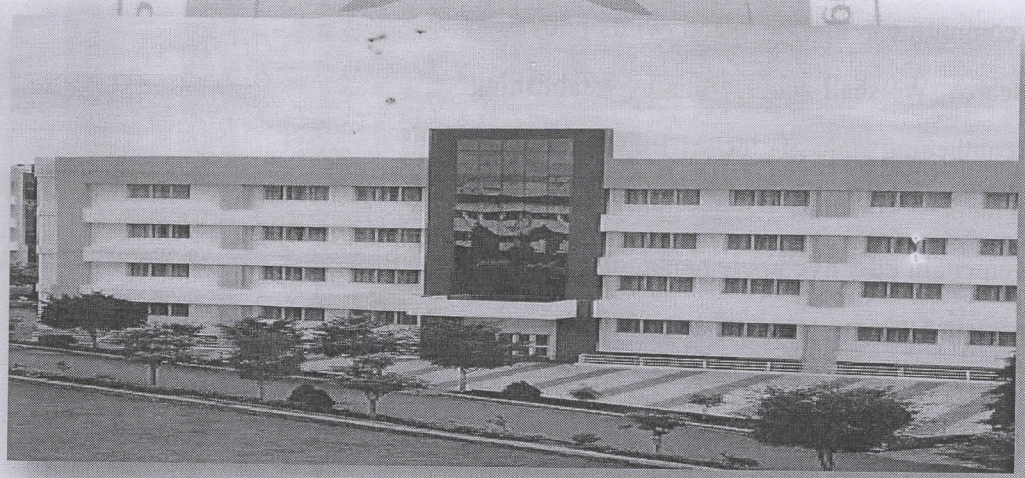
Pimpri Chinchwad Education Trust's

PIMPRI CHINCHWAD COLLEGE OF ENGINEERING

SECTOR NO. 26, PRADHIKARAN, NIGDI, PUNE 411044

An Autonomous Institute Approved by AICTE and Affiliated to SPPU, Pune

Curriculum Structure and Syllabus of B. Voc. Construction Project Management (Regulations 2023)



Effective from Academic Year 2024-25

Chairman
BoS B.Voc. Program
PCET's, Pimpri Chinchwad College of Engineering
Sector No. 26, Pradhikaran, Nigdi, Pune-44

Chairman
Academic Council
PCET's, Pimpri Chinchwad College of Engineering
Sector No. 26, Pradhikaran, Nigdi, Pune-44

Institute Vision

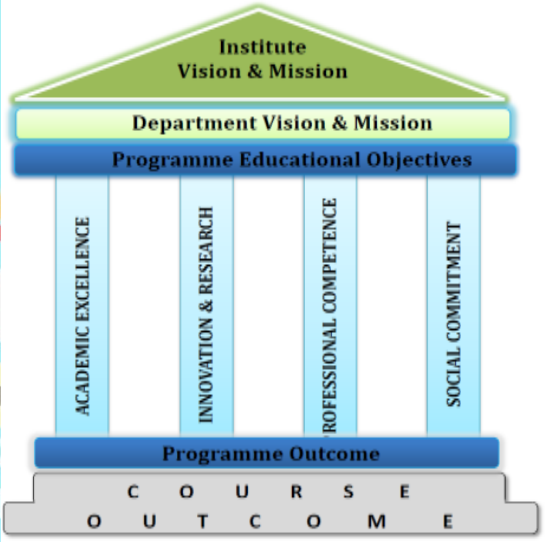
To be one of the top 100 Engineering Institutes of India in coming five years by offering exemplarily Ethical, Sustainable and Value-Added Quality Education through a matching ecosystem for building successful careers.

Institute Mission

1. Serving the needs of the society at large through establishment of a state-of-art Engineering Institute.
2. Imparting right Attitude, Skills, Knowledge for self-sustenance through Quality Education.
3. Creating globally competent and Sensible engineers, researchers and entrepreneurs with an ability to think and act independently in demanding situations.

Quality Policy

We at PCCOE are committed to impart Value Added Quality Education to satisfy the applicable requirements, needs and expectations of the Students and Stakeholders. We shall strive for academic excellence, professional competence and social commitment in fine blend with innovation and research. We shall achieve this by establishing and strengthening state-of- the-art Engineering and Management Institute through continual improvement in effective implementation of Quality Management System.



INDEX

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ABBREVIATIONS

Abbreviations	Course Full Name
MJ	Major Course
MI	Minor Course
MD	Multidisciplinary Course
AEC	Ability Enhancement Course
VAC	Value added Course
SEC	Skill Enhancement Course
FA	Formative Assessment
SA	Summative Assessment

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CURRICULUM STRUCTURE

STRUCTURE FOR I[ST] YEAR B. Voc. (CONSTRUCTION & PROJECT MANAGEMENT)

SEMESTER I

B. Voc. Structure	Sem-I		Teaching Scheme				Examination Scheme						
Course Code	**Course Type**	**Course Name**	**L**	**P**	**H**	**CR**	**FA1**	**FA 2**	**SA**	**TW**	**O R**	**PR**	**Total**
VCM21101	MJ	Major Course I:: Basics of Construction	3	-	3	3	25	25	50	-	-	-	100
VCM21201	MI	Minor Course I: Engineering Drawing	3	-	3	3	25	25	50	-	-	-	100
VCM21301	MD	Multidisciplinary Course I: Applied Science	2	-	2	2	20	20	40	-	-	-	80
VCM21401	AEC	Ability Enhancement Course I: Writing skills		2	2	1	-	-	-	50	-	-	50
VCM21501	VAC	Value added Course I: Health & Wellness I		2	2	1	-	-	-	50	-	-	50
VCM21601	SEC	Internship I: On Job Training	-	20	20	10	-	-	-	-	-	200	200
		Total	**8**	**24**	**32**	**20**	70	70	**140**	**100**	**-**	**200**	**580**

SEMESTER II

B. Voc. Structure	Sem-II		Teaching Scheme				Examination Scheme						
Course Code	**Course Type**	**Course Name**	**L**	**P**	**H**	**CR**	**FA1**	**FA 2**	**SA**	**TW**	**O R**	**PR**	**Total**
VCM22102	MJ	Major Course II: Construction Materials	3	-	3	3	25	25	50	-	-	-	100
VCM22202	MI	Minor Course II: Basics of Electrical & Electronics	3	-	3	3	25	25	50	-	-	-	100
VCM22302	MD	Multidisciplinary Course II: Applied Mathematics	2	-	2	2	20	20	40	-	-	-	80
VCM22402	AEC	Ability Enhancement Course II: Soft Skills		2	2	1	-	-	-	50	-	-	50
VCM22502	VAC	Value added Course II: IT Tools I		2	2	1	-	-	-	50	-	-	50
VCM22602	SEC	Internship II: On Job Training: CON/Q1003	-	20	20	10	-	-	-	-	-	200	200
		Total	**8**	**24**	**32**	**20**	70	70	**140**	**100**	**-**	**200**	**580**

Abbreviation: L- Lecture; **P**- Practical; **H**- Hours; **CR**- Credits; **FA**–Formative Assessment**, SA**-Summative Assessment; **TW** – Term Work; **OR** – Oral Exam, **PR** – Practical Exam.

STRUCTURE FOR IIND YEAR B. Voc. (CONSTRUCTION & PROJECT MANAGEMENT)
SEMESTER III

B. Voc. Structure Sem-III			Teaching Scheme				Examination Scheme						
Course Code	**Course Type**	**Course Name**	**L**	**P**	**H**	**CR**	**FA1**	**FA2**	**SA**	**TW**	**OR**	**PR**	**Total**
VCM23103	MJ	Major Course III: Civil Engineering Drawing and Building Planning	2	-	2	2	20	20	40	-	-	-	80
VCM23104	MJ	Major Course IV: Civil Engineering Drawing and Building Planning Lab	-	2	2	1	-	-	-	-	-	50	50
VCM23203	MI	Minor Course III: Surveying	2	-	2	2	20	20	40	-	-	-	80
VCM23204	MI	Minor Course IV: Surveying Lab	-	2	2	1	-	-	-	-	-	50	50
VCM23303	MD	Multidisciplinary Course III: IT Tools II	2	-	2	2	20	20	40	-	-	-	80
VCM23403	AEC	Ability Enhancement Course III: Business Communication I		2	2	1	-	-	-	50	-	-	50
VCM23503	VAC	Value added Course III: Health & Wellness II		2	2	1	-	-	-	50	-	-	50
VCM23603	SEC	Internship III: On Job Training	-	20	20	10	-	-	-	-	-	200	200
		Total	**6**	**28**	**34**	20	60	60	**120**	**100**	**-**	**300**	**640**

SEMESTER-IV

B. Voc. Structure Sem-IV			Teaching Scheme				Examination Scheme						
Course Code	**Course Type**	**Course Name**	**L**	**P**	**H**	**CR**	**FA1**	**FA2**	**SA**	**TW**	**OR**	**PR**	**Total**
VCM24105	MJ	Major Course V: Construction Technology	3	-	3	3	25	25	50	-	-	-	100
VCM24106	MJ	Major Course VI: Construction Technology Lab	-	2	2	1	-	-	-	-	-	50	50
VCM24205	MI	Minor Course V: Construction Project Management	2	-	2	2	20	20	40	-	-	-	80
VCM24404	AEC	Ability Enhancement Course IV: Business Communication II		2	2	1	-	-	-	50	-	-	50

