unit: 4 RADIATION	Definition of: Black Body — Grey Body — Emissivity — Reflectivity — Absorptivity — Transmissivity — Kirchoff's law — Stephan-Boltzmann law — Black body radiation — Simple problems	8	
Unit: 5 HEAT EXCHANGERS	Concept of log-mean temperature difference — Individual & overall heat transfer co-efficient — Double pipe heat exchanger — Shell & tube heat exchanger & their industrial application — Simple problems	9	
Unit: 6 EVAPORATOR	Types of evaporators — Elementary principles of single & multiple effect evaporators — Basic calculation of single effect evaporator — Simple problems	8	
Total		51	

Text Books:

Name of Authors	Title of the Book	Edition	Name of the Publisher
D.Q. Kern	Process Heat Transfer		McGraw-Hill Book Co. Ltd., New York
McCabe and Smith	Unit Operations of Chemical Engineering		McGraw-Hill Book Co. Ltd., New York
S.K. Ghosal, S.K. Sanyal, S. Datta	Introduction to Chemical Engineering		Tata McGraw-Hill

Reference Books:			
Name of Authors	Title of the Book	Edition	Name of the Publisher
Coulson and Richardson	Chemical Engineering (in SI units), Vol. 1 & 4 /		Pargamon Press, Oxford
Sl. No.	Question Paper setting tips		
A	Short questions: 20 marks, students will answer 20 questions out of 25 questions, each carrying 1 mark.		
B	Long questions: 50 marks, students will answer 5 questions out of 8 questions, each carrying 10 mark.		



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Syllabus for : Mechanical Operation

Name of the Course: Mechanical Operation			
Course Code:		Semester: Fourth	
Duration: : Seventeen weeks		Maximum Marks: 200	
Teaching Scheme		Examination Scheme	
Theory: 3 hrs./week		Mid Semester Exam.:20Marks	
Tutorial: Nil hrs./week		Attendance & Teacher's Assessment 10 Marks	
Practical: 3 hrs./week		End Semester Exam.:70Marks	
Credit: 5		Practical : 100	
Aim:			
Sl. No.			
1.	To provide knowledge on selection of pump for a specific installation.		
2.	To provide knowledge on common trouble associated with pump operation & troubleshooting.		
3.	To provide knowledge on size reduction equipments & energy required for size reduction.		
4.	To provide knowledge on separation of heterogeneous mixture.		
Objective:			
Sl. No.			
1.	To educate students on various types of mechanical operation equipments as used in chemical process industries with basic ideas on operating principles & efficiency of the equipments.		
Pre-Requisite:			
Sl. No.			
1.	Basic knowledge of mathematics to solve the problems.		
2.	Analytical approach towards the subject.		
Contents :		TOTAL PERIODS: 51hrs/wk	
		Hrs./Unit	Mark s
Unit: 1 PUMP	Classification of pumps –Positive Displacement Pump – Centrifugal pump, Rotary pump –Characteristic Curves of pump -- Pump Selection for Industrial application — Pump specification -- Head developed by pump — Cavitation — NPSH	7	
Unit: 2 SIZE REDUCTION	Crushing & grinding — Laws of crushing — Close circuit & open circuit — Dry & wet, free & choke grinding (simple problems) — Working principle of jaw crusher — Roll crusher — Hammer mill — Ball mill	10	

