

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

DIPLOMA PROGRAMME IN METALLURGICAL ENGINEERING

Semester – IV

COURSE OF STUDY AND SCHEME OF EXAMINATION (Revised Dated 26-6-06)

Sl. No.	Board of Study	Course Code	Course	Periods/Week (in hours)			Scheme of Examination					Credit L+(T+P)/2	
				L	T	P	Theory			Practical			Total Marks
							ESE	CT	TA	ESE	TA		
	Electronics & Telecommunication Engineering	238411 (28)	Basic Electrical and Electronics	4	1	-	100	20	20	-	-	140	5
	Metallurgical Engineering	238412 (38)	Fuel, Furnace and Refractory (F.F.R.)	4	1	-	100	20	20	-	-	140	5
	Metallurgical Engineering	238413 (38)	Steel Production	5	1	-	100	20	20	-	-	140	6
	Metallurgical Engineering	238414 (38)	Metallurgical Engineering Drawing	3	4	-	100	20	20	-	-	140	5
	Mechanical Engineering	200415 (37)	Industrial Management	4	-	-	100	20	10	-	-	130	4
	Electronics & Telecommunication Engineering	238421 (28)	Basic Electrical and Electronics Lab	-	-	2	-	-	-	50	20	70	1
	Metallurgical Engineering	238422 (38)	Fuel, Furnace and Refractory Lab	-	-	3	-	-	-	50	20	70	2
	Metallurgical Engineering	238423 (38)	Steel Production Lab	-	-	3	-	-	-	50	20	70	2
	Metallurgical Engineering	238424 (38)	*Industrial Training, Phase I	-	-	1	-	-	-	80	20	100	1
TOTAL				20	7	9	500	100	90	230	80	1000	31

L : Lecture hours : T : Tutorial hours, P : Practical hours

ESE – End of Semester Exam.; CT – Class Test; TA- Teacher's Assessment

*Industrial Training, Phase I, organised after 3rd Sem Exam.

Note : Industrial training (for Phase II) of 2 week will be organised after 4th semester and evaluation will be done in 5th semester.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI**

- A) SEMESTER : IV
 B) COURSE TITLE : BAISC ELECTRICAL AND ELECTRONICS
 C) CODE : 238411 (28)
 D) BRANCH/DISCIPLINE : MECHANICAL ENGINEERING
 E) RATIONALE :

A Mechanical Engineering Diploma in his job in industry has to interact with many electrical and electronics gadgets in operation of various machine tools and machine control system and basic knowledge about electrical and electronics engineering relevant to his job requirement of operation and maintenance in industry will give him a new confidence to perform his job efficiently.

F) TEACHING AND EXMINATION SCHEME:

Course Code	Periods/Week (In Hours)			Scheme of Examination						Credit L+(T+P)/2
	L	T	P	Theory			Practical		Total Marks	
				ESE	CT	TA	ESE	TA		
238411 (28)	4	1	-	100	20	20	-	-	140	5
238421 (28)	-	-	2	-	-	-	50	20	70	1

G) DISTRIBUTION OF MARKS AND HOURS:

Chapter No.	Chapter Name	Hours	Marks
1	D.C. Circuits	06	10
2	D.C. Machine	08	10
3	A.C. Fundamentals	10	10
4	Three Phase A.C. System	08	10
5	Transformer	08	10
6	Three Phase A.C. Machine	10	10
7	Single Phase Motors	08	10
8	Electrical Measuring Instruments	08	10
9	Semiconductor Devices	08	10
10	Rectifier and Filters	06	10
	Total	80	100

H) DETAILED CONTENTS:

Chapter – 1 : D.C. Circuit

- ?? Concept of Electrical Engineering – Electrical Phenomena and their causes,
- ?? Electrical current, potential and voltage,
- ?? Methods of voltage generation, types of voltage and voltage measurement,
- ?? Types of current, effect of electric current, current measurement
- ?? Power resistance, D.C Circuit,
- ?? Kirchhoffs' Laws,
- ?? Resistance law.

Chapter – 2 : D.C. Machine

- ?? Constructional feature of D.C Machine,
- ?? Significance of e.m.f., and e.m.f. Equation,
- ?? Characteristics of D.C series and shunt motors,
- ?? Application of D.C. motor,
- ?? Method of speed control of D.C Motor,
- ?? D.C. Motor starter and efficiency of D.C. Motor,
- ?? D.C. Generators – Construction, working principle and types of D.C. Generators.

Chapter – 3 : A.C. Fundamentals

- ?? A.C Circuit ,
- ?? A.C Circuit wave forms,
- ?? Root Mean Square (RMS) value, Average Value,
- ?? Power in A.C. Circuits and Power Factor,
- ?? R.L.C. in A.C Circuit (Series & Parallel).