VCM24504	VAC	Value added Course IV: Environmental Science		2	2	1	-	-	-	50	-	-	50
VCM24604	SEC	Project I: Mini Project	-	4	4	2	-	-	-	-	-	50	50
VCM24605	SEC	Internship III: On Job Training	-	20	20	10	-	-	-	-	-	200	200
		Total	**4**	**30**	**34**	20	45	45	**90**	**100**	**-**	**300**	**580**

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STRUCTURE FOR III[RD] YEAR B. Voc. (CONSTRUCTION & PROJECT MANAGEMENT)
SEMESTER V

B. Voc. Structure	Sem-V		Teaching Scheme				Examination Scheme						
Course Code	**Course Type**	**Course Name**	**L**	**P**	**H**	**CR**	**FA1**	**FA2**	**SA**	**TW**	**OR**	**PR**	**Total**
VCM25106	MJ	Concrete Technology	3	-	3	3	25	25	50	-	-	-	100
VCM25107	MJ	Concrete Technology Lab	-	2	2	1	-	-	-	-	-	50	50
VCM25108	MJ	Tenders, Contract and Administration	3	-	3	3	25	25	50	-	-	-	100
VCM25109	MJ	Tenders, Contract and Administration Lab	-	2	2	1	-	-	-	-	-	50	50
VCM25206	MI	Construction Equipment & Management	2	-	2	2	20	20	40	-	-	-	80
VCM25606	SEC	Internship V: On Job Training	-	20	20	10	-	-	-	-	-	200	200
		Total	**8**	**24**	**32**	20	70	70	**140**	**-**	**-**	**300**	**580**

SEMESTER-VI

B. Voc. Structure	Sem-VI		Teaching Scheme				Examination Scheme						
Course Code	**Course Type**	**Course Name**	**L**	**P**	**H**	**CR**	**FA1**	**FA2**	**SA**	**TW**	**OR**	**PR**	**Total**
VCM26110	MJ	Quantity Surveying & Cost Estimation	3	-	3	**3**	**25**	**25**	**50**	-	-	-	100
VCM26111	MJ	Quantity Surveying & Cost Estimation Lab	-	2	2	1	-	-	-	-	-	50	50
VCM26207	MI	Green Building & Eco-friendly Construction Materials	2	-	2	2	20	20	40	-	-	-	80
VCM26607	SEC	Project II: Project	-	8	8	4	-	-	-	50	150	-	200
VCM26608	SEC	Internship VI: On Job Training	-	20	20	10	-	-	-	-	-	200	200
Total			**5**	**30**	**35**	**20**	**45**	**45**	**90**	**50**	**150**	**250**	**630**

Abbreviation: L- Lecture; **P**- Practical; **H**- Hours; **CR**- Credits; **FA–**Formative Assessment**, SA-**Summative Assessment; **TW** – Term Work; **OR** – Oral Exam, **PR** – Practical Exam.

Course Syllabus
Semester-I

Program:	B. Voc. (Construction & Project Management)				Semester: I	
Course:	Basics of Construction				Code: VCM21101	
	Teaching Scheme		Evaluation Scheme			
Lecture	Hours	Credit	FA 1	FA 2	SA	Total
3	3	3	25	25	50	100

Course Objectives:

1. To understand the basic building bye laws, building terminology and building planning and services.
2. To understand the basics of construction project management.
3. To be aware of knowledge on building components and construction.
4. Understanding fundamental concepts of construction, different services and bye laws.

Course Outcomes: After learning the course, students will be able to

1. Identify the basic types of different construction projects**.**
2. Understand different types of infrastructure projects.
3. Discuss building bye laws and basic requirements of building planning.
4. Understand fundamental principles of surveying.
5. Understand basic terms of construction projects.
6. Label basic layout of building plan.
7. Understand Roles and responsibilities of construction work supervisor task of construction building.

Detailed Syllabus:

Unit	Description	Duration (45 Hrs)
1	**Introduction** Introduction and scope of Civil Engineering, History of construction, Modern development in construction, role of engineers in infrastructure development, Difference between construction and other industry, Different types of construction project, residential, commercial, industrial and public building.	8
2	**Infrastructure projects** Different types of infrastructure projects: bridges, Metros, rail over bridges, subways, dams, canals, airport, docks.	7
3	**Introduction to modern tools of surveying** Basic definitions, Fundamental Principles, horizontals and vertical measurements, modern survey methods: Auto level, Total station, Theodolite, GIS, GPS etc.	8
4	**Basic terminology of construction projects** Building Bye-Laws, components of buildings, arrangement of doors, windows, cupboards etc. for residential building, basic requirements of a building Planning.	7
5	**Building planning** Introduction to Building Drawing and Brief History of Building Drawing, planning of residential buildings and public buildings, layout of buildings plan, sample plan.	7

6	**Construction Work Supervision** Roles and responsibilities of construction work supervisor, Record keeping: Muster roll, measurement book, quantities estimation, register for material receipt and issue, logbook for construction equipment. Site Registers, register for scrap material, register for construction equipment, checklist for construction work supervision, daily report, consumption of material.	8

Text Books:

1. S.C. Rangwala., *Building Construction*, *Charotar Publications*, 2016.
2. Dr. B. C. Punamia., *Building Construction, Laxmi Publications*, 2016.
3. M. G. Shah, C. M. Kale and S. Y. Patki, *Building Drawings with an integrated Approach to Build-Environment, Tata McGraw Hill*, New Delhi, 2017.

Reference books:

1. Frederick Merrit., *Building Design and construction,* Tata McGraw Hill.5th Edition (1994) Hand Book.
2. Rangwala, S. C. *Building Construction: Materials and types of Construction*, 3rd Ed. New York: John Wiley and Sons. (1963).
3. Sushil-Kumar, T. B., *Building Construction*, 19th Ed. Delhi: Standard Pub. Distributors, 2003.

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Program:	**B. Voc. (Construction & Project Management)**				**Semester: I**	
Course:	**Engineering Drawing**				**Course Code: VCM21201**	
	Teaching Scheme		**Evaluation Scheme**			
Lecture	**Hours**	**Credit**	**FA 1**	**FA 2**	**SA**	**Total**
3	**3**	**3**	**20**	**30**	**50**	**100**

Course Objectives:

1. To develop imagination of physical objects to be represented on paper for engineering communication.
2. To develop the interpretation and manual drawing skills.
3. To develop the physical realization and manual drawing skill

Course Outcomes:

After learning the course, students will be able to

1. Understand the drawing sheets, dimensioning and tolerances
2. Understand and draw the projections of point and line on reference planes, inclined planes.
3. Understand the orthographic projections, first and third angle projections methods, draw orthographic views
4. Understand and draw the Isometric scale, construction of Isometric view of simple objects
5. Understand and draw the development of lateral surfaces of simple solids.
6. Understand and draw the free hand sketches of standard components of machine.

Detailed Syllabus:

Unit	**Description**	**Duration (45 Hrs)**
1	**Introduction** Layout of drawing sheets, sizes of drawing sheets, different types of lines used in drawing practice, Dimensioning – linear, angular, aligned system, unidirectional system, parallel dimensioning, chain dimensioning, location dimension and size dimension. Tolerances – methods of representing tolerances, unilateral and bilateral tolerances, tolerance on linear and angular dimensions, geometrical tolerances.	7
2	**Projection of Line and Planes** Introduction, Projection of points – points on the different quadrants and on the reference planes. Projection of straight lines (only first angle projection method) – Line on the reference planes - perpendicular to one plane and parallel to other plane – inclined to one plane and parallel to the other plane – parallel to both the planes –inclined to both the planes. Projection of planes (only first angle projection method) - Types of planes, Projection of planes perpendicular to both the reference planes, Perpendicular to one plane and parallel to other plane, Perpendicular to one plane and inclined to the other plane, Inclined to both planes.	8

3	**Orthographic Projections** Reference planes, types of orthographic projections – First angle projections, Third angle projections, methods of obtaining orthographic views by First angle method.	6
4	**Isometric View** Introduction, Isometric scale, construction of Isometric view of simple objects from given orthographic.	8
5	**Development of Lateral Surfaces of Solids** Introduction, Development of lateral surfaces of Cone, Cylinder, Pyramid and Prism.	8
6	**Freehand Sketching and introduction of AutoCAD software** Free hand sketching -- FV and TV of standard machine parts – Hexagonal headed nut and bolt, foundation bolts, shafts, keys, couplings, springs, screw thread forms, welded joints, riveted joints.	8

Text Books

1. Bhatt N.D., and Panchal V.M., *Engineering Drawing, Charotar Publishing House*, 2010.
2. Agrawal B., and Agrawal C M "*Engineering drawing*", Tata McGraw Hill Education Private Limited., 2014.

Reference books:

1. Gill P.S., *Engineering drawing*, S.K. Kataria & Sons., 2016.
2. Gopalakrishnan.K.R., *Engineering Drawing*, (Vol.I and Vol.II), Dhanalakshmi publishers, 1970.
3. Venugopal. K, and Sreekanjana G., *Engineering Graphics*, New Age International Publishers. 2019.
4. Natarajan K. V., *A text book of Engineering Drawing Graphics*. Dhanalakshmi Publishers, 2008.

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Program:	B. Voc. (Construction & Project Management)				Semester: I	
Course:	Applied Science				Course Code: VCM21301	
Teaching Scheme			Evaluation Scheme			
Lecture	Hours	Credit	FA 1	FA 2	SA	Total
2	2	2	20	20	40	80

Course Objectives:

To develop an ability to understand phenomena with the help of science concepts and relate them to applications.

Course Outcomes:

After learning the course, students will be able to

1. Understand the quality of water, its softening techniques and quality of fuel and its different types.
2. Interpret the optical phenomena - reflection, refraction, polarization with wave nature of light.
3. Understand what is corrosion, its types and its consequences in environment.
4. Summarize production of ultrasonic waves and their applications.