Unit: 3 SIZE ENLARGEMENT OPERATION	Granulation — Flocculation — extrusion	3	
Unit: 4 MECHANICAL SEPARATION OPERATIONS & SEPARATING EQUIPMENTS	Sampling — Screening (simple problems) — Elutriation — Froth Flotation — Jigging — Heavy media separation Principle, Description & Application of Cyclone Separator — Bag Filter — Electrostatic Precipitator — Electromagnetic Separator	15	
Unit: 5 FILTRATION & WASHING	Constant Rate & Constant Pressure Filtration — Batch & Continuous Filtration equipment --- Plate & Frame filter, Rotary Drum Filter, Leaf filter (principle, description, application) --- Filter Aids — Simple problems	10	
Unit: 6 FUNDAMENTALS OF MIXING & MIXING EQUIPMENT	Types of impellers used in stirred tank — Study of power consumption of mixers — Dimensional analysis of power consumption — Construction and working of stirred tank mixer & sigma mixer	6	
Total		51	
Text Books:			
Name of Authors	Title of the Book	Edition	Name of the Publisher
McCabe and Smith	Unit operations of Chemical Engineering	4 th ed. /	Tata McGraw Hill
Badger & Banchero	Introduction to Chemical Engineering		McGraw-Hill Book Co. Ltd., New York and Kogakusha Co. Ltd., Tokyo
Reference Books:			
Name of Authors	Title of the Book	Edition	Name of the Publisher
Ghosal, Sanyal and Dutta	Introduction to Chemical Engineering		Tata McGraw-Hill, New Delhi
Coulson & Richardson /	Chemical Engineering, Vol. 2 & 5		Pergamon Press, Oxford
Sl. No.	Question Paper setting tips		
A	Short questions:20 marks, students will answer 20 questions out of 25 questions each carrying 1 mark		
B	Long question:50 marks, students will answer 5 questions out of 8 questions each carrying 10 marks.		



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Syllabus for : Energy Engineering for D.Ch.E-II(SEM-II)

Name of the Course: Energy Engineering	
Course Code:	Semester: Fourth
Duration: : Seventeen weeks	Maximum Marks: 150
Teaching Scheme	Examination Scheme
Theory: 3hrs./week, total 51 weeks	Mid Semester Exam.:20Marks
Tutorial: Nil hrs./week	Attendance & Teacher's Assessment 10 Marks
Practical:3 hrs./week	End Semester Exam.:70Marks
Credit: 5	Practical:50
Aim:	
Sl. No.	
1.	It imparts knowledge about various energy sources.
2.	Imparts energy awareness among students during this intense energy crisis era.
3.	Provides knowledge about Renewable & Non-renewable energy sources and their processing techniques
4.	Economic use of energy
5.	Means of energy conservation & future energy availability.
Objective:	
Sl. No.	
1.	Non-renewable & Renewable sources of energy- Indian scenario & prospect . Brief idea about Wind, Tidal, Biomass & Geothermal energy.
2.	Non-renewable sources of energy Coal: various aspects of coal washing, carbonization, source, composition, classification ,properties etc.
3.	Liquid Fuel Study of Petroleum products.
4.	Gaseous Fuels Study of Water Gas, Producer Gas, Coal Gas etc Major Gasification Processes.
5.	Nuclear Energy Nuclear Fuel Types, Coolants, various specialties of Nuclear power generation Concept of Atomic Power generation.
6.	Solar Energy Measurement of Solar Radiation Measuring Instruments.