Chapter – 4 : Three Phase A.C. System

- ?? Three Phase /Star and Delta connection,
- ?? Relation between line voltage & Phase Voltage,
- ?? Calculation of three-phase power.

Chapter – 5 : Transformer

- ?? Construction of Transformer, its working principle and types,
- ?? Efficiency of transformer,
- ?? Transformer ratio and e.m.f. Equation,
- ?? Transformer Testing - Open circuit test and short circuit test.

Chapter – 6 : Three phase A.C Machine

- ?? Constructional Feature of Induction Motor,
- ?? Types of induction motor - Cage type and slip ring type,
- ?? Working principle and operation of 3 phase Slipping induction motor and its application,
- ?? Alternator, Synchronous Motor - Constructional and their working Principle.

Chapter – 7 : Single Phase Motor

- ?? Working principle and operation,
- ?? Single Phase Capacitor Start,
- ?? Capacitor run Motor,
- ?? Shaded Pole Motor,
- ?? Universal motor,
- ?? Application of motors.

Chapter – 8 : Electrical Measuring Instruments

- ?? Working principle of moving iron and moving coil meter,
- ?? Commonly used electrical measuring instruments (Ammeter, voltmeter, wattmeter and Energy meter) their working principle and constructional features,
- ?? Dynamometer type instrument,
- ?? Multi meters.

Chapter – 9 : Semi Conductor Devices

- ?? Semi conductor Device – Diode, Transistor, SCR, and their application,
- ?? Amplifier action of transistor, S.C.R and its application.

Chapter – 10 : Rectifier & filters

- ?? Controlled and uncontrolled rectification (Half & Full wave) bridge,
- ?? Filters and power supply.

I) INSTRUCTIONAL STRATEGIES:

- ?? **Lecture Method.**
- ?? **Demonstration.** Underpinning laws and principles should be explained using working instruments.
- ?? **Industrial visits:** Industrial/field visit are to be arranged to observe the applications of Transformer, Single & Three phase A.C. motors, Semiconductor devices, Rectifiers etc.. Students will be asked to measure current, voltage, power resistance energy speed etc. in different electrical machines.

J) LEARNING RESOURCES.

(a) Reference Books

S.No.	Title	Author and Publisher
1.	Electrical Technology	B.L Therja, S. Chand & Co.
2	Electrical Technology	S.L Uppal, Khanna Publisher
3	Electrical measurement	J.BGupta Dhanpat Rai & Sons Publisher
4	Elementary electrical engineering	H. Pratab
5	Electrical Machine	S.K Bhattacharya (Tata Mc Hill)
6	Basic electronics	S.K Bhattacharya (Tata Mc Hill)
7	Basic Electronics	V.K. Mehta
8	Electrical Machines	Nagrath Kothari

(b) Others :

- ?? VCDs.
- ?? Learning packages.
- ?? Lab Manuals& Charts.

COURSE TITLE: BAISC ELECTRICAL AND ELECTRONICS LAB

PRACTICAL CODE : 238421 (28)

Total Hours: 32

LIST OF PRACTICALS / TUTORIALS:

- ?? Study of D.C machine.
- ?? Study of D.C motor Starters.
- ?? Speed control of D.C motor by (i) Shunt field Control (ii) armature voltage control.
- ?? Study of Induction Motor Slip ring and Cage type.
- ?? Connection of various measuring instrument of the motor circuit and measure current, Voltage & Power.
- ?? Study of a Half & Full wave rectifier and measure input/output voltage with the help of multi meter.
- ?? Use of multi meter to be encouraged in all practical use for measurement of Resistance Current, Voltage in AC & DC circuit.
- ?? Study of Various electronic component /device.
- ?? Study of Model of control system involving Ac supply error signal, feed back signal error correction motor control circuit (if available).
- ?? Find out transformer ratio and x forms.
- ?? Verification of Kirchoff's Current Law.
- ?? Verification of K Kirchoff's Voltage Law.
- ?? Perform open circuit Test & vshort circuit Test on transformer.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI**

- A) **SEMESTER** : IV
 B) **SUBJECT TITLE** : **STEEL PRODUCTION**
 C) **CODE** : 238413 (38)
 D) **BRANCH/DISCIPLINE** : **METALLURGICAL ENGINEERING**
 E) **RATIONALE** : This subject is taught to the students to gain knowledge of producing steel by different steel making processes. It gives knowledge of technology used in different steel making processes.