Detailed Syllabus:

Unit	Description	Duration (30Hrs)
1	**Water** Impurities in water, methods of their removal, hardness of water, its types and units. Chemical analysis of water by determination of hardness by EDTA method and its numericals. Disadvantages of hard water in boilers, Water softening techniques: Permutit Water purification by reverse osmosis **Fuel and their Classification** Definition, characteristics, classification into solid, liquid and gaseous fuel. Calorific value of fuels – GCV, NCV and their relation. Coal, its types and their properties, proximate analysis and ultimate analysis. Gaseous fuels- Gaseous fuels: Hydrogen gas as a future fuel, production by steam reforming of methane and coke, storage and transportation. .	8
2	**Optics:** Electromagnetic wave nature of light, electromagnetic spectrum, reflection and refraction of a wave from a plane surface, laws of reflection and refraction, total internal reflection, plane polarized light, Law of Malus.	8
3	**Corrosion** Theory of corrosion. Different types of corrosion: Pitting corrosion, concentration cell corrosion, stress corrosion and soil corrosion. Factors affecting corrosion: nature of metal and nature of environment. Prevention of corrosion by various methods using metallic and non- metallic coatings like – hot dipping, cladding, electroplating and cementation and powder coating.	7

4	**Vibrations & Ultrasonic waves:** Vibration as simple spring mass system, elementary and qualitative concept of free and forced vibrations, resonance Ultrasonic waves, properties of ultrasonic waves, Productions of ultrasonic waves by magnetostriction and piezo-electric effect, application of ultrasonic in industry	7

Text Books:

1. Jain and Jain, Engineering Chemistry, Dhanpat Rai Publishing Co., sixteenth edition ,2016.
2. M. N. Avadhanulu ,P.G. Kshirsagar , A text book of Engineering Physics, S. Chand publication ,revised edition, 2015

Reference books:

1. Wiley Editorial, Engineering Chemistry, Wiley India, 2nd edition, 2012.
2. O.G. Palanna, Engineering Chemistry, Tata McGraw-Hill Education, 2009.
3. R. K. *Gaur*, S. L. *Gupta ,* Engineering Physics, Dhanpat Rai Publications, 8th edition ,2001.

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Program: B. Voc. (Construction & Project Management)					**Semester: I**	
Course: Writing Skills					**Course Code: VCM21401**	
Teaching Scheme			**Evaluation Scheme**			
Practical	**Hours**	**Credit**	**FA 1**	**FA 2**	**TW**	**Total**
2	**2**	**1**	**-**	**-**	**50**	**50**

Objectives:

1. Understand the aspects and characteristics of effective writing skills.
2. Recognize the importance of effective writing skills in various contexts.
3. Demonstrate proficiency in different types of writing, including descriptive, narrative, persuasive, instructional, and formal business writing.
4. Develop the ability to critically evaluate and revise written work for structure, cohesion, coherence, grammar, correctness, completeness, logic, and other aspects of effective writing.
5. Apply effective writing techniques to communicate ideas clearly, persuasively, and professionally in diverse writing tasks.

Course Outcomes: After learning the course students will;

1. Understand the essential aspects and significance of effective writing skills across personal, academic, and professional contexts.
2. Demonstrate proficiency in descriptive and narrative writing techniques, employing vivid language and sensory details to engage readers.
3. Develop critical thinking skills by summarizing complex material and providing insightful personal responses.
4. Apply persuasive writing strategies effectively and produce professional written documents in various communication contexts, including letters and emails.

Detailed Syllabus:

Sr No	Description
1	**Introduction to Effective Writing Skills** Aspects and characteristics of writing skills. Importance of effective writing Skills.
2	**Effective Writing** Structure, Cohesion and Coherence, Grammar, Correctness, Completeness, Logic and other aspects of effective writing skills
3	**Write a descriptive paragraph:** Write a descriptive paragraph about a person, place, or object. Encourage them to use sensory details and vivid language to create a picture in the reader's mind.
4	**Write a personal narrative:** Write a personal narrative about a memorable event. Use descriptive language, dialogue, and reflection to make the story come alive.
5	**Write a summary and response:** Read an article or essay and write a summary of the main points, followed by a personal response that explains your thoughts and reactions to the piece.
6	**Writing instructions** Writing clear, concise and compete instructions
7	**Write a persuasive letter** Write a persuasive letter to a local or national government representative, expressing your opinions on a current issue or proposing a solution to a problem.
8	**Business email writing:**

	Write a business email on a given scenario. Write a formal email, using appropriate tone, format, and language.
9	**Report writing assignment:** Write a report on a given topic. Use a clear prompt, a report outline, in a structured and professional format, using appropriate language and terminology.
10	**Job Application/ Cover Letter:** Write a job application in a professional format with all the necessary details.

Instructions:

- First lab activity is mandatory
- Any six assignments other than first lab activity to be conducted

References Books:

1. Seely, John. Oxford Guide to Effective Writing and Speaking. OUP 2nd edition, 2005
2. Goins, Jeff. You Are a Writer (So Start Acting Like One). Tribe Press
3. Brohaugh, William. Write Tight: Say Exactly What You Mean with Precision and Power.
4. Janzer. Anne. The Writer's Process: Getting Your Brain in Gear. Cuesta Park Consulting, 2016
5. King, Stephen. On Writing: A Memoir of the Craft. Scribner, 2010

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Program: B. Voc. (Construction & Project Management)				**Semester: II**		
Course: On Job Training				**Code: VCM22602**		
Teaching Scheme			**Evaluation Scheme**			
Practical	**Hours**	**Credit**	**TW**	**PR**	**OR**	**Total**
20	**20**	**10**	**-**	**200**	**-**	**200**

Course Objective:

1. To understand the construction Project based industry.

Course Outcomes: After learning the course, students will be able to

1. Demonstrate the use of different types of construction materials.
2. Understand how field study is carried on for construction materials.
3. Demonstrate technical skills and expertise.

Guidelines: Students will take on-the-job training in the industry in the domain of Construction Management as per the following job description and personal attributes.

Job Description

To execute the construction activities from preliminary survey to finishing of work.

Personal Attributes

Aptitude for conducting training, and pre/ post work to ensure competent, employable candidates at the end of the training. Strong communication skills, interpersonal skills, ability to work as part of a team; a passion for quality and for developing others; well-organised and focused, eager to learn and keep oneself updated with the latest in the mentioned field.

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Course Syllabus
Semester-II

Program:	**B. Voc. (Construction & Project Management)**				**Semester: II**	
Course:	**Construction Materials**				**Course Code: VCM22102**	
Teaching Scheme			**Evaluation Scheme**			
Lecture	**Hours**	**Credit**	**FA 1**	**FA 2**	**SA**	**Total**
3	**3**	**3**	**25**	**25**	**50**	**100**

Course Objectives: To provide basics knowledge of different types of construction materials that are used for projects.

Course Outcome: After completing this course**,** student will be able to

1. State overview of different construction materials used on site.
2. Discuss different types of construction materials and relevant criteria to be used.
3. Understand different type of concrete and its applicability.
4. Describe types of cement and admixtures.
5. Identify the different types of steels and aluminums.
6. Examine advanced construction materials and its applicability.

Detailed Syllabus:

Unit	**Description**	**Duration (45 Hrs)**
1	**Overview of construction material:** Scope of construction materials in different construction activities: transportation engineering, environment engineering, irrigation engineering, selection of materials for different civil engineering structures.	7
2	**Construction materials:** Stones, timber, bamboo, tar and bitumen, lime, sand, soil and its properties, aggregates and its classification, bricks/blocks	8
3	**Cement and Admixture:** Various types of cement and their properties; Various field and laboratory tests for cement; Various ingredients of cement concrete and their importance, Field and tests admixtures, mineral and chemical admixture.	8
4	**Mortar and Concrete:** Preparation of cement mortar and concrete for different types of works, factors affecting strength of concrete, various tests for concrete; types of concrete and their specific use.	7
5	**Steel and Aluminum:** Types of steel-mild steel, high carbon steel, high strength steel- properties and uses, light Guage steel, commercial forms of steel and aluminium and their uses.	7
6	**Advanced materials:** Ferro cement, FRP, FAL-G brick, Autoclaved Cement Concrete (ACC) Blocks, fly ash, super plasticizers, wall panels, plastics, and geotextiles.	8

Text Books:

1. Shushil Kumar., "*Building Construction*", Standard Publication, 2003.
2. Arora, S.P. and Bindra, S.P.; "*A Text Book of Building Construction";* Dhanpt Rai and Sons, New Delhi, 1980.
3. Dr. B. C. Punamia., *Building Construction, Laxmi Publications*, 2016.
4. ML Gambhi, *Concrete Technology, Tata McGraw-Hill Pub.,* 2004.
5. MS Shetty, *Concrete Technology- Practical & Theory*, S. Chand, 2008.

Reference books:

1. Rangwala, S*., Building Construction*. 22nd Ed. Anand : Charotar Pub. House, 2004.
2. Bindra, S. P. and Arora, S. P, *Building Construction: Planning Techniques and Methods of Construction*, 19th Ed. New Delhi Dhanpat Rai Pub., 2000.