7	Furnace & Kilns			
Pre-Requisite:				
Sl. No.				
1.	Knowledge of basic Physics & Chemistry			
2.	Basic concepts of Chemical Engineering Unit Operations.			
			Hrs./Unit	Mark s
Unit: 1: Non- renewable & renewable sources of energy	Brief idea of different types of renewable energy like Wind –Biomass-Tidal-Ocean thermal-Geothermal etc types of energy.	4		
Unit: 2: Non- renewable source of energy:Coal	Origin ,classification, composition, Proximate & Ultimate analysis , properties such as net & gross Calorific value, caking Index, Swelling Index etc Washing & Storage of Coal, Briquetting, High & Low Temperature Carbonisation --- Lurgi-Spul gas LTC, Beehive Coke Oven, By-product Slot type Coke oven, Recovery of By-products(Direct, Indirect & Semi direct processes).	12		
Unit3 : Liquid Fuel Petroleum	Composition of Liquid Fuel , Distillation(ADU& VDU) products with their boiling range & uses. Knocking properties, Anti-knock compound, Octane & Cetane Number. Properties of liquid fuel e.g Pour point, Flash point, Fire point, Smoke point, Char value, Aniline point, Diesel index, Viscosity index, Calorific value-brief idea.	8		
Unit4: Gaseous Fuels	Manufacture of Water Gas, Carburetted Water gas, Producer gas, Coal Gas, Blast Furnace Gas. Gasification- Kopper-Totzek process, Lurgi Gasifier, Winkler process.	10		
Unit5: Nuclear Energy	Fission & Fertile Fuel, Coolants, Nuclear fuel cycle, Nuclear reactions. Fuel conversion & Breeding , Atomic Power Plants.	6		
Unit6: Solar Energy	Direct & Scattered Radiation, Solar Constant, Diurnal & Height variation of direct sunlight. Instruments—Pyrometer, Pyranometer, Pyrheliometer, Flat Plate Collector, Solar Pond.	6		
Unit 7: Furnace & Kilns	Classifications of Furnaces, Working principle of Metallurgical, Ceramic & Electric Furnaces. Waste heat Recovery systems.	5		
			51	
Text Books:				
Name of Authors	Title of the Book	Edition	Name of the Publisher	

Samir Sarkar	Fuels & Combustion	Orient Longman	
Himus	Elements of Fuel Technology	Leonard Hill Ltd	
O.P.Gupta	Elements of Fuels, Furnaces, & Refractories	Khanna Publishers	
Reference Books:			
Name of Authors		Title of the Book	Name of the Publisher
Sl. No.	Question Paper setting tips		
A	Short questions: 20 marks, students will answer 20 questions out of 25 questions, each carrying 1 mark.		
B	Long questions: 50 marks, students will answer 5 questions out of 8 questions, each carrying 10 mark.		



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Syllabus For MATERIAL SCIENCE

Name of the Course: MATERIAL SCIENCE	
Subject Code:	Semester: Fourth
Duration: 17 Weeks	Maximum Marks: 100
Teaching Scheme	Examination Scheme
Theory: 3hrs./week	Mid Semester Exam.: 20 Marks
Tutorial: Nil	Attendance, Assignment & interaction: 10 Marks
Practical: Nil	End Semester Exam.: 70 Marks
Credit: 3	
Aim:	
Sl. No.	
1.	This subject will provide an exposure to the students about different types of materials.
2.	It will provide the knowledge of Crystal Structure.
3.	This will make the students familiar with the Equilibrium Diagram.
4.	This subject will provide an idea about Mechanical Properties.
5.	It will provide the knowledge of Heat Treatment.
6.	It will also provide knowledge Corrosion of metals & its prevention.
7.	It will provide an exposure the students about Alloys & Composite Materials.
Objective:	
Sl. No.	Students will be able to Learn :
1	About the classification of materials & examples of each type. Classification of Electrical Engineering materials & examples of each type. Classification of Magnetic materials & examples of each type. Basic idea about the properties of materials.
2.	Basic idea about the Crystal structure – BCC crystal , FCC crystal , HCP crystal.
3.	Phase rule, Degrees of freedom, Equilibrium diagram.
4.	The elementary idea about Heat Treatment
5	The elementary idea about Mechanical properties.

6.	About Corrosion & its Prevention.
7.	About the names of some important Alloys & Composite materials and their uses.
Pre-Requisite:	
Sl. No.	
1.	Knowledge of basic concepts of science such as physics, chemistry.