F) TEACHING AND EXAMINATION SCHEME :

Course Code	Teaching Scheme (Hours/Week)				Scheme of Examination						Credit $\frac{[L+(T+P)]}{2}$
	L	T	P	Total Hours	Theory			Practical		Total Marks	
					ESE	CT	TTA	ESE	PTA		
238413 (38)	5	1	-	5	100	20	20	-	-	140	6
238423 (38)	-	-	3	3	-	-	-	50	20	70	2

G DISTRIBUTION OF MARKS AND HOURS :

Chapter No.	Chapter Name	Hours	Marks
1	Steel Production	06	08
2	Principles of Steel Making	06	08
3	Production of Steel in Bessemer Converters	09	09
4	Production of Steel in Open Hearth Processes	12	10
5	Production of Steel by L.D. Process	12	15
6	Production of Steel in Electric Arc Furnace	12	10
7	Production of Steel in Induction Furnace	09	10
8	Ingot Casting	09	10
9	Continuous Casting of Steel	09	10
10	Efficiency of Steel Making Process	05	05
11	Use of Computers in different processes of Steel Production	07	05
	Total	96	100

H) DETAILED COURSE CONTENTS:

Chapter - 1 Steel Production:

- ?? Brief history of developments of steel production,
- ?? Raw materials used in steel making,
- ?? Steel making Processes,
- ?? Occurrence of Raw material in India.

Chapter – 2 Principles of Steel Making :

- ?? Metallurgy of removal of C, Mn, Si, S, P,
- ?? Thermodynamics and kinetics involved in steel making,
- ?? Removal and Impact of gases impurities.

Chapter – 3 Production of Steel in Bessemer Converters :

- ?? Brief study of Bessemer process of steel making,
- ?? Acid and Basic process.

Chapter - 4 Production of Steel in Open Hearth Processes :

- ?? History, advantages and limitations of the process,
- ?? Brief out line of construction,
- ?? Raw materials used in open hearth furnaces and their uses at various stages,
- ?? Slag control, refining and finishing operation,
- ?? Twin hearth furnace – construction & process.

Chapter - 5 Production of Steel by L.D. Process :

- ?? Principle of oxygen steel making , constructional details,
- ?? Design of oxygen lance, Refractory lining of L.D. vessel,
- ?? Charge materials in L.D. process,
- ?? Hot metal fluxes, Scrap, ore, Oxygen,
- ?? Characteristics of L.D. process, process parameters,
- ?? Modified L.D. converter process-Kaldo & Rotor process.

Chapter – 6 Production of Steel in Electric Arc (EA) Furnace :

- ?? Construction, Melting practice, operational details , problem and their rectification and application,
- ?? Use of sponge iron as raw material and refining type,

Chapter - 7 Production of Steel in Induction Furnace :

- ?? Melting practice,
- ?? Operational details,
- ?? Problem and their rectification,
- ?? Sponge iron refining practice.

Chapter - 8 Ingot Casting :

- ?? Solidification of Ingots,
- ?? Ingot defects – Ingot cracks, piping, segregation,
- ?? Surface defects, blow holes, and non – metallic inclusions.

Chapter – 9 Continuous Casting of Steel:

- ?? Principle, Type of Continuous casting machine,
- ?? Details of equipments,
- ?? Hot metal handling,
- ?? Metallurgical aspect of continuous casting,
- ?? Merits developments in continuous casting processes.

Chapter –10 Efficiency of Steel Making Process:

- ?? Refractory consumption,
- ?? Yield, production, rate quality of product,
- ?? Different efficiency factor,
- ?? Energy and Economic consideration in steel making processes.

Chapter-11 Use of Computers in Steel Production by Different Processes:

- ?? Twin hearth furnace,
- ?? L.D. Process,
- ?? Electric arc furnace,
- ?? Induction furnace.

I) INSTRUCTIONAL STRATEGIES:

?? Lecture Method

- With glass board.
- Transparencies.
- O.H.P,LCD Projectors.

?? Expert Lecture

- Through Industry persons, engineers, managers, site officers on related topics.

?? Plant Visit

- Training in industries in different field.
- Bhilai steel plants,(Bhilai) with reference to explore the use of computer in different steel production processes.
- Industrial estate, (Raipur).

?? Demonstration.

- Demonstration of Production of steel at different stages.
- Demonstration of casting process and its defects.
- Demonstration of uses of different furnace.

J) LEARNING RESOURCES:

(a) Reference Books:

Sl. No.	Title	Author, Publisher, Edition & Year
1	Introduction to Modern Steel making	Dr. Tupkary R.H., Khanna Publishers
2	Steel making	Kudrin, Mir Publication. Moskow
3	Fundamental of steel making	Turkdogane.T.
4	Steel making	Bashforth

(b) Others:

- ?? CDs and video films.
- ?? Models.
- ?? Lab Manuals.
- ?? Learning Packages.