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Program:	B. Voc. (Construction & Project Management)				Semester: II	
Course:	Basics of Electrical & Electronics				Code: VCM22202	
Teaching Scheme			Evaluation Scheme			
Lecture	Hours	Credit	FA1	FA2	SA	Total
3	3	3	25	25	50	100

Course Objectives:

1. To build strong conceptual understanding and fundamentals of basic electrical circuit, single phase and polyphase AC systems.
2. To impart basic knowledge for conceptual understanding of DC and AC machines
3. To acquire the basic knowledge of digital and analog electronics.
4. Familiarize students with various electrical measuring instruments and drives used in electrical and electronics engineering

Course Outcomes: After learning the course, students will be able to

1. Understand fundamental concepts of electrical engineering, DC circuits and work power and energy.
2. Apply the knowledge of single phase and three phase circuits to determine unknown electrical quantities.
3. Demonstrate the constructional features and operational details of DC and AC machines
4. Understand the concept of a number system and logic gates to implement any logic function.
5. Understand the characteristics and applications of Zener diodes, PN junction diode, LED and Photo diode.
6. Describe the different types of electrical drives and instruments used for voltage, current, and power measurements in various industrial applications.

Detailed Syllabus:

Unit	Description	Duration (45 Hrs)
1	**Elementary Concepts:** Concept of Potential difference. Current and resistance. Series and parallel circuits, Voltage and current dividers, Power and energy calculations, Ohm's law, Kirchhoff's Law, SI units of work Power and Energy, Conversion of energy from one form to another (Electricity bill verification as an activity)	7
2	**Single phase and poly phase A. C. circuits:** Generation of single phase sinusoidal A.C. voltages, AC quantities, phasor representation, Pure R, Pure L, and Pure C circuits, impedance, admittance, concept of active, reactive, apparent power and power factor. **(Verification of power factor for RL and RC circuit on multisim)** Polyphase A.C. Circuits: Introduction to 3 phase supply and its necessity, balance three phase system, relation between line and phase quantities (with phasor diagram), power in three phase circuits for star and delta connection **(Verification of line and phase values for star and delta on simulation platform)**	7

3	**DC and AC machines** **DC Machines:** Construction, working principle of D.C. generator, emf equation of DC generator (derivation not expected), working principle of D.C. motor, types of D.C. motor, Back emf (Numerical), Industrial applications. **(Demonstration of machine parts)** **AC Machines:** Single phase transformers: Construction, operating principle, emf equation, voltage and current ratios. Losses, Efficiency and regulation, Autotransformer. **(Understating of direct loading test on single phase transformer)**	8
4	**Fundamentals of Digital Electronics: Number System:** Introduction to number system, Conversion of number systems, Binary Code, 1's complement and 2's complement, Introduction to Digital Electronics: Basic logic Gates, Boolean Postulates/laws, De-Morgan Theorems. **(Verification of logic gates on digital trainer kit)**	7
5	**Basics of Semiconductor:** The P-N Junction Diode, V-I characteristics, Diode as Rectifier, specifications of Rectifier Diodes, Half Wave, Full wave, Bridge rectifiers, Zener Diode, Characteristics, Specifications, Zener Voltage Regulator, Types of Diodes: LED, Photodiode **(Demonstration of above devices on Virtual labs)**	8
6	**Measuring instrument and drives:** Measurement of Voltage, Current, and Power, Study of Energy meters, Use of CT and PT for measurement of power /energy in single phase and three phase Drives: Advantages of electrical and electronic drives, individual and group drive, selection of drives depending on load characteristics. **(Case study on selection of drive)**	8

Text Books:

1. I. J. Nagrath and Kothari (PHI learning Pvt.Ltd). "*Theory and problems of Basic Electrical Engineering*, Eastern Economy Edition.

2. Ashfaq Husain. "*Fundamentals of Electrical Engineering*", 4 th Edition, Dhanpat Rai & Co.),

3. V. N. Mittal and Arvind Mittal,. "*Basic Electrical Engineering*", 2 nd Edition, McGrawHill.

4. V.K. Mehta. "*Basic Electrical Engineering*", 1 st Revised Edition ,S. Chand & Co. Pvt. Ltd. NewDelhi.

5. R.P. Jain, Modern Digital Electronics, Prentice Hall of India,New Delhi 4 th edition

Reference Books:

1. D. C. Kulshreshta . "*Basic Electrical Engineering" ,1 st Edition ,Tata McGraw hill.*

2. B. L. Theraja and A. K. Theraja S. *A textbook of Electrical Technology Vol I S. Chand & amp; Co. Pvt. Ltd. New Delhi,1 st Edition.*

3. B. L. Theraja and A. K. Theraj . *A textbook of Electrical Technology Vol II , S. Chand & amp; Co. Pvt. Ltd. New Delhi,1 st Edition*

4. Edward Hughes. *"Electrical Technology", 10 th Edition* ,Pearson.Ltd..

5. A. K. Sawhney Publisher*: Dhanpat Rai Publications,"* A Course in Electrical and Electronic Measurements and Instrumentation.

6. R. L. Boylestad & Louis Nashlesky *Electronic Devices Circuit Theory,* Pearson Education.

Program:	B. Voc. (Construction & Project Management)				Semester: II	
Course:	Soft Skill				Code: VCM22402	
	Teaching Scheme		Evaluation Scheme			
Lecture	Hours	Credit	FA 1	FA 2	TW	Total
2	2	2	-	-	50	50

Objectives:

1. Analyze the significance of soft skills, particularly language proficiency, in personal and professional contexts, emphasizing their role in effective communication and interpersonal relationships.
2. Evaluate the distinction between soft skills and hard skills, discerning their respective importance and applicability in diverse situations.
3. Apply advanced listening strategies and techniques to enhance comprehension and communication effectiveness in various contexts.
4. Synthesize information from diverse texts through proficient reading skills, summarizing content accurately and concisely.
5. Create and deliver structured and engaging verbal presentations, utilizing effective speaking techniques to convey ideas convincingly and adaptively to different audiences

Course Outcomes:

After learning the course students will be able to;

1. Understand the importance of listening and reading skills
2. Write well developed paragraphs and instructions
3. Develop skills required for public speaking
4. Present themselves effectively in different contexts

Detailed Syllabus:

Sr No	Description
1	**Introduction to Soft Skills with special reference to language skills** Importance, need of soft skills, Soft Skills V/s hard skills
2	**Listening Skills** Importance, Types and techniques for effective listening. Assignment:Listen and summarize the content.
3	**Reading Skills** Tips for effective reading, Types of reading. Assignment: Read the given article/text and summarize in your own words
4	**Speaking Skills 1 – Self Introductions** Tips for effective public speaking Assignment: Self introductions and describing job profiles.
5	**Speaking Skills 2 – Group Discussions** Assignment: Dos and Don'ts of a Group Discussion
6	**Speaking Skills 3 – Presentations** Assignment: Presenting ideas and thoughts before an audience.
7	**Communication Skills** Types of communication and barriers to communication. Assignment: Role play

8	**Time Management** Time Management prioritizing, urgency and importance, categorizing tasks as high, medium, or low priority, developing a structured daily, weekly, or monthly schedule to manage time efficiently. Assignment: Create a visual schedule or checklist for daily tasks, including schoolwork, chores, and free time.
9	**Problem-Solving Skills** Basics of problem solving, critical thinking, brainstorm ideas and try different approaches to find solutions, Steps in problem solving.

Instructions:

1. First lab activity is mandatory
2. Any six assignments other than first lab activity to be conducted

Reference Books:

1. Rao Prasad N D V, English Grammar and Composition, S. Chand and Co. Pvt. Ltd, 2017.
2. Salaria R.S., and Kumar K.B., Effective Communication Skills, Khanna book publishing co. (P)Ltd, 2020.
3. Patil Z.N., Walke B., Thorat A., and Merchant Z., English For Practical Purposes, Macmillan Publication,2016.
4. Mishra S., and Muralikrishna C., Communication Skills for Engineers, Pearson India Publication,2011.
5. Bhatia V., Business Communication, Khanna book publishing co. (P)Ltd, 2013.

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Program:	**B. Voc. (Construction & Project Management)**				**Semester: II**	
Course:	**IT Tools I**				**Code: VCM22502**	
Teaching Scheme			**Evaluation Scheme**			
Practical	**Hours**	**Credit**	**FA 1**	**FA 2**	**TW**	**Total**
2	**2**	**1**	**-**	**-**	**50**	**50**

Course Objectives:

1. To understand use of computer-based system in communication and fundamentals of Internet
2. To learn and understand the MS office world using simple tools.

Course Outcomes: After learning the course, students will be able to

1. Demonstrate the computer components and how they are used for communication and networking.
2. Comprehend the use of MS office and Internet Communication

Guideline:

Total : 6 experiments/assignments to be conducted

Detailed Syllabus:

Sr No	Description
1	Study of Basic Computer fundamentals.
2	Demonstrate and Study of different types of computer networks and internet.
3	Create and manage professional documents using MS word.
4	Create and manage data using MS excel.
5	Create and manage presentation using power point.
6	Study of Internet Communication: Email, Social Media, etc.

Text Books:

1. Kumar B., *Mastering MS Office: Concise Handbook with screenshots*, V&S Publishers, 2017.
2. Orchids, *Microsoft Office 2007*, MS Office Series, 2018
3. Jain S., Kartika Geeta, *Microsoft Office 2010 Training Guide*, BPB Publications 2015.
4. Kurose James F., and Ross Keith W., *A Computer Networking: A top-down approach featuring the internet*, Pearson Publication, 2017.
5. Thareja Reema, *Fundamentals of Computers*, Oxford University Press, 2019.

Reference Books:

1. Ed Tittel, and Muthukumaran B., *Computer Networking*, Schaum's Outlines, TATA Mcgraw Hill Publications, 2006.
2. Peter Norton, *Introduction to Computers*, Tata Mcgraw Hill Publication, 2005.