Contents : MATERIAL SCIENCE TOTAL 51 hrs /week		hrs/Unit	Marks
Unit I: INTRODUCTION	<p>Meaning of Material Science, Classification of materials, Basic idea about Metals, Alloys, Ceramic materials, organic materials with suitable examples.</p> <p>Classification of Electrical engineering materials with examples. (Details not necessary)</p> <p>Classification of Magnetic materials with examples. (Details not necessary)</p> <p>Basic idea about the properties of materials.</p>	10	
Unit II CRYSTAL STRUCTURE	<p>Concept of Crystal Structure : Definition of Unit Cell, Space lattice, Lattice points, Lattice spacing.</p> <p>Crystal structures for metallic elements : BCC, FCC, HCP (Details not necessary).</p> <p>Basic idea about Solid Solution, Classification of Solid Solution. (Details not necessary).</p>	4	

Unit III : EQUILIBRIUM DIAGRAM	Concept of Phase, Gibb's Phase rule, Degrees of Freedom, Binary Equilibrium Diagram, Eutectic phase diagram. Iron – Carbon equilibrium diagram , Definition of Critical temperature.	10	
Unit IV : HEAT TREATMENT OF STEELS	Concept of Heat Treatment. Typical heat treatment processes of Steels like Annealing, Normalising, Quenching, Tempering, Case hardening , Induction hardening, Flame hardening, Carburising, Cyaniding, Nitriding . (Process details are not necessary.)	8	
Unit V: MECHANICAL PROPERTIES	Stress – Strain Curve for Engineering materials. Fundamental properties : Strength, Elasticity, Stiffness, Plasticity, Ductility, Hardness, Toughness, Creep, Creep curve, Creep resistance, Creep Resistant materials.(Testing methods are not necessary).	7	
Unit VI: CORROSION AND ITS PREVENTION	General aspects of Corrosion. Factors influencing Corrosion. Types of Corrosion Control and Prevention of Corrosion.	7	
Unit VII: ENGINEERING ALLOYS	Composition and uses of some important alloys like – Low Carbon Steel, Mild Steel, Medium Carbon Steel, Stainless Steel, Brass, Bronze.	3	
Unit VIII: COMPOSITE MATERIAL	Elementary idea about composite materials. (Only the names of some important composite materials & uses.)	2	
TOTAL		51	

Text and reference books:

Sl. No.	Title of the Book	Name of Authors	Publisher
1.	A Text Book of Material Science & Engineering	R.K Rajput	S.K. Kataria & Sons , New Delhi.
2.	Material Science and Engineering,	Raghavan:	Prentice Hall of India Pvt. Ltd., New Delhi
3.	Engineering Physical Metallurgy	Lakhtin	MIR Publisher, Moscow.

Question Paper Setting Tips :

Short questions :20 marks, Students will answer 20 questions out of 25 questions ,each carrying 1 mark

Long question :50 marks ,Students will answer 5 questions , out of 8 questions, each carrying 10 marks.



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Name of the Course : ENERGY ENGINEERING LABORATORY	
Course Code:	Semester: fourth
Duration: : Seventeen weeks	Maximum Marks: 50
Practical: 3 hrs./week	
Credit: 2	

Sl. No.	Skills to be developed
1	Proper handling of instruments.
2.	Measuring physical quantities accurately.
3.	To observe the phenomenon and to list the observations in proper tabular form.
4.	To adopt proper procedure and precautions while performing the experiment.
5.	To plot the graphs
6.	To verify the principles, laws, using given instruments under different conditions.

Examination scheme: Maximum marks: 50

1. **Continuous Internal Assessment of 25 marks** is to be carried out by the teachers throughout the Part – II SECOND Semester. **Distribution of marks:** Performance of Job –15 Report–10
2. **External Assessment of 25 marks** shall be held at the end of the 2nd Year SECOND Semester on the entire syllabus. Viva-voce – 25.

Laboratory Experiments :

Sl. No.	
1	To determine the Flash & Fire point of petroleum fraction .
2	To determine the smoke point and char value of kerosene
3	To determine the Softening point of Bitumen
4	To determine the Thermal efficiency of kerosene stove
5	To determine the Pour point & Cloud point of a Crude oil
6	To determine the proximate analysis of coal.
7	To determine the calorific value of solid fuel.