SUBJECT TITLE : STEEL PRODUCTION LAB

PRACTICAL CODE: 238423 (38)

Total Hours: 48

LIST OF PRACTICALS / TUTORIALS :

?? Charge Calculation for

- a) Bessemer converter.
- b) Basic Open Hearth Furnace.
- c) L.D. and Electric Arc Furnace.

?? Detailed drawings & constructional details of

- d) Bessemer Converter
- e) Open Hearth Furnace.
- f) L.D. converter
- g) Arc Furnace
- h) Induction F/c

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI**

- A) SEMESTER : IV
 B) SUBJECT TITLE : FUEL, FURNACE & REFRACTORY (F.F.R.)
 C) CODE : 238412 (38)
 D) BRANCH/DISCIPLINE : METALLURGICAL ENGINEERING
 E) RATIONALE :

The objective of this subject is to impart the knowledge of fuels, its efficiency, furnaces and combustion to the students. They should have complete knowledge of Refractories and furnaces. There is very close relation between fuels, furnaces & refractory. Any Industry could not run without any one of above these. In melting, heating and refining, the fuel is the main source of heat. So the students should know about the types, properties and use of the fuels. They must be able to select the proper refractory for proper furnace and also the proper selection of furnace for particular purpose.

F) TEACHING AND EXAMINATION SCHEME:

Course Code	Teaching Scheme (Hours/Week)				Scheme of Examination						Credit L+ $\frac{(T+P)}{2}$
	L	T	P	Total Hours	Theory			Practical		Total Marks	
					ESE	CT	TTA	ESE	PTA		
238412 (38)	3	4	-	5	100	20	20	-	-	140	5
238422 (38)	-	-	3	3	-	-	-	50	20	70	2

G) DISTRIBUTION OF MARKS AND HOURS :

Chapter No.	Chapter Name	Hours	Marks
1	Solid Fuels	13	14
2	Liquid Fuels	06	08
3	Gaseous Fuels	06	08
4	Combustion of Fuels	08	10
5	Refractories	12	15
6	Testing of Refractories	08	10
7	Pyrometry and Mode of Heat Transfer	12	15
8	Furnace	15	20
	Total	80	100

H) DETAILED COURSE CONTENTS :

Chapter –1 Solid Fuels:

?? Classification of fuels, Natural, Artificial, Solid, Liquid and Gaseous Fuel,

- ?? Wood, peat, lignite bituminous, Anthracite, their composition and properties,
- ?? Origin and occurrence of coal,
- ?? Classification of coal-parr classification seyler's classification,
- ?? Analysis of Coal-Proximate and Ultimate analysis of coal,
- ?? Coking and Non-Coking coals,
- ?? Coke-Carbonisation, Type of carbonization,
- ?? Manufacture of coke by Bechive oven and byproduct method,
- ?? Properties of Metallurgical coke,
- ?? Pulverised fuel-Types, properties and advantages.

Chapter –2 Liquid Fuels:

- ?? Origin & Refining of Petroleum,
- ?? Fractions obtained in fractional distillation,
- ?? Advantages of liquid fuels over solid fuel.

Chapter –3 Gaseous Fuels:

- ?? Composition, Manufacture & Properties and uses of the following fuels:
 - ?? Producer gas,
 - ?? Water gas,
 - ?? Carbured water gas ,
 - ?? Blast Furnace gas,
 - ?? Coke oven gas
 - ?? Natural gas.
- ?? Advantages of gaseous fuels over solid and liquid fuels.

Chapter – 4 Combustion of Fuels:

- ?? Calculation of air required for combustion,
- ?? Air required in volume and by weight.

Chapter - 5 Refractories :

- ?? Definitions, properties of a good refractory, selection of a refractory,
- ?? Classification of refractories- Acid, Basic and Neutral,
- ?? Acid refractories : Fire clay and silica refractory, Raw materials, manufacture, properties and uses,
- ?? Basic refractories : Raw material manufacture, properties and uses of Magnesite, Dolomite and Chromite refractories,
- ?? Neutral refractories : Raw materials manufacture, properties and uses of Graphite, Carbide, Chrommagnesite, Silicon Carbide.

Chapter - 6 Testing of Refractories:

- ?? Importance of testing,

- ?? Standard tests ,
- ?? Pyrometric cone equivalent test,
- ?? Refractoriness under load(RUL),
- ?? Spalling resistance, strength and permeability test.

Chapter - 7 Pyrometry and Mode of Heat Transfer :

- ?? Mode of Heat Transfer – Conduction, convection and radiation,
- ?? Thermo Couples – Peltier effect, Thomson effect Thermocouple, Noble metal thermocouple, Base metal thermocouple, junction correction,
- ?? Resistance thermometer,
- ?? Optical Pyrometer – Temperature and colour, black body condition,
- ?? Radiation Pyrometer: Fery radiation Pyrometer, Fixed focus radiation pyrometer,
- ?? Sources of error in radiation pyrometer.