Program: B. Voc. (Construction & Project Management)				**Semester: II**		
Course: On Job Training				**Code: VCM22602**		
Teaching Scheme			**Evaluation Scheme**			
Practical	**Hours**	**Credit**	**TW**	**PR**	**OR**	**Total**
20	**20**	**10**	**-**	**200**	**-**	**200**

Course Objective:

1. To understand the construction Project based industry.

Course Outcomes: After learning the course, students will be able to

1. Demonstrate the use of different types of construction materials.
2. Understand how field study is carried on for construction materials.
3. Demonstrate technical skills and expertise.

Guidelines: Students will take on-the-job training in the industry in the domain of Construction Management as per the following job description and personal attributes.

Job Description

To execute the construction activities from preliminary survey to finishing of work.

Personal Attributes

Aptitude for conducting training, and pre/ post work to ensure competent, employable candidates at the end of the training. Strong communication skills, interpersonal skills, ability to work as part of a team; a passion for quality and for developing others; well-organised and focused, eager to learn and keep oneself updated with the latest in the mentioned field.

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Course Syllabus
Semester-III

Program: B. Voc. (Construction & Project Management)			**Semester: III**			
Course: Civil Engineering Drawing and building Planning			**Code: VCM23103**			
Teaching Scheme			**Evaluation Scheme**			
Lecture	**Hours**	**Credit**	**FA 1**	**FA 2**	**ETE**	**Total**
2	**2**	**2**	**20**	**20**	**40**	**80**

Course Objectives:

1. To impart knowledge of submission drawing by understanding Building bye laws.
2. To make aware about various building components and their construction methods.

Course outcomes:

After learning the course, students will be able to

1. Interpret the symbols, signs and conventions front the given drawing.
2. Prepare line plans of residential and public buildings using principles of planning.
3. Prepare submission and working drawing for one the given requirement for Load Bearing Structure.
4. Prepare submission and working drawing from the given requirement for Framed Structure.

Detailed Syllabus:

Unit	**Description**	**Duration (30 Hrs)**
1	**Conventions and Symbols** Draw the conventions, signs and symbols used in given civil engineering drawings. Explain the use of various types of lines in the given building drawing. Select relevant scale in given situation. Interpret the given drawings for the given civil structures. Principles of Building planning and architectural planning. Importance of Building bye-laws.	7
2	**Planning of Building** Apply the norms for minimum dimensions to various units in a given residential building. Describe rules and bye laws of governing authority in a given area for construction. Compute built up, carpet and plinth, super built area for the given building. Draw line plans for the given residential and public buildings.	8
3	**Drawing of load bearing Structure** Draw developed plan, elevation, section, site plan from the given line plan for load bearing residential building. Prepare submission drawing of the given load bearing residential building. Prepare working drawing of the given load bearing residential building. Prepare foundation plan of the given load bearing residential building.	7
4	**Drawing of Framed Structure** Draw developed plan, elevation, section, site plan from the given line plan for framed residential building. Prepare submission drawing of the given framed residential building. Prepare working drawing of the given framed residential building. Prepare foundation plan of the given framed residential building.	8

Text Books:

1. S.S. Bhavikatti, 2014. *Building Materials*, Vikas Publication House Private Ltd. First Edition.
2. B.C. Punmia, 2016. *Building Construction*, 11th Edition, Laxmi Publications.
3. S. K. Duggal, 2019. *Building Materials*, 5th Edition New Age International Publishers.
4. S.C. Rangwala, 2016. *Building Construction*, 33rd Edition Charotar Publications.
5. M. G. Shah, C. M. Kale and S. Y. Patki, 2017. *Building Drawings with an integrated Approach to Built-Environment,* 5th Edition New Delhi, Tata McGraw Hill.

Reference Books:

1. R. Barry 1999, *The construction of buildings*; seventh edition, Vol.1 & Vol.2 by, Oxford: Blackwell ScienceISBN-13
2. Ruth T. Brantley & L. Reed Brantley 1995. *Building Materials Technology*, Tata McGraw Hill.
3. National Building Code (R 2016).
4. Frederick Merrit, 1994. *Building Design and construction,* 5th Edition (1994) Hand Book. Tata McGraw Hill
5. I.S. 962 – 1989 Code for Practice for Architectural and Building Drawings, Revision-2 (R 2017).

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Program:	**B. Voc. (Construction & Project Management)**					**Semester: III**
Course:	**Civil Engineering Drawing and building Planning Lab**					**Course Code: VCM23104**
Teaching Scheme			**Evaluation Scheme**			
Practical	**Hours**	**Credit**	**TW**	**OR**	**PR**	**Total**
2	**2**	**1**	**_**	**_**	**50**	**50**

Course Objectives:

1. To impart knowledge of fundamentals of building drawing.
2. To imbibe proficiency of approval plans by understanding Building bye laws.

Course outcomes:

After learning the course, students will be able to

1. Interpret the symbols, signs and conventions in the given drawing.
2. Prepare approval plans of residential and public buildings.

Detailed Syllabus:

Assignment No.	**Description**
1	Following Sketches pertaining to the above plan (with Standard Dimensions) a. Door b. Window c. Stair d. Masonry e. Lintel
2	Draw sketches using computer software of the following: 1. Foundations- two plates a) Line sketches of shallow and deep footing. b) Details of any one of the shallow footings.
3	Development of a given line plan of a residential and public building.
4	Draw a developed plan of residential /public building to a scale of 1: 50 1. Detailed Plan. 2. Elevation. 3. Section**.**
5	Draw sketches for 1) Types of Doors, 2) Types of Windows, 3) Types of stairs
6	Conduct a Site visit and write a report on the same.

Text Books:

1. Shah, C. M. Kale and S. Y. Patki (2017), *Building Drawings with an integrated Approach to Built-Environment* ,5th Edition, M. G., New Delhi, Tata McGraw Hill.

Reference Books:

1. R. Barry 1999, *The construction of buildings*; seventh edition, Vol.1 & Vol.2 by, Oxford: Blackwell ScienceISBN-13
2. Ruth T. Brantley & L. Reed Brantley 1995. *Building Materials Technology*, Tata

McGraw Hill.
3. National Building Code (R 2016).
4. Frederick Merrit , 1994. *Building Design and construction,* 5th Edition (1994) Hand Book. Tata McGraw Hill
5. I.S. 962 – 1989 Code for Practice for Architectural and Building Drawings, Revision-2 (R 2017).

Program:	B. Voc. (Construction & Project Management)				Semester: III	
Course:	Surveying				Course Code: VCM23203	
	Teaching Scheme		Evaluation Scheme			
Lecture	Hours	Credit	FA 1	FA 2	SA	Total
2	2	2	20	20	40	80

Course Objectives:

1. To learn the basics of plane surveying and different types of instruments used for plane surveying.
2. To learn different methods of surveying.
3. To understand advancements in plane surveying such as electronic instruments and software's.

Course outcomes: After learning the course, students will be able to

1. Operate and use surveying equipment.
2. Draw a plan or map of the existing permanent features on the ground.
3. Classify the ground features from the map or plan.
4. Analyze temporary adjustments and check permanent adjustments of the Theodolite.

Detailed Syllabus:

Unit	Description	Duration (30 Hrs)
1	**Introduction**: Importance, Principles of Surveying. Types of Surveying. b. Chaining: Field Equipment, Methods of chaining, Offsets, obstacles in chain-surveying; plotting; Degree of accuracy, Scale, land measurement units.	6
2	**Prismatic compass surveying**: Instruments; Principle, Closed traverse; corrections, Procedure and precautions, local attraction. **Plane Table Surveying**: Field equipments, Radiation and Intersection Methods of plane tabling.	6
3	**Levelling**; Instruments; Field book recording, Bench mark & its types, methods of reduction of levels, contouring; Plotting. Testing and permanent adjustments. **Areas and Volumes**: Methods of determining areas and volumes.	8
4	**Theodolite**: Construction, Temporary and Permanent adjustment of transit Theodolite; angle measurements and errors. **Tacheometry**: Stadia and its principal, analytic lens, Heights and distances from stadia intercepts. Introduction and use of Electronic Total Station for area measurement, DGPS for area measurement, Introduction to GIS and remote sensing.	10
	Total	**30**

Text Books:

1. Duggal, S.K , *Surveying* Vols. I & II, McGraw-Hill; 5th edition.
2. A. M. Chandra, *Plane Surveying*, New Age International Publishers.

Reference Books:

1. James M. Anderson, Edward M. Mikhail, 2013. *Surveying: Theory and Practice* by, Tata McGraw Hill.
2. N. N. Basak, 2013. *Surveying and Levelling* by, Tata McGraw Hill.

Program:	B. Voc. (Construction & Project Management)				Semester: -III	
Course:	Surveying Lab				Code: VCM23204	
Teaching Scheme			Evaluation Scheme			
Practical	Hours	Credit	FA 1	FA 2	PR	Total
2	2	1	-	-	50	50

Objectives:

1. To impart basic understanding of various aspects related to surveying and carrying out physically linear and angular measurements on filed.

Course Outcomes: After learning the course, students will be able to

1. Operate and use surveying equipment.
2. Analyze temporary adjustments and check permanent adjustments of the Theodolite.
3. Analyze field data for linear, angular, area or volume measurement.