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Name of the Course : HEAT TRANSFER LABORATORY	
Course Code:	Semester: Fourth
Duration: : Seventeen weeks	Maximum Marks: 50
Practical: 3 hrs./week	
Credit: 2	

Sl. No.	Skills to be developed
1	Proper handling of instruments.
2.	Measuring physical quantities accurately.
3.	To observe the phenomenon and to list the observations in proper tabular form.
4.	To adopt proper procedure and precautions while performing the experiment.
5.	To plot the graphs
6.	To verify the principles, laws, using given instruments under different conditions.

Examination scheme: Maximum marks: 50

1. **Continuous Internal Assessment of 25 marks** is to be carried out by the teachers throughout the Part – II SECOND Semester. **Distribution of marks:** Performance of Job –15, Report– 10.
2. **External Assessment of 25 marks** shall be held at the end of the 2nd Year SECOND Semester on the entire syllabus. Viva-voce – 25.

Laboratory Experiments :

Sl. No.	
1	To determine the linear expansion co-efficient of a metal rod.
2	To determine overall heat transfer co-efficient for a double pipe heat exchanger.

3	To determine the overall heat transfer co-efficient for a shell and tube heat exchanger.
4	To determine rate of evaporation in a jacketed open pan evaporator.
5	To determine the thermal conductivity of solid metal steel rod.
6	To determine the thermal conductivity of bricks in series.
7	To determine the rate of heat transfer through bricks in series.



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Name of the Course : MECHANICAL OPERATION LABORATORY	
Course Code:	Semester: Fourth
Duration: : Seventeen weeks	Maximum Marks: 100
Practical: 3 hrs./week	
Credit: 2	

Sl. No.	Skills to be developed
1	Proper handling of instruments.
2.	Measuring physical quantities accurately.
3.	To observe the phenomenon and to list the observations in proper tabular form.
4.	To adopt proper procedure and precautions while performing the experiment.
5.	To plot the graphs
6	To verify the principles, laws, using given instruments under different conditions.

Examination scheme: Maximum marks: 100

- 1. Continuous Internal Assessment of 50 marks** is to be carried out by the teachers throughout the Part – II Second Semester. **Distribution of marks:** Performance of Job – 35, Report– 15
- 2. External Assessment of 50 marks** shall be held at the end of the 2nd Year Second Semester on the entire syllabus. Viva-voce –50.

Laboratory Experiments :

Sl. No.	
1	To determine crushing efficiency of a Roll Crusher and Jaw Crusher.
2	To study the screen analysis and determine average particle size of solid particles in a ROTAP type sieve shaker.
3	To study the grinding characteristics of a Ball mill and determine its critical speed.
4	To study the filtration characteristics of a slurry in a filter press.
5	To study the solid-liquid separation characteristics in a centrifuge.
6	To study the solid-liquid mixing characteristics in a sigma mixer.
7	To determine the screening characteristics in a vibratory screen.
8	To study the filtration characteristics in a vacuum filtration apparatus with Buckner funnel.
9	To demonstrate centrifugal pump and gear pump.
10	To study the solid-solid separation in a froth-floatation cell.
11	To study the fluidisation characteristics of sand in a fluidisation apparatus.



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Syllabus for : Programming in C