Chapter - 8 Furnaces :

- ?? Significance of furnaces in modern Metallurgical process,
- ?? General Principles and classification of furnaces,
- ?? Selection of furnace,
- ?? Principles, operation and application of the following furnaces:
 - ?? Crucible
 - ?? Shaft furnace,
 - ?? Melting Hearth converter,
 - ?? Reheating furnace,
 - ?? Kiln,
 - ?? Heat Treatment furnace,
 - ?? Electric furnace,
- ?? Principle, operation and application of resistance induction, Arc furnace,
- ?? Heat recovery, working principle,
- ?? Description and application of regenerators, recuperates.

I) INSTRUCTIONAL STRATEGIES:

?? Lecture method

- Teaching through models charts, transparencies
- LCD Projectors.
- Video C.D packages.

?? Industrial visits

- Plant visits in related field.

?? Experts Lectures

- Through different field managers, engineers.

- Lecture on various effects of heat on metal.

?? **Demonstration.**

- Seminar on selected topics.
- Demonstration of different furnace and their temperature zone.
- Demonstration of refractory materials.

J) LEARNING RESOURCES:

(a) Reference Books :

Sl. No.	Title	Author, Publisher, Edition & Year
1	Fuel furnace & refractories	O.P. Gupta, Khanna Publishers, New Delhi.
2	Engineering Chemistry	Uppal Gynjel & R.B. Sharma
3	Refractories	Norten
4	Refractories	A. Rashid Chesti
5	Metallurgical furnaces	A. Krivandin & B. Markov.
6	A text book of Engineering Chemistry	S. Dara, S. Chand & Co. Ltd, New Delhi
7	A General theory of furnaces	Glinkov, Mir Publications, Moscow

(b) Others:

- ?? Journals & hand books.
- ?? Charts, models, transparencies.
- ?? Educational VCDs.
- ?? Learning packages.

SUBJECT TITLE : FUEL, FURNACE & REFRACTORY (F.F.R.) LAB

PRACTICAL CODE: 238422 (37)

Total Hours: 48

LIST OF PRACTICALS / TUTORIALS:

- ?? Detailed drawings & Constructional details of following furnaces :
 - ?? Blast furnace,
 - ?? Cupola furnace,
 - ?? open hearth furnace,
 - ?? Electric Arc furnace,
 - ?? Induction furnace,
 - ?? L.D. converter,
 - ?? Bessemer converter,
- ?? Calculation of oxygen required & fuel gas analysis in combustion of fuel.
- ?? Proximate analysis of coal.
- ?? Ultimate analysis of coal.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI**

- A) SEMESTER : IV
 B) SUBJECT TITLE : METALLURGICAL ENGINEERING
 DRAWING
 C) CODE : 238414 (38)
 D) BRANCH/DISCIPLINE : METALLURGICAL ENGINEERING.
 E) RATIONALE :

The aim of the syllabus of engineering drawing is to introduce the concepts of engineering drawing to the students of metallurgy, which they will face in different shops like molding, welding, rolling, smelting etc. Reading a pictorial orthographic or working drawing and analyzing the details are the essential requirements of an engineer. The curriculum is framed to fulfill the above requirement.

F) TEACHING AND EXAMINATION SCHEME :

Course Code	Teaching Scheme (Hours/Week)				Scheme of Examination					Credit [L+(T+P)]	
	L	T	P	Total Hours	Theory			Practical		Total Marks	
					ESE	CT	TTA	ESE	PTA		
238414 (38)	3	4	-	7	100	20	20	-	-	140	2

G) DISTRIBUTION OF MARKS AND HOURS :

Chapter No.	Chapter Name	Hours	Marks
1	Dimensioning	08	05
2	Development of Surfaces	08	05
3	Orthographic Projection	10	10
4	Reading Drawings	12	10
5	Free Hand Sketching	10	05
6	Isometric Projection	10	10
7	Sections and Conventions	10	10
8	Threads, Nuts and Bolts	12	10
9	Machining, Welding & Piping Drawing	12	15
10	Detailed and Assembly Drawing	20	20
	Total	112	100

H) DETAILED COURSE CONTENTS :

Chapter - 1 Dimensioning :

- ?? Dimensioning terms and notations,
- ?? Theory of dimensioning, size and location dimensions,
- ?? General rules for dimensioning,
- ?? Dimensioning of arc, circle, hole, cylinder, narrow space, angle, counter sunk, counter bore, spot face, screw threads, taper etc.