Detailed Syllabus:

Assignment No.	Description
1	**Chain surveying:** 1. Ranging / chaining a line and recording the field book. 2. Setting-out Right Angles using Tape. 3. Taking offsets and setting-out Right Angles using:- (i) Cross Staff (ii) Indian Optical Square
2	**Compass surveying**: Compass Surveying: Measurement of Angles between the lines meeting at a point, and Compass Traversing and Taking Observations of FB and BBs to check accuracy of traversing.
4	**Plane table surveying:** 1. Study of Equipment 2. Setting-up the plane table- Temp. Adjustments. 3. Marking North Direction and Orientation by: (i). Magnetic Needle/Trough Compass (ii). Back- sighting. 4. Plotting a few points by Radiation Method. 5. Plotting a few points by Inter-Section Method.
5	**Levelling**: 1. Study of Equipment and levelling staff, Temporary adjustment of levelling Instruments. 3. Field work using in levelling :(i) Taking Staff readings recording the field book for Simple and Differential levelling
6	**Transit theodolite surveying:** 1. Study of Equipment:(i) Ordinary Transit Theodolite (ii) E D M Theodolites 2. Temporary Adjustments of a Theodolite. 3. Field work: (i) Measurement of Horizontal and Vertical Angles by Theodolites/ETS,
7	**Demonstration and applications of:** Electronic Total Station and Differential Global Positioning System, Introduction to GIS and RS, introduction to other software's contouring, earthwork calculations.

Text Books:

1. Duggal, S.K , *Surveying* Vols. I & II, McGraw-Hill; 5th edition.
2. A. M. Chandra, *Plane Surveying*, New Age International Publishers.

Reference Books:

1. James M. Anderson, Edward M. Mikhail, 2013. *Surveying: Theory and Practice* by, Tata McGraw Hill.
2. N. N. Basak, 2013. *Surveying and Levelling* by, Tata McGraw Hill.

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Program:	B. Voc. Construction & Project Management)				Semester: III	
Course:	IT Tools II				Code: VCM23303	
	Teaching Scheme		Evaluation Scheme			
Lecture	Hours	Credit	FA 1	FA 2	SA	Total
2	2	2	20	20	40	80

Course Objectives:

1. To develop advanced skills in using word processing and spreadsheet software for complex tasks and automation.
2. To introduce students to digital multimedia tools for image, audio, video editing, and screen casting.

Course outcomes:

After learning the course, students will be able to

1. Use word processors to Create and manage long documents with tables of contents, indexing, cross-references, and footnotes.
2. Utilize advanced spreadsheet features like VLOOKUP, nested functions, data validation, scenarios, and basic macros/VBA.
3. Perform basic image editing, audio/video editing, screen recording, and use online multimedia tools.
4. Collaborate effectively using cloud storage, file sharing, online office suites, and project management tools.

Detailed Syllabus:

Unit	Description	Duration (30 Hrs)
1	**Advanced Word Processing** Working with long documents (Table of contents, indexing, cross-references, footnotes), Using mail merge for bulk emails/letters, collaborating on documents (Track changes, comments), Protecting and securing documents	8
2	**Advanced Spreadsheet Features** Advanced functions (VLOOKUP, IF, Nested IFs, etc.), Data validation and data entry forms, Scenarios and goal seek analysis, Introduction to macros and VBA	8
3	**Digital Multimedia** Image editing basics, Audio/video editing introduction, Screen recording and screencasting, Online multimedia tools, online video conferencing tools (google meet/Microsoft team/Zoom App etc.)	8
4	**Collaboration and Cloud Tools** Cloud storage (Google Drive, OneDrive), File sharing and collaboration, Online office suites, Introduction to project management tools, AI-based Automation (Zapier, Co-Pilot)	6
	Total	**30**

Text Books:

1. Shelly Cashman Series. 2019. *Office 365 & Office 2019 Introductory*, 1st Edition, Cengage Learning, Boston.

2. Jennifer Duffy. 2018. *Multimedia Foundations*: Core Concepts for Digital Design, 2nd Edition, Focal Press, Burlington.

Reference Books:

1. Joan Lambert and Joyce Cox. 2013. *Microsoft Word 2013 Step by Step*, Microsoft Press, Redmond.
2. Curtis Frye. 2013. *Microsoft Excel 2013 Step by Step*, Microsoft Press, Redmond.
3. David W. Beskeen, et al. 2015. *Microsoft Office 2016 Illustrated Introductory*, First Course, Cengage Learning, Boston.
4. Katherine Murray. 2018. *Modern Desktop Environments for Virtual*, Cloud, and Mobile Users, Pearson Education, London.

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Program:	**B. Voc. (Construction & Project Management)**				**Semester: III**	
Course:	**Business Communication - I**				**Code: VCM23403**	
Teaching Scheme			**Evaluation Scheme**			
Practical	**Hours**	**Credit**	**FA 1**	**FA 2**	**TW**	**Total**
2	**2**	**1**	**-**	**-**	**50**	**50**

Objectives:

1. Analyze the role and significance of business communication in professional and personal contexts.
2. Evaluate various types of communication and identify principles and barriers affecting effective communication.
3. Demonstrate effective interpersonal communication skills including active listening, empathy, and conflict resolution.
4. Apply non-verbal communication techniques, including body language, to enhance communication effectiveness in business scenarios.
5. Develop proficiency in professional business correspondence, including writing formal letters and resumes, and demonstrate persuasive communication skills in mock business meetings.

Course Outcomes:

After learning the course students will be able to;

1. Apply knowledge of fundamentals of communication in given situations
2. Communicate effectively using non-verbal codes
3. Write professional letters
4. Demonstrate business and social skills.

Detailed Syllabus:

Sr No	Description
1	**Role and importance of Business Communication** Introduction to the art of Business Communication, Role and importance in professional and personal life, Ice-breaking activities for various scenarios, Professional Greetings, Making & Responding to Requests.
2	**Introduction to Business Communication** Types of Communication, Principles and Barriers to Communication, Overcoming Barriers to communication **Assignment:** Explain different types of communication. Provide examples of barriers to communication from your own experiences and suggest ways to overcome it.
3	**Talking about opinions and perceptions** Get recognized in the crowd: Introducing self in business environment Understand purpose of introduction, tailor self-introduction for gaining attention, find out USP (individuality, skills etc) and emphasize, assertive and expressive, Express opinions confidently in business environment, Speak with purpose, use persuasive communication.
4	**Non-Verbal communication & Body Language** Importance of Non-Verbal Communication, Non-Verbal Codes, Kinesics, Haptics, Proxemics, Chronemics, Para-language, Artifacts **Assignment:** Case Study of the role of body language in a given situation
5	**Interpersonal Communication Skills** Developing active listening and empathy skills in business interactions, Managing conflict and difficult conversations in the workplace
6	**Business Correspondence**

	Art of writing Business Letters (Understand different formats, writing with purpose, difference between day-to-day language and formal language)Write a professional resume or CV. Use a professional format. Highlight skills, experiences, and qualifications relevant to the target job or industry. **Assignment:**Developing formal business letters for different purposes
7	**Mock Business Meetings** Self- Grooming, Art of persuasion, Techniques of Short Speech & Effective Delivery of Extempore & Debate.
8	**Professional Etiquette and Networking** Understanding and practicing professional etiquette in various business settings, Building and maintaining professional relationships through networking.
9	**Emotional & Social Skills** Situational Conversations & Rapport Building through Role Play, Emotional Intelligence: Testing and Improving EI Assignment: Provide step by step solutions in the form of practical examples for the given case studies.

Instructions:

- All assignments are suggestive however, course teacher may devise another assignments to evaluate students
- First lab activity is mandatory

References:

1. Rao Prasad N D V, 2017, *English Grammar and Composition*, S. Chand and Co. Pvt. Ltd.
2. Salaria R.S., and Kumar K.B., 2020, *Effective Communication Skills*, Khanna book publishing co. (P) Ltd.
3. Patil Z.N., Walke B., Thorat A., and Merchant Z., 2016. *English For Practical Purposes*, Macmillan Publication.
4. Mishra S., and Muralikrishna C., 2011, *Communication Skills for Engineers*, Pearson India Publication.
5. Bhatia V., 2013, *Business Communication*, Khanna book publishing co. (P) Ltd.

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Program:	**B. Voc. (Construction & Project Management)**				**Semester: III**	
Course:	**Health and wellness II**				**Code: VCM23503**	
Teaching Scheme			**Evaluation Scheme**			
Practical	**Hours**	**Credit**	**FA 1**	**FA 2**	**TW**	**Total**
2	**2**	**1**	**-**	**-**	**50**	**50**

Objectives:

1. Prepare graduates to become wellness, health, fitness, nutrition education or foodservice professionals.
2. Prepare students for a variety of careers in wellness, fitness, food and nutrition education and foodservice.

Course Outcomes:

After learning the course students will be able to;

1. Describe the principles of health and wellness from a multidimensional and interdisciplinary perspective.
2. Develop a Positive and Optimistic approach.

Detailed Syllabus:

Unit No	Description
1	Positive psychology: what do you understand by positive psychology? What are benefits of positive psychology.
2	Identifying strengths: what do you understand by strengths? Classification of strengths, developmental assests. Identifying your personal strengths
3	Living well at every stage: what is resilience? positive youth development, Life tasks of adulthood.
4	Self-efficacy: Definition, the neurobiology of self-efficacy, self-efficacy's influence in life arenas.
5	Mnemonics: method of loci, peg word system, key word method, Recall of Name, Recall of words.
6	Optimism: learned optimism -Seligman, primary prevention, primary enhancement.

Instructions:

- Any 5 practical assignments to be conducted.

References Books:

1. W. Weiten, and M. A. Lloyd, 2007. *Psychology Applied to Modern Life: Adjustment in* the 21st Century, Wadsworth Publishing.
2. R. Harington, Stress, 2013, *Health and well-being*: Thriving in the 21st century, Wadsworth Publishing.
3. Boniwell, 2012, Positive psychology in a nutshell, McGraw-Hill Education.
4. S. Lyubomirsky, 2008, The how of happiness, Penguine Press.