<ul style="list-style-type: none"> • Name of the Course: Programming in C 	
<ul style="list-style-type: none"> • Course Code: 	<ul style="list-style-type: none"> • Semester: Fourth
<ul style="list-style-type: none"> • Duration: : Seventeen weeks 	<ul style="list-style-type: none"> • Maximum Marks: 100 (Theory) + 50(practical)
<ul style="list-style-type: none"> • Teaching Scheme 	<ul style="list-style-type: none"> • Examination Scheme
<ul style="list-style-type: none"> • Theory: 3 hrs./week 	<ul style="list-style-type: none"> • Mid Semester Exam.:20Marks
<ul style="list-style-type: none"> • Tutorial: Nil hrs./week 	<ul style="list-style-type: none"> • Attendance & Teacher's Assessment 10 Marks
<ul style="list-style-type: none"> • Practical: 3il hrs./week 	<ul style="list-style-type: none"> • End Semester Exam.:70Marks
<ul style="list-style-type: none"> • Credit: 3 +2 	<ul style="list-style-type: none"> • Practical / Sessional : 25 (Internal) + 25 (External)
<ul style="list-style-type: none"> • Aim: 	
<ul style="list-style-type: none"> • S • I • . • N • 0 • . 	<ul style="list-style-type: none"> •
<ul style="list-style-type: none"> • 1 • . 	<ul style="list-style-type: none"> • To study the structure programming concept.(Algorithm & Flowcharting)
<ul style="list-style-type: none"> • 2 • . 	<ul style="list-style-type: none"> • To study Linear Data Structure.
<ul style="list-style-type: none"> • 3 • . 	<ul style="list-style-type: none"> • To study Looping and Branching.
<ul style="list-style-type: none"> • 4 • . 	<ul style="list-style-type: none"> • To study subscripted variables and user defined data types.
<ul style="list-style-type: none"> • 5 • . 	<ul style="list-style-type: none"> • To study user defined functions
<ul style="list-style-type: none"> • Objective: 	
<ul style="list-style-type: none"> • S • I • . • N • 0 • . 	<ul style="list-style-type: none"> •
<ul style="list-style-type: none"> • 1 • . 	<ul style="list-style-type: none"> • Describe the concepts of Algorithm and flowcharting, constants, variables, data types and operators
<ul style="list-style-type: none"> • 2 • . 	<ul style="list-style-type: none"> • Develop programs using input and output operations.

• 3	• Write programs using different looping and branching statements.		
• 4	• Write programs based on arrays and strings handling functions.		
• 5	• Write programs using user-defined functions, structures and union.		
• Pre-Requisite:			
• S I . N o .	•		
• 1	• Interaction with DOS / Windows Operating System.		
• 2	• Ability to develop logic / flow of simple problem.		
• Contents :		• Hrs. /Uni t	•
• Unit: 1	<ul style="list-style-type: none"> • Introduction to Algorithm & Flowcharting • Basics of C <ul style="list-style-type: none"> ○ History of C, Advantages of Structured Program, Files • (source, header, object, binary executable) used in C, • Characteristics of C. <ul style="list-style-type: none"> ○ C character set, Tokens, Constants, Variables, • Keywords, Data types used in C. <ul style="list-style-type: none"> ○ C operators (arithmetic, logical, assignment, relational, unary, binary, increment and decrement, conditional, bit wise, special, comma, sizeof, postfix, prefix etc.), Operator precedence, Associativity of operators, Type conversion, Typecasting. • 1.4 Formatted input, Formatted output. 	• 12	•
• Unit: 2	<ul style="list-style-type: none"> • • Decision Control and Looping Statements • 2.1 Decision making and branching statements, if statement (if, if-else, else-if ladder, nested if-else), Switch case statement. • 2.2 Iterative/Loop statement, Entry controlled & exit • controlled loop structure & differences, while, do while, • and for loop structure, Break and continue statement, Conditional and unconditional goto statement, nested loop structure. 	• 12	•