Chapter – 2 Development of Surfaces :

- ?? Introduction, utility of development,
- ?? Development of simple solids like,
 - ?? Cube,
 - ?? Prism,
 - ?? Pyramid,
 - ?? Cone and their frustums.

Chapter - 3 Orthographic Projection :

- ?? Introduction, four quadrants,
- ?? Selection of views,
- ?? Conversion of pictorial views into orthographic views,
- ?? Layout of views.

Chapter – 4 Reading Drawings:

- ?? Visualization, use of actual model and use of Isometric box,
- ?? Projecting side view, front view and top view,
- ?? Missing lines problems,
- ?? Missing view problems.

Chapter – 5 Isometric Projection :

- ?? Isometric scale, its uses,
- ?? Conversion of orthographic projection into isometric view and vice versa.

Chapter – 6 Section and Conventions :

- ?? Object of sectioning, section lines,
- ?? Concept of section planes,
- ?? Full section, half section, local section, offset section, removed section, resolved section,
- ?? Solid cylindrical parts in section- spokes and webs of wheel in section, ribs in section.

Chapter – 7 Threads, Nuts and Bolts :

- ?? Square and metric threads,
- ?? Square and hexagonal nuts and bolts, their usual proportions.

Chapter – 8 Machining, Welding and Piping Drawing :

- ?? Roughness grade, machining symbols and their application,
- ?? Sectional representation of welding joints and welding symbols,
- ?? Piping symbols (single line) piping drawing (single line orthographic only).

Chapter – 9 Detailed and Assembly Drawing :

- ?? Parts list,
- ?? Working drawing,
- ?? Detailed and assembly drawings of
 - ?? Flange coupling,
 - ?? Foot step bearing,
 - ?? Pedestal bearing,

Chapter – 10 : Computer Graphics

- ?? Introduction to computer graphics, geometric modeling.
- ?? Methods of representing objects in geometric modeling.
- ?? Automatic Drafting
- ?? Graphic terminal and other hardware for computer graphics like Input devices Plotters and other output devices their functions and use.
- ?? Familiar with a set of commands for generating simple two dimensional entities like Line, circle, arc using AutoCAD software.

I) SUGGESTED INSTRUCTIONAL STRATEGIES:

- ?? **Lecture Method.**
 - Teaching through models charts, transparencies.
 - LCD Projectors.
 - Video CD packages.
- ?? **Experts Lecture.**
 - Through different field managers, engineers.
- ?? **Demonstration.**
 - Seminar on selected topics.

J) LEARNING RESOURCES:

(a) Reference Books :

Sl. No.	Title	Author, Publisher, Edition & Year
1	Engineering Drawing	N.D. Bhatt, Anand Charotkar.
2	Machine Drawing	P.S. Gill
3	Machine Drawing	R.K.Dhawan,S.Chand.
4	Machine Drawing	Siddheswar,S.Chand.
5	Machine Drawing	Nagpal,Khanna Publisher.
6	Engineering Graphics	Giesecke/Mitchell/Spencer/Hill/Loving (Macmillan)

(b) Others

- ?? Wooden models of different geometrical entities.
- ?? Charts on different dimensioning practices, conventions and symbols. piping/welding
- ?? Different drawing instruments like Mini-Drafter, T-Scale, Drawing board, Templates, French curves.
- ?? Samples industrial manufacturing drawing having all symbols, geometrical tolerances and dimensioning.
- ?? Physical samples illustrating different types of nuts, bolts and thread.

LIST OF LAB. WORK

Following shall be list of sheets to be prepared as Metallurgy drawing lab. Work:

- ?? Two Sheets on Orthographic Projection.
- ?? One sheet on Development of surfaces.
- ?? One sheet on Isometric Projection.
- ?? One sheet on welding symbols.
- ?? One sheets on sectional views
- ?? One sheet on various Threads, Nuts & Bolts
- ?? Two sheets on assembly drawing like flange coupling, etc.
- ?? One sheet on Pipe joints and pipe fittings

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY
BHILAI**

- A) **SEMESTER** : **IV**
 B) **SUBJECT TITLE** : **INDUSTRIAL MANAGEMENT**
 C) **CODE** : **200415 (37)**
 D) **BRANCH/DISCIPLINE** : **METALLURGICAL ENGINEERING**
 E) **RATIONALE** :

Student has been earmarked for this course since the shop floor provides majority of the opportunity available for employment & many diploma pass outs are engaged in shop floor supervisory work. Hence it has been found necessary to impart information related to the concepts, principles, procedures and ‘understanding’ of management techniques so that the student is brought to fairly high level of competency in ‘supervisor ship’.