Program: B. Voc. (Construction & Project Management)				**Semester: III**		
Course: Internship III: On Job Training				**Code: VCM23603**		
Teaching Scheme			**Evaluation Scheme**			
Practical	**Hours**	**Credit**	**TW**	**PR**	**OR**	**Total**
20	**20**	**10**	**-**	**200**	**-**	**200**

Course Objectives:

1. To understand the construction Project based industry.

Course Outcomes: After learning the course, students will be able to

1. Understand the scope of work.
2. Preparation of working drawing
3. Demonstrate technical skills and expertise.

Guidelines: Students will take on-the-job training in the industry in the domain of Constructio Management as per the following job description and personal attributes.

Job Description

Individual will be able the knowledge of different survey methods for field work.
Individual should be able to calculate distance, angles etc. from field data.
The individual should be able to hold interest in technology changes; demonstrate strong technica expertise and possess good oral and written communications skills.

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Course Syllabus
Semester-IV

Program: B. Voc. (Construction and Project Management)					Semester: IV	
Course: Construction Technology					Code: VCM24105	
Teaching Scheme			Evaluation Scheme			
Lecture	Hours	Credit	FA 1	FA 2	SA	Total
3	3	3	25	25	50	100

Course Objectives:

1. To understand types of structure, construction techniques of formwork, masonry, floor, roof construction.
2. To understand the basics of concrete technology and techniques involved in concreting work.

Course outcomes:

After learning the course, students will be able to

1. Identify types of building and explain the requirements of building components.
2. Explain types of masonry, formwork system and its construction.
3. Explain the construction techniques for flooring and roofing.
4. Describe techniques involve in construction of doors and windows.
5. Explain the basics of concrete operations and equipment's
6. Explain the various concreting techniques.

Detailed Syllabus:

Unit	Description	Duration (45 Hrs)
1	**Building construction techniques-** Introduction to building construction– definition, types of building as per National Building Code. Building components- substructure and superstructure, Superstructure: Concept and advantages of a framed structure, types: light framed structures, Timber framed, RCC framed structures. Substructure - shallow and deep foundations and their suitability. Settlement of shallow foundations. Damp Proof Course, plinth filling and soling.	8 8
2	**Masonry construction and Formwork techniques-** Masonry– Stone masonry: Principal terms, types of stone masonry. Brick masonry: characteristics of good building masonry, types of brick bonds: English, Flemish, Header, Stretcher, construction procedure, supervision. Cellular lightweight concrete block masonry. Formwork techniques: conventional timber and steel formwork system, Slip form work, table form, tunnel form. Mivan construction technique	7
3	**Techniques for doors, windows construction-** Doors and Windows – basic terms, installation of doors and window frames and their size specifications, fixtures and fastenings. Types of doors: glazed or sash doors, plastic doors, flush doors, louvered doors, collapsible doors, revolving doors, rolling steel doors, sliding doors, swing doors, folding doors. Types of windows: casement window, double hung window, pivoted window, sliding windows, louvered or venetian window, metal window, sash or glazed window, bay window, corner window, dormer window, gable window, skylight window, circular window, mosquito proof window, curtain wall window. Lintel and arches- types and method construction.	8

4	**Techniques for flooring and roof construction-** Flooring construction- Functional requirement, types of materials of flooring, Types of flooring: timber flooring, cement concrete flooring, mosaic flooring,ceramic flooring, terrazzo flooring, stone flooring, Industrial flooring: tremix or Vacuum Dewatered Flooring (VDF). Roof construction – roofing material– galvanized iron pre-coated aluminum sheets, fiber sheets, and Mangalore tiles. Roof construction: types and their suitability, method of construction, types of trusses, fixing details of roof covering.	7
5	**Introduction to concrete technology** Introduction to Concrete ingredients, admixtures, Concreting operations- Batching; Mixing; Transporting; Placing and Compacting; curing. Concreting Equipment: concrete mixers, pumps, vibrators and compaction equipment‟s. Special concrete: Lightweight concrete, self-compacting concrete, fiber reinforced concrete, geo-polymer concrete, High strength concrete, Ferrocement.	8
6	**Concreting Techniques** Ready mix concrete, Pumped concrete for high rise structures, under water concreting, roller compacted concrete, hot and cold weather concreting. Concrete repairing techniques- repairing of cracks, shotcrete, grouting, basics of retrofitting of concrete.	7
	Total	**45**

Text Books:

1. B.C. Punmia, 2016. *Building Construction*, Laxmi Publications.
2. Bindra and Arora 2016. *Building Construction*, Dhanpat Rai Publications.
3. M. S. Shetty 2018, Concrete Technology: Theory and practice.

Reference Books:

1. Rangwala, S. C. (1963). *Building Construction: Materials and types of Construction*, 3rd Ed. New York: John Wiley and Sons.
2. Sushil-Kumar, 2003. *Building Construction*, 19th Ed. Delhi: Standard Pub. Distributors,
3. National Building Code of India.

Program:	B. Voc. (Construction and Project Management)				Semester: IV	
Course:	Construction Technology Lab				Code: VCM24106	
Teaching Scheme			Evaluation Scheme			
Practical	Hours	Credit	FA 1	FA 2	PR	Total
2	2	1	-	-	50	50

Course Objectives:

To understand the construction technology of various building components and concrete construction.

Course Outcomes:

After learning the course, students will be able to

1. Explain the details and techniques involve in building construction
2. Explain the techniques involve in concreting operation.

Detailed Syllabus:

Assignment	Description
1	Draw the sketches of - Types of building components, Visit different types of masonry work and write a report on them.
2	Report on formwork system used of ongoing construction building
3	Draw the sketches of any one type of Door and Window.
4	Flooring and Roof Construction- Technical report on – 1) site visit based on existing residential building 2) on-going Construction Site- building components, stage of construction, construction techniques used for different components
5	Interior Decoration work (Flooring, Roofing, Finishing, painting etc) and collection of various samples of each.
6	Types of glass and uses available in the local market.
7	Site visit report of RMC plant and study of concreting equipments

Text Books:

1. B.C. Punmia, 2016. *Building Construction*, Laxmi Publications.
2. Bindra and Arora 2016. *Building Construction*, Dhanpat Rai Publications.
3. M. S. Shetty 2018, Concrete Technology: Theory and practice.

Reference Books:

1. Rangwala, S. C. (1963). *Building Construction: Materials and types of Construction*, 3rd Ed. New York: John Wiley and Sons.
2. Sushil-Kumar, 2003. *Building Construction*, 19th Ed. Delhi: Standard Pub. Distributors, National Building Code of India.

Program:	B. Voc. (Construction & Project Management)				Semester: - IV	
Course:	Construction Project Management				Course Code: VCM24205	
Teaching Scheme			Evaluation Scheme			
Lecture	Hours	Credit	FA 1	FA 2	SA	Total
2	2	2	20	20	40	80

Course Objectives:
The main objective of this course is students will be able to plan and develop management solutions to construction projects.

Course outcomes:
After learning the course, students will be able to:

1. Understand modern techniques for construction project
2. Solve and analyze project network
3. Interpret productivity measurement tools for construction projects.
4. Examine monitoring and controlling techniques for construction projects.

Detailed Syllabus:

Unit	Description	Duration (30 Hrs)
1	**Introduction** Introduction to construction industries, concepts and need of management in construction, project life cycle, feasibility study, types of organization for construction project.	7
2	**Network Analysis** Project planning, work breakdown structure, bar chart, Network analysis: basic terminology, types of precedence relationships, preparation of CPM networks: computation of float values, critical path, PERT and ladder network.	7
3	**Project Monitoring and Control** Earned value analysis, Time cost trade off, Resource levelling and smoothing, Productivity measurement	8
4	**Modern Project Management System** Use of software in managing construction projects, introduction to Building Information Modelling (BIM), lean construction and integrated project management system.	8
	Total	**30**

Text Books:

1. Jha, K.N 2015. *Construction and Project Management*, 2nd edition, Pearson.
2. Gahlot P.S & Dhir B.M, 2018. *Construction planning and management*, 2nd edition New Age International.
3. Sharma S. C., 2019. *Construction Equipment and its Management: Planning, Scheduling*

and Controlling, 1st edition Tata McGraw-Hill Publishing.
4. Punmia, B.C., Khandelwal, 2023. K.K., *Project Planning with PERT and CPM*, 4th edition, Laxmi Publications Pvt Ltd.

Reference Books:

1. Peurifoy R.L., 2018. *Construction Planning, equipment and methods*, McGraw-Hill.
2. Chitkara K. K., 2010. *Construction Project Management: Planning, Scheduling and Controlling*, Tata McGraw-Hill Publishing Company Ltd.

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Program:	B. Voc. (Construction and Project Management)				Semester: IV	
Course:	Business Communication - II				Code: VCM24404	
Teaching Scheme			Evaluation Scheme			
Practical	Hours	Credit	FA 1	FA 2	TW	Total
2	2	1	-	-	50	50

Objectives:

1. Analyse effective strategies for handling customer inquiries and complaints in a timely and courteous manner to maintain customer satisfaction.
2. Evaluate various digital and visual communication tools for their suitability in business contexts, and apply them effectively to enhance communication impact.
3. Explore the concept of social networking for professional purposes, including the creation of a comprehensive LinkedIn profile, to expand professional connections and opportunities.
4. Develop interview skills through research, preparation, and practice, including crafting tailored responses to common interview questions and formulating insightful questions for the interviewer.
5. Apply storytelling techniques to craft compelling narratives for business communication, and understand the importance and structure of common business documents in various contexts, including negotiation simulations and business plan presentations.