<ul style="list-style-type: none"> • Unit: 3 	<ul style="list-style-type: none"> ○ • Arrays and Strings • 3.1. Advantages of subscripted variables/ arrays, Declaration and initialization of one dimensional, two dimensional and character arrays, Accessing array elements. • 3.2. Declaration and initialization of string variables, • String handling functions from standard library (strlen (), strcpy (), strcat (), strcmp ()), String operations to extract substring from left, right, middle of a string, Replacement of string characters, • Concatenation of two strings. 	<ul style="list-style-type: none"> • • 10 	<ul style="list-style-type: none"> •
<ul style="list-style-type: none"> • Unit: 4 	<ul style="list-style-type: none"> • • Functions • 4.1 Functions, Need of functions, Prototype declaration, Scope and lifetime of variables, Defining functions, • Passing parameter types, Function call (call by value, call by reference), Return values. • 4.2 Storage classes, Category of function (No argument • No return value, No argument with return value, Argument with return value), Recursion and use of • memory stack, Types of recursion. 	<ul style="list-style-type: none"> • • 8 	<ul style="list-style-type: none"> •
<ul style="list-style-type: none"> • Unit: 5 	<ul style="list-style-type: none"> • • Structures, Union and Enumerated Data types • 5.1 Structures, Defining structure, Declaring and accessing • structure members, Typedef declaration, Initialization • of structure, Arrays of structure, Nested structure, • Structures and functions. • 5.2 Unions, Defining union, Declaring and accessing union • members, Initialization of union, Arrays of union • variables, Nested union, Union under structure, • Differences between structure and union. • 5.3 Enumerated data, Assigning and accessing • enumerated variables, Enumeration type conversion, • comparing and I/O operations on enumerated types. 	<ul style="list-style-type: none"> • • 5 	<ul style="list-style-type: none"> •
<ul style="list-style-type: none"> • Unit: 6 	<ul style="list-style-type: none"> • Pre-processor Directives • Introduction, Types of pre-processor directives, Macros, • Rules for using macros, Distinction between functions and • macros. 	<ul style="list-style-type: none"> • • 4 	<ul style="list-style-type: none"> •

<ul style="list-style-type: none"> • Text Books: 			
<ul style="list-style-type: none"> • Name of Authors 	<ul style="list-style-type: none"> • Title of the Book 	<ul style="list-style-type: none"> • Name of the Publisher 	
<ul style="list-style-type: none"> • Byron Gottfried 	<ul style="list-style-type: none"> • PROGRAMMING WITH C 	<ul style="list-style-type: none"> • Tata McGraw Hill 	
<ul style="list-style-type: none"> • E. Balagurusamy 	<ul style="list-style-type: none"> • PROGRAMMING IN ANSI C 	<ul style="list-style-type: none"> • Tata McGraw Hill 	
<ul style="list-style-type: none"> • Y. Kanetkar 	<ul style="list-style-type: none"> • LET US C 	<ul style="list-style-type: none"> • BPB 	
<ul style="list-style-type: none"> • REEMA THAREJA 	<ul style="list-style-type: none"> • PROGRAMMING IN C 	<ul style="list-style-type: none"> • OXFORD 	
<ul style="list-style-type: none"> • Kamthane 	<ul style="list-style-type: none"> • C programming: Test your skills 	<ul style="list-style-type: none"> • Pearson 	
<ul style="list-style-type: none"> • E.Karthikeyan 	<ul style="list-style-type: none"> • A Textbook on C 	<ul style="list-style-type: none"> • PHI 	
<ul style="list-style-type: none"> • Reference Books: 			
<ul style="list-style-type: none"> • Name of Authors 	<ul style="list-style-type: none"> • Title of the Book 	<ul style="list-style-type: none"> • Name of the Publisher 	
<ul style="list-style-type: none"> • Amiya Kumar Rath 	<ul style="list-style-type: none"> • Programming in C 	<ul style="list-style-type: none"> • Scitech 	
<ul style="list-style-type: none"> • Venugopal 	<ul style="list-style-type: none"> • Mastering C 	<ul style="list-style-type: none"> • TMH 	
<ul style="list-style-type: none"> • S . N o . 	<ul style="list-style-type: none"> • Question Paper setting tips 		
<ul style="list-style-type: none"> • A 	<ul style="list-style-type: none"> • Objective type (20 Marks):To be answered 20 questions each of carrying one marks from 25 questions covering whole syllabus. 		
<ul style="list-style-type: none"> • B 	<ul style="list-style-type: none"> • Subjective type: 50 marks. To be set at least 9 questions and to be answered 5 questions each carrying 10 marks 		