The course is introduced through a chapter on ‘Systems Thinking’. It is felt that considerable time is spent in identification and alternative solution selection when a young engineer encounters problematic situations on the shop floor. A systematic frame of thinking and a proper problem-solving attitude is required to with these situations. The course comprises of two major parts, one is of ‘Behavioral Science’ where the students are exposed to the principles of Group behavior, which will help them to deal with worker’s psychology, their motivation level, and finally an idea of how communication transfer is effected form the highest to lowest level. The second face deals with the ‘Mathematical Approach towards Management’, which comprises of Modern management concepts like CPM and PERT value Analysis, Inventory control, economic batch size determination and operation-research. It is hoped that this course will evoke considerable interest in the diploma students and will help to get jobs earlier.

F) TEACHING AND EXAMINATION SCHEME:

Course Code	Teaching Scheme (Hrs./week)				Scheme of Examination					Credit [L+(T+P)] 2	
	L	T	P	Total Hours	Theory			Practical			Total Marks
					ESE	CT	TTA	ESE	PTA		
200415 (37)	4	-	-		100	20	10	-	-	130	4

G) DISTRIBUTION OF MARKS AND HOURS:

Chapter No.	Chapter Name	Hours	Marks
1.	Management & System Thinking Concepts	06	10
2.	Materials Management	06	10
3.	Production Planning and Control	07	10
4.	Project Planning using Network Techniques	07	10
5.	Industrial Relations	07	10
6.	Supervision And Leadership	06	10
7.	Organizational Dynamics	06	10
8.	Operation Research	07	10
9.	Planning & Preparing Project Report	06	10
10.	Value Analysis & Computers in Management	06	10
	Total	64	100

H) DETAILED COURSE CONTENTS:

Chapter- 1: Management & System Thinking Concepts:

- ?? Management- definition, activities,
- ?? Theories-Decision, Quantitative, Mathematical, Behavioral Sciences,
- ?? System definition and parameters,
- ?? Production system, Non-production system and objectives,
- ?? System design, procedure, system variables,
- ?? Different types of model under system thinking.

Chapter- 2: Materials Management:

- ?? Introduction & function of Material Management purchase system,
- ?? Inventory, need & advantages of Inventory control,
- ?? Different techniques of Inventory control -A.B.C. analysis, simple treatment only,
- ?? Correlation, stock turn over, order quantity, Lead time purchase cycle,
- ?? Economic order Quantity, simple numerical problems ,Safety stock,
- ?? **Stores Management**-Definition and importance, Storing Procedure and store records.

Chapter- 3: Production Planning And Control:

- ?? Production system, concept of planning, meaning of PPC,
- ?? Classification & characteristics of each type,
- ?? Function of & place of PPC in a organization,
- ?? Production and consumption rate,
- ?? Job, Batch and Mass production,
- ?? Batch size, Buffer stock, Production cost components,
- ?? Concept of production scheduling. Difference between Loading & Scheduling,
- ?? Gantt chart scheduling, advantages and preparation of GANTT chart,
- ?? Interpretation updating, critical ratio scheduling,
- ?? Gap phasing and Lap phasing.

Chapter- 4: Project Planning using Network Techniques:

- ?? Network –meaning & objectives,
- ?? Network formation, representation of activities and event on network, rules for drawing network diagram, Fulkerson’s rule,
- ?? Different techniques-PERT & CPM,
- ?? Dependency of activities, Dummy activities,
- ?? Different Time estimates- Optimistic, Pessimistic & Most likely Time, ET, LT, EST, LST, LCT, ECT, Floats & Slacks and Network analysis on tabular form,
- ?? Main power loading and calculation on load smoothing.

Chapter- 5: Industrial Relations:

- ?? Scope, definition, need, objective and function of personnel management,
- ?? Job analysis, Job description and its constituents,
- ?? Man power as resources, recruitment, selection, training and terminal behavior in an organization,
- ?? Communication in Industry its need and importance,
- ?? Classification, technique and barriers in communication and their effects,
- ?? Grievances, its meaning, factors responsible for grievances, process and condition for handling of grievances,
- ?? Strikes and lockouts, conditions, conciliation and adjudication machinery,
- ?? Motivation, meaning and its benefits, factors responsible for lack of motivation, techniques to boost the motivation in workers,
- ?? Job satisfaction, social and economic values, factors influencing job satisfaction.

Chapter- 6: Supervision and Leadership:

- ?? Meaning and Role of supervisor in an industry,
- ?? Need of supervision, older workers and their supervision,
- ?? Concept of leadership, Qualities of a good leader,
- ?? Effectiveness of leadership system,

?? Industrial acts-Introduction, Factory acts, Industrial disputes act, Boiler act, Workman's compensation act, Indian electricity act, Pollution control act, ESI act.