Course Outcomes:

After learning the course students will be able to;

1. Demonstrate the skills of handling customer and clients.
2. Use digital tools effectively to present or communicate as per situation
3. Appear confidently for business meetings and interviews
4. Write professional drafts and proposals.

Detailed Syllabus:

Sr No	Description
1	**Interpersonal Communication Skills** Developing active listening and empathy skills in business interactions, Managing conflict and difficult conversations in the workplace
2	**Handling Customer Inquiries and Complaints** Strategies for responding to customer inquiries promptly and courteously, Techniques for addressing customer complaints effectively to maintain customer satisfaction Assignment: Develop a comprehensive response plan for handling customer inquiries and complaints, focusing on promptness, courtesy, and satisfaction maintenance.
3	**Digital and Visual Communication Tools** Utilizing digital tools and platforms for effective business communication. Assignment: Create a visually engaging presentation or document using digital tools, demonstrating effective communication techniques to enhance impact.
4	**Social Networking** Content: What is Social networking; networking through social media platforms like LinkedIn, Indeed, for professional purposes. Assignment: Create and launch a full-fledged LinkedIn profile with all relevant details. Submit printouts of LinkedIn Bio, Qualifications and Other important sections.
5	**Interview Skills** Researching the company and role, practicing responses to common questions, and preparing questions to ask the interviewer.

	Assignment: Develop a set of interview questions tailored to a specific job role, considering both traditional and behavioral-based questions.
6	**Business Storytelling** Crafting compelling stories and using storytelling techniques for business communication.
7	**Understanding Business Documents** Introduction to common business documents (e.g., invoices, receipts).
8	**Negotiation Simulation:** Negotiation exercise, practicing persuasive communication, active listening, and conflict resolution skills. **Assignment:** Compose a pitch /oral presentation on the given topic and submit the write-up of the same. (Evaluation will be based on both oral and written content.)
9	**Business Plan: Writing & Presentation** Content: Elevator pitch, Business plan proposal, presenting a business proposal Assignment: Create a basic business plan proposal and present it in the form of an Elevator pitch.
10	**Advanced Business Writing Skills** Techniques for writing business documents, such as proposals, executive summaries, and business plans, Incorporating data and research into written communication effectively Assignment: Create proposal for business purpose in a professional format.

Instructions:

- All assignments are suggestive however; course teacher may devise other assignments to evaluate students.
- Any five assignments are mandatory.

References:

1. Rao Prasad N. D., 2017. *English Grammar and Composition*, S. Chand and Co. Pvt. Ltd.
2. Salaria R.S. and Kumar K.B., 2020. *Effective Communication Skills*, Khanna book publishing co. (P) Ltd.
3. Patil Z.N., Walke B., Thorat A., and Merchant Z., 2016. *English For Practical Purposes*, Macmillan Publication.
4. Mishra S., and Muralikrishna C., 2011. *Communication Skills for Engineers*, Pearson India Publication.
5. Bhatia V. 2013. *Business Communication*, Khanna book publishing co. (P) Ltd.

Program:	B. Voc. (Construction and Project Management)	Semester: - IV
Course:	Environmental Science	Course Code: VCM24504

Teaching Scheme			Evaluation Scheme			
Practical	Hours	Credit	FA 1	FA 2	TW	Total
2	2	1	-	-	50	50

Objectives:

To study components of the environment, their function, quality, issues related to the environment, the effect of quality degradation on human beings, and their solutions.

Course Outcomes:

After learning the course, students will be able to

1. Measure atmospheric meteorological parameters and interpret the results.
2. Determine water quality parameters and interpret the results.
3. Distinguish different components of the environment and their function and sustainable development.

Detailed Syllabus:

Assignment No.	Description
	Any Five experiments from assignments 1 to 9.
1	Measurement and interpretation of metrological parameters of the atmosphere. Use a weather sensor or weather station to measure metrological parameters such as temperature, wind direction, wind speed, humidity, rainfall, air pressure, solar radiation, etc.
2	Determine the water quality of a given location using a water monitoring kit. Determine the water quality, such as pH, Temperature, Total Dissolved Solids (TDS), Electrical Conductivity (EC), Turbidity, etc., of a given location using a water monitoring kit. Compare results with BIS standards.
3	Determine total hardness of water sample. Determine total hardness of various types of water samples. Compare results with standards and write observations/conclusions.
4	Prepare water audit report of the college/house/locality/colony/ industry. Prepare a water audit report of the college/house/locality/colony/ industry for water quantity and quality with observations and recommendations.
5	Visit a Water Treatment Plant (WTP) or Sewage Treatment Plant (STP). Study various unit's operations and processes of water and wastewater treatment.
6	Inspect solid and liquid discharge of the college/colony/industry and develop a management plan. Inspect solid and liquid discharge of the college/colony/industry and develop a management plan with schematic diagrams and photographs.

7	Determine the noise level to find out its direct exposure to communities.Determine noise level using a sound level meter or noise dosimeter at various locations. Compare the results with standards and write observations/conclusions.
8	Propose a model for pollutant removal. Propose a model for the treatment or removal of any type of contaminant or pollutant from water/ wastewater/air/soil. Demonstrate the mechanism of working and its application.
9	Calculate environmental footprint.Calculate environmental footprint such as water footprint/ carbon footprint/ energy footprint, etc.

Text Books:

1. S. K. Garg, 2015. *Water Supply Engineering*, 35th Edition, Khanna Publishers, New Delhi.
2. G. Swarajya 2018. *Environmental Science: A Practical Manual*. Lakshmi Publisher: BS Publications, ISBN: 9788178002286.

Reference Books:

1. Mary Franson. *Standard Methods for examination of water and wastewater*, 18th Edition, American Public Health Association.
2. IS 10500:2012 *Drinking water specifications*., 2nd Edition.
3. IS 3025: 2013, Methods of Sampling and Test (Physical, Chemical and Biological) for Water and Waste Water, Bureau of Indian Standards, New Delhi.
4. G. S. Birdie and J. S. Birdie, 2010. *Water Supply and Sanitary Engineering*, Dhanpat Rai Publishing Company, New Delhi.

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Program: B. Voc. (Construction and Project Management)				**Semester: IV**		
Course: Mini Project				**Code: VCM24604**		
Teaching Scheme			**Evaluation Scheme**			
Practical	**Hours**	**Credit**	**TW**	**PR**	**OR**	**Total**
4	**4**	**2**	**-**	**50**	**-**	**100**

Course Objectives:

1. To build, design and implement real time applications using available platforms.

Course outcomes:

After learning the course, students will be able to

1. Design real time application
2. Prepare a technical report based on the Mini project.
3. Develop first-hand experience and confidence amongst the students to enable them to use and apply knowledge and skills to solve practical problems in the construction projects.

Guidelines to the Students:

1. Group Size: The student will carry the project work individually or by a group of students. Optimum group size is in 3 students. However, if project complexity demands a maximum group size of 4 students, the review committee should be convinced about such complexity and scope of the work.
2. Selection and approval of Topic: Topic preferably related to real life applications/ Thrust areas in the above application fields/ prototype development/ testing/ Numerical Simulation/ Analysis.
3. Students are expected to prepare the results and report.

Note: The group should maintain a logbook of activities. It should have entries related to the work done, problems faced, solution evolved etc., duly signed by internal/external guides. Project report must be submitted in the prescribed format only. No variation in the format will be accepted.

Detailed Syllabus:

A Project based learning approach will be followed for this course and hence they can work on topics related to construction technology, construction project management, Construction software's, or any domain related to construction project management.

Program: B. Voc. (Construction and Project Management)				Semester: - IV		
Course: Internship IV:On Job Training				Code: VCM24605		
Teaching Scheme			Evaluation Scheme			
Practical	Hours	Credit	TW	PR	OR	Total
20	20	10	-	200	-	200

Course Outcomes: After learning the course, students will be able to

1. Construct a site Plan of the Residential Building
2. Generate a simple survey drawing in AutoCAD.
3. Demonstrate technical skills and expertise.

Guidelines: Students will take on-the-job training in the industry in the domain of Construction Management as per the following job description and personal attributes.

Job Description

- Individual should be able to understand the basic skills of computer-based engineering drawings using AutoCAD s e.g. layers, block, insert, group, divide, measure, design center, text gradient, dimension style, leader, layouts, model space.
- Generate line segment in AutoCAD importing data from Excel worksheet.
- The individual should be able to hold interest in technology changes; demonstrate strong technical expertise and possess good oral and written communications skills.

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Course Syllabus
Semester-V

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Program:	B. Voc. (Construction & Project Management)				Semester:V	
Course:	Concrete Technology				Course Code: VCM25106	
	Teaching Scheme		Evaluation Scheme			
Lecture	Hours	Credit	FA 1	FA 2	SA	Total
3	3	3	25	25	50	100

Course Objectives:

1. To make aware of fundamental properties of various ingredients of concrete
2. To provide the knowledge of behavior and properties of concrete at its fresh and hardened state
3. To build their ability to design concrete mix.
4. To impart knowledge of special concrete and repairs of concrete

Course outcomes: After learning the course, students will be able to

1. Explain the classification and properties of various concrete ingredients.
2. Identify and explain the various tests and properties of fresh concrete
3. Explain the various tests and properties of harden concrete
4. Design a concrete mix as per IS guidelines
5. Describe concreting techniques, equipment's and need of special concrete
6. Explain the durability related issues and select suitable repairing techniques for deteriorated concrete

Detailed Syllabus:

Unit	Description	Duration (45 Hrs)
1	**Concrete Ingredients:**Cement- Manufacturing, classification and types, tests on cement, chemical composition and hydