

**Vivekanand College, Kolhapur (Autonomous)**  
**Department of B.Voc. Foundry Technology**

**Annual Teaching Plan**

Academic Year: 2020-21

Name of the teacher: **Mr. Abhijit M. Mane**

Class: B.Voc.Part I DSC 3FTE11

Semester: I

Course Title: Moulding Technology

Month: August			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>1 Conventional Sand moulding:</b>	Hand moulding with green sand using natural binders like clay, use of mechanical ramming aids & mould manipulation dry sand process, loam sand moulding, use of cow dung, Bentonites dextrin core oils & molasses as binder, mould washers Skin drying of moulds.
15	N. A	15		
Month : September			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>1.2 Moulding Machine:</b>	Use of moulding machines, jolt squeeze, jolt squeeze & slinger, insertion of cores, power computation, type of flask equipment, preparation of sand cycle, mulling of the sand, flow charting special moulding/core making process, Use of plaster of Paris & cement as a moulding material carbon dioxide process, shell moulding & metal moulds, gravity & pressure die casting, V moulding processes.
15	N. A	15		
Month: October			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>1.3 Mould Quality:</b>	

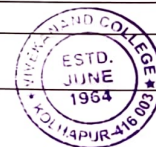


15	N. A	15		Role of quality & packaging of sand. Mould hardness variation, Strength of mould & core enforcement, core floatation, use of chaplets for supporting cores, use of chills, mass hardness & hard spots. Defects like scabs & rat tails, storage of mould & moisture pick up.
<b>Month: November</b>			<b>Module/Unit:</b>	<b>Sub-units planned</b>
Lectures	Practical's	Total	<b>1.4 Functions &amp; design of mould:</b>  <b>2.0. Core Making:</b>	Function of cavity, components of mould, gating system & risers, Directional solidification
15	N. A	15		of metals, streamlined pouring of mould, maintenance of metal purity, Riggng and shake out,  recycling of sand, reclamation of sand.  2.1 Importance and requirement of cores, Core making materials. 2.2 Core sand, its ingredients and properties. 2.3 Binders & machines used in core making. 2.4 Types of Cores, Core making processes. 2.5 Core venting, Core baking by different methods. 2.6 Finishing of Cores. Core setting chaplets. 2.7 Core sand disposal.

Class: B.Voc.Part II 1612

Semester: III Course Title : Fuels, Furnaces & Refractories

<b>Month: August</b>			<b>Module/Unit:</b>	<b>Sub-units planned</b>
Lectures	Practical's	Total	1.0 Classification of fuels	



15	N. A	15		Solid liquid and gaseous, natural and synthetic liquid fuels, their advantages and limitations.
<b>Month : September</b>			<b>Module/Unit:</b>	<b>Sub-units planned</b>
Lectures	Practical's	Total	<b>2.0 Principles of combustion</b>	Calorific value, speed and combustion, requirements of air, or oxygen, properties of flames, combustion problems, non conventional energy.
15	N. A	15		
<b>Month: October</b>			<b>Module/Unit:</b>	<b>Sub-units planned</b>
Lectures	Practical's	Total	<b>3.0 Furnaces</b>	Classification of furnaces based on heating methods and refractories used, basic principles of fuel fired, resistance, induction and arc furnaces, furnace lining, furnace atmospheres, furnace efficiency.
15	N. A	15		
<b>Month: November</b>			<b>Module/Unit:</b>	<b>Sub-units planned</b>
Lectures	Practical's	Total	<b>4.0 Refractories</b>	Classification of refractories, their properties and uses in foundry industries.
15	N. A	15		

Class: B.Voc.Part III 1726

Semester: V

Course Title: Quality Control

<b>Month: August</b>			<b>Module/Unit:</b>	<b>Sub-units planned</b>
Lectures	Practical's	Total	1 Introduction: New culture of TQM:	1 Introduction: New culture of TQM, TQM axioms, consequences of total quality managing, cost of total quality, valuable tools for quality, the Japanese factor. The Deming Approach to management: Historical background, Deming's fourteen points for management, deadly sins
15	N. A	15		