Chapter- 7: Organisational Dynamics:

?? Organization structure, characteristic and principle of organization,
?? Modern organization approach,
?? Types of organization, meaning and signification of various types,
?? Organization change, resistance to change, employee's attitude, factors for reducing the resistance to change.

Chapter- 8: Operation Research:

?? Definition and concept & methods of Operation Research,
?? Linear programming-problem formulation and Graphical methods,

Chapter- 9: Planning and Preparing Project Report:

?? Selection of project, Scheduling of activities Involved, Model format,
?? Project planning, preparation of action plan for implementation, preparation of project,
?? Cases: - Illustrate some real cases, the students are advised to
 1 Visit few small-scale industries situated in the city, near by industrial area,
 2 Discuss the problem related to S.S.I. with entrepreneurs,
 3 Collect information about the market rates, quality & quantity of goods of their choice,
 4 Develop logical & analytical approach to purchase the raw material, finished good,
 5 Prepare project report for the industry, they are willing to start.

Chapter- 10: Value Analysis & Computers in Management

?? Concept of Cost and Concept of value,
?? Objectives, components and types of value,
?? V.A. procedure and V.A. Test. DARA SIRI method, value improvement procedures,
?? Role of computers in management, introduction to computer system, Personal computer and its uses-introduction to management information system (MIS).

I) INSTRUCTIONAL STRATEGIES:

?? Lecture Method

- Teaching through chalk board.
- H.P, LCD Projector.
- Interaction with students through seminar.
- As far as possible concepts are to be visualized by extensive use of charts models.

?? Industrial Visits

Visits to nearby industries to expose the students to industrial environment, their working, ways of written & verbal communications, their team working & decision-making styles, , problem solving strategies, computer usage in different aspects of industrial work, Industrial relations and material management methods.

?? Expert Lectures

- Expert lectures are to be arranged on above subject through guest faculty.

?? Demonstration

J) LEARNING RESOURCES:

(a) Reference Books:

S.No.	Title	Author/Publisher
1.	Learning package on Industrial Management	T.T.T.I., Bhopal.
2.	CPM and FERT- Principles and Application	L.S. Srinath.
3.	Modern Production Management	Buffa.
4.	Essentials of Management	Kuntz , Mcgraw Hill.
5.	Industrial Engineering and Management	O.P. Khanna.
6.	Industrial organization and management	Ahuja.
7.	Value Analysis	Miles.
8.	Manpower Management	R.S. Diwedi.
9.	Personnel Management and Industrial Relations	R.S. Davar.
10.	Production and operations Management	Ray Wild.
11	Management of operations	Jack R. Meredith.
12	Production and Operations Management- Contemporary policy for managing Operating	Tata McGraw Hill.
13.	Project Engineering and Management	A.K.Sinha & Rama Sinha

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY
BHILAI**

A)	SEMESTER	:	IV
B)	SUBJECT TITLE	:	INDUSTRIAL TRAINING PHASE I
C)	THEORY CODE	:	238424 (38)
D)	BRANCH/DISCIPLINE	:	METALLURGICAL ENGINEERING
E)	RATIONALE	:	

The purpose of industrial training is to offer wide range of practical exposures to latest practices, equipments and techniques used in the field. This training programme will help the student in acquiring hands on experiences of various practices and events required to perform in different job situations. Through the industrial training the students are given an opportunity to develop psychomotor skills and problem solving ability. The students will have to go for industrial training in the following sections:

1. Steel Melting
2. Machine Shop
3. Research & Control.
4. Iron Production
5. Rolling Mill- Rail & Structural Mill, Plate mill.
6. Sponge Iron Making
7. Foundry Shop
8. Coke Ovens & Byproducts.

The industrial Training has basically the following three components: -

1. Orientation Programme
2. Industrial Training in the Industry
3. Report Writing and Evaluation

Note:

During the orientation programme complete guidelines will be provided to the students regarding planning, implementation and evaluation of industrial training.

During the training student will have to maintain a daily diary to record his observations and experiences at field and on the basis of daily diary student has to prepare and submit Industrial Training Report.

For evaluation each student has to prepare and present a seminar paper related to experience gained during the industrial training. Each student will be evaluated on the basis of daily diary, training report, seminar presentation and viva voce.

F) TEACHING AND EXMINATION SCHEME:

Course Code	Teaching Scheme (Hrs./week)				Scheme of Examination						Credit $L+\frac{(T+P)}{2}$
	L	T	P	Total Hours	Theory			Practical		Total Marks	
					ESE	CT	TA	ESE	TA		
238424(38)	-	-	1	1	-	-	-	80	20	100	1

The duration of industrial training will be of 02 weeks and organized after the end of 3rd semester examination. The evaluation of this training is done in 4th semester.