				<p>&amp;diseases, implementing the Deming's philosophy, Deming on management. Juran on Quality:</p> <p>Developing a habit of quality, Juran's quality trilogy, the universal breakthrough sequence,</p> <p>Juran's Deming.</p>
<b>Month : September</b>			<b>Module/Unit:</b>	<b>Sub-units planned</b>
<b>Lectures</b>	<b>Practical's</b>	<b>Total</b>	2. Crosby & the Quality Treatment:	2. Crosby & the Quality Treatment: Crosby diagnosis of a troubled company, Crosby's quality vaccine, Crosby's absolutes for quality management, Crosby's fourteen steps for quality improvement. Imai's Kaizen: The concept, Kaizen & innovation, the Kaizen management practices, Kaizen & Deming.
15	N. A	15		
<b>Month: October</b>			<b>Module/Unit:</b>	<b>Sub-units planned</b>
<b>Lectures</b>	<b>Practical's</b>	<b>Total</b>	3. Basic Techniques for Statistical Analysis	3. Basic Techniques for Statistical Analysis: Introduction, measures of central tendency & dispersion, confidence intervals, hypothesis testing, frequency distributions & histograms, probability distributions, measuring linear associations. Design & Analysis of Experiments: Introductions, factorial experiments, aliasing, constructing fractional designs, analysis of variance.
15	N. A	15		
<b>Month: November 2023</b>			<b>Module/Unit:</b>	<b>Sub-units planned</b>
			4. Supporting of Quality Improvement Processes:	4. Supporting of Quality Improvement Processes: Affinity diagram, bar chart, block diagram brain storming, cause and effect analysis, control charts, cost benefit analysis, customer-supplier relationship check list, decision analysis, flow charts, force field analysis, line graph/run charts, pareto analysis, quality costing, quality function development (QFD), quality project approach & problem solving process, risk analysis scatter



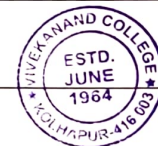
	5. Statistical Process Control: Introduction	diagrams, Weibull analysis, 6 Sigma. 5. Statistical Process Control: Introduction, data collection plan, variables charts, attributes, interpreting the control charts. Taguchi's Approach to Experimental Design & Offline Quality Control: Introduction, background to the method, Taguchi's recommended design techniques, from Deming to Taguchi & vice-versa.
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Class: B.Voc Part I SEC23FTE21

Semester: II

Course Title: Gating Systems & Risering

Month: January			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	1.0 GATING SYSTEM:	1.1: Components of gating system- Pouring basin, down sprue, sprue well, runner bar, skimbob and ingates: Significance and function. 1.2: Types of gating: Top gate, bottom gate and parting gates
15	N. A	15		
Month : February			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	1.0 GATING SYSTEM:	1.3: Steps in design of gating area, calculations of pouring time, Runners and ingates for ferrous and non-ferrous alloys. 1.4: Importance and determination of dimensions of passages i.e gating ratio
15	N. A	15		
Month: March			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	2.0 RISERING SYSTEM:	2.1 Function of risers/ feeders in compensating shrinkage in metals and alloys during solidification. 2.2 Riser types, shapes, sizes and locations.
15	N. A	15		
Month: April 2024			Module/Unit:	Sub-units planned
15	N. A	15		





Month: January			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	1.0 Introduction to Steels	Classification, properties and applications of carbon and alloy steels,
9	N. A	9		
Month : February 2024			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	2.0 Melting and Solidification of steel	Solidification mechanism, melting of carbon and alloy steels in electric arc and induction furnaces,
7	N. A	7		
Month: March			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	3.0 Basic Practices and Reactions of Steel	Acid and basic practices, oxidation and refining, fluxing; Sulphur and phosphorous removal, de-oxidation, methods of degassing, tapping and pouring,
7	N. A	7		
Month: April			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	4.0 Methoding for Steel 5.0 Heat treatment for steel castings.	Gating and feeding practices; mould and core making practice for steel, fettling and salvaging for steel castings,
7	N. A	7		



Month: January			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	1. Energy Conservation	Energy Conservation- Forms of energy, energy conservation, energy sources and resources, present and future energy demands; Review of commercial energies from solid, liquid and gaseous fuels.
9	N. A	9		
Month : February			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	2. Nuclear energy systems	Nuclear energy systems, alternate energy sources; Improving energy efficiency in extractive metallurgical processes; Design and management of energy conservation; Recycling of energy, energy conservation techniques.
7	N. A	7		
Month: March			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	3. Pollution Control	Pollution Control- Gas recovery in metal processing industries, gas cleaning and removal of particulate matter from gases; Heat exchangers and water cleaning of solids; Pollution control in specific metal process industries- Iron and steel, Cu, Ni, Pb, Zn, Al etc;
7	N. A	7		
Month: April			Module/Unit:	Sub-units planned
7	N. A	7		

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**Mr. Abhijit M. Mane**  
**Subject Teacher**  
**HEAD**

B. VOC. FOUNDRY TECHNOLOGY  
 VIVEKANAND COLLEGE, KOLHAPUR  
 (AUTONOMOUS)



**Vivekanand College, Kolhapur (Autonomous)**  
**Department of Foundry Technology**  
Annual Teaching Plan  
 Academic Year: 2020-21

Name of the Teacher: **Mr. Sidhant A Kanik**

**Class: B. Voc Foundry Technology**

**Semester: I**

**Course Title: Engineering Graphics-I (1594)**

<b>Month: June 2020</b>			<b>Module/Unit:</b>	<b>Sub-units planned</b>
Lectures	Practical's	Total	<b>Module I: Drawing office practice</b>	
10	N. A	10		1.1. Importance of engineering drawing - drawing instruments: drawing board, mini drafter, compass, divider, protractor, drawing sheets etc., - layout of drawing sheets. 1.2. Importance of legible lettering and numbering - single stroke letters - upper case and lower case letters- general procedures for lettering and numbering - height of letters- guidelines. 1.3. Dimensioning - Need for dimensioning - terms and notations as per BIS - Dimension line, Extension line and Leader line - Methods of dimensioning - Importance of dimensioning rules - Exercises. 1.4. Scales - Study of scales - full size scale, reduced scale and enlarged scale
<b>Month : July 2020:</b>			<b>Module/Unit:</b>	<b>Sub-units planned</b>
Lectures	Practical's	Total	<b>Module II: Constructions of conics.</b>	<b>2.0. Constructions of conics.</b>
15	N. A	15		2.1. Conics: Different types – Definition of locus, focus and directrix - Applications of ellipse, parabola and hyperbola. 2.2. Ellipse: Construction of ellipse by concentric circle method, rectangular method and Eccentricity method when focus and directrix are given – Practical applications. 2.3. Parabola: Construction of parabola by rectangular method, parallelogram method and eccentricity method when focus and directrix are given– Practical





				<p>applications.</p> <p>2.4. Hyperbola: Construction of hyperbola by rectangular method and eccentricity method when focus and directrix are given – Practical applications.</p> <p>2.5. Scales: Construction of Diagonal and Vernier scales.</p> <p>2.6. Visualization concepts and Free Hand sketching: Visualization principles – Representation of Three Dimensional objects – Layout of views- Free hand sketching of multiple views from pictorial views of objects.</p>
<b>Month: August 2020</b>			<b>Module/Unit:</b>	<b>Sub-units planned</b>
Lectures	Practical's	Total	<b>Module III: Constructions of special curves.</b>	<p>3.1. Geometric curves: Definition, application and construction of cycloid - epicycloids – hypocycloid – exercises.</p> <p>3.2. Involute of a circle – Archimedean spiral – helix – exercises.</p>
10	N. A	10		
<b>Month: September 2020</b>			<b>Module/Unit:</b>	<b>Sub-units planned</b>
Lectures	Practical's	Total	<b>Module IV: Projection of points.</b>	4.1. Projection of points – points in different quadrants.
5	N. A	5		
<b>Month: September 2020</b>			<b>Module/Unit:</b>	<p>5.1. Projection of straight lines – parallel to one plane and perpendicular to other plane – inclined to one plane and parallel to the other plane – parallel to both the planes – inclined to both the planes (simple problems only).</p>
Lectures	Practical's	Total	<b>Module V: Projection of straight lines.</b>	
10	N. A.	10Hrs		



Month: June 2020			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module I: Pattern materials</b>	<p>Pattern materials. Pattern making tools, different pattern materials their merits and Demerits.</p> <p>Different types of patterns such as single piece, Cope and Drag, Follow board, Match plate pattern etc.</p>
20	N. A	20		
Month : July 2020			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module II: Tools:</b>	<p>Tools for making Wood patterns and Metal patterns.</p> <p>Patterns for special processes such as foam molding, shell molding.</p>
12	N. A	12		
Month: August 2020			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module II: Principles of pattern construction</b>	<p>Principles of pattern construction and layout. Machines for making wooden pattern and machine patterns.</p> <p>Finishing of patterns, colour codes for pattern and importance..</p>
14	N. A	14		
Month: Sept 2020			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module IV: Pattern allowances</b>	Pattern allowances.
4	N. A	4		



Month: June 2020			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module I Principles of drawings :</b>	Classification of drawings, review of drawing sheet sizes & layout recommended by BIS, types of lines, scales used in engineering drawing, sections, types of sections, conventional representation of engineering materials and machine components, methods of dimensioning, symbolic representations of welds and surface finish
15	N. A	15		
Month : July 2020			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module II Sketching of machine components</b>	Screw thread terminology, forms of threads, conventional representation of threads, multiple start threads, RH & LH threads, type of nuts and bolts, washers, locking arrangements for nuts, foundation bolts, types of keys, cotter joint and knuckle joints, rigid coupling, flange coupling & flexible coupling, flat and V belt pulleys, sliding and rolling contact bearings: journal bearing, bush bearing, pedestal bearing, pivot bearing, ball & roller bearings
15	N. A	15		
Month: August 2020			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module III Gear drives</b>	Gear Terminology, introduction to spur gear, helical gear, bevel gear, worm & worm wheel, gear materials, forms of teeth, advantages & disadvantage
10	N. A	10		
Month: September 2020			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module IV : Elements of Production Drawings:</b>	Limits fits & tolerances- significance, types and selections, hole basis & shaft basis system, Surface roughness- terminology symbols, characteristics, representation of elements on production drawings.
10	N. A	10		



Month: June 2020			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module I : 1. Functions of Management</b>	Definition of Management, Management environment. Planning – Need, Objectives, Strategy, policies, Procedures, Steps in Planning, Decision making, Forecasting. Organizing – Process of Organizing importance and principle of organizing, departmentation, Organizational relationship, Authority, Responsibility, Delegation, Span of control. Staffing – Nature, Purpose, Scope, Human resource management, Policies, Recruitment procedure training and development, appraisal methods. Leading – Communication process, Barriers, remedies, motivation, importance, Theories.
20	N. A	20		
Month : July 2020			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module II: Introduction to Marketing and Material Management</b>	Marketing: Marketing Concepts –Objective –Types, of markets – Market Segmentation, Market strategy – 4 AP"s of market, Market Research, Salesmanship, Advertising. b) Materials Management: Definition, Scope, advantages of materials management, functions of materials management, c) Purchase Objectives, 5-R Principles of purchasing, Functions of Purchase department, Purchasing cycle, Purchase policy & procedure, Evaluation of Purchase Performance.
10	N. A	10		
Month: August 2020			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module III: Human Resource Development</b>	Strategic importance HRM; objectives of HRM; challenges to HR professionals; role, Responsibilities and competencies of HR professionals; HR department operations; Human Resource Planning - objectives and process; human resource information system. Talent acquisition; recruitment and selection strategies, career planning and management, training and development, investment in training programme; executive development.
10	N. A	10		
Month: September 2020			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module IV: Introduction to E- Commerce</b>	E-Commerce – Introduction to Management Information System (MIS), Introduction to ISO 9000 procedures. b) Industrial Safety – Reasons for accidents, prevention of accidents, Promotion of safety mindness.
10	N. A	10		





Month: Jan 2021			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module I: Projection of Points, Lines and Plane Surfaces.</b>	1.1. Orthographic projection- principles-Principal planes-First angle projection-projection of points. 1.2. Projection of straight lines (only First angle projections) inclined to both the principal planes 1.3. Determination of true lengths and true inclinations by rotating line method and traces 1.4. Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.
10	N.A	10		
Month : Feb 2021			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module II: text Projection of Solids.</b>	2.1. Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes by rotating object method and auxiliary plane method.
10	N.A	10		
Month: February 2021			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module III: Projection of Sectioned Solids and Development of Surfaces.</b>	3.1. Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section. 3.2. Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones: 3.3. Development of lateral surfaces of solids with cut-outs and holes
10	N.A	10		
Month: March 2021			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module IV : Isometric and Perspective Projections.</b>  <b>Module V : Computer Aided Drafting (Demonstration Only)</b>	4.1. Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions and miscellaneous problems. 4.2. Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray Method 5.1. Introduction to drafting packages (AUTOCAD) and demonstration of their use.
20	N.A	20		





Class: B. Voc Foundry Technology

Semester: II

Course Title: Melting Technology (1603)

Month: Jan 2021			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module I: Melting of primary and secondary metals</b>	Basics of melting scrap and smelting, handling and characterization of scrap, cleaning and bailing charge preparation control and charge balance, general methods of charging in furnaces, changes for SG cast iron. Role of flux; Reducing agents; Air reductants and chemical additives, in the furnaces; types and, selection of furnaces suitable for specific metals; cupola, induction, rotary, pit furnaces their operation and nature/characteristics of product there from; role of temperature and super heat; acid, basic and neutral operations; post melting treatment and air furnaces; melting of various types of cast iron, steel, aluminum, brass, SG cast iron..
20	N. A	20		
Month : Feb 2021			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module II: Composition control and melt quality:</b>	Importance of metal cleanliness; endogenous and exogenous inclusions; need of formation of right quality and nature of slag; oxygen, chlorine or argon blowing to improve melt quality; role of temperature and super heat.
10	N. A	10		
Month: February 2021			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module III: Efficient Operation:</b>	Control of fuel consumption, quality of fuel coke in context to sulphur and ash, use of hot blast cupola; method of producing hot blast. Use of recuperators and regenerators, regulation control of power input into the furnaces, comparison of power input into different furnaces.
10	N. A	10		
Month: March 2021			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module IV Handling of liquid metal</b>	Different methods to consume liquid metal, ingot, pigging, power production, casting etc. economical output, management of liquid metal; handing devices, preheating of laddles; use of vacuum assisted equipment for degasification, killing and rimming of steels, inoculation in SG cast iron and its control
10	N. A	10		



Month: Jan, Feb, March 2021			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module I CASTING</b>	1.1 Sand Casting, 1.2 Advantages of special casting techniques over sand casting method. 1.3 Plaster mold casting, 1.4 Permanent mold casting, 1.5 Die casting - Gravity and pressure die casting, Hot chamber and cold chamber. 1.6 Centrifugal casting, 1.7 Shell mold casting, 1.8 Investment casting, 1.9 CO <sub>2</sub> process of casting, 1.10 Continuous process.
35	N. A	35		
Month : March 2023			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module II CASTINGS DEFECTS</b>	Causes and remedies of following defects 2.1 Blow holes, Gas holes, Pin holes, 2.2 Scabs, Hot tears, Cold cracks, Shrinkage cavity.
15	N. A	15		



Month: Jan 2021			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module I : Introduction to Foundry Testing</b>	Classification of various tests on the basis of type and rate of loading; Principles of different tests- tensile, compression, hardness, impact;
10	N. A	10		
Month : Feb 2021			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module II: Non Destructive Testing</b>	<b>10 Hrs.</b> Principles, classification of testing techniques, merits, demerits and field of applications of various non destructive tests- visual inspection, radiography, ultrasonic, magnetic particle, eddy current, dye penetrant;
10	N. A	10		
Month: February 2021			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module III: Optical Metallography techniques</b>	Principles, methoding, applications;
10	N. A	10		
Month: March 2021			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	<b>Module IV: Electron Microscopy, Spectroscopy Techniques</b>	Scanning Electron Microscopy, Transmission Electron Microscopy; Optical emission spectrometer, Atomic absorption spectroscopy, Infrared Spectroscopy, X-Ray Spectroscopy
20	N. A	20		



Month: Jan Feb March 2021			Module/Unit:	Sub-units planned
Lectures	Practical's	Total	Module I : 1. Functions of Management	Aims of failure analysis, Prime factors in the premature failure of metallic components and structures, Tools and techniques in failure analysis, Types of failures: ductile, brittle, fatigue, creep, corrosion, wear etc. fractography, mixed mode and fatigue failures, Failure mechanisms; Embrittlement phenomena; environmental effects; Failures due to faulty heat treatments, Failures in metal forming and welding, Case studies in failure analysis, Prevention of failures, case histories of component failures.
50	N. A	20		

*Ghani*  
(S.A. Kasnik)  
Sub. Teacher.

*J. Kar*  
HEAD  
B.VOC. FOUNDRY TECHNOLOGY  
VIVEKANAND COLLEGE, KOLHAPUR  
(AUTONOMOUS)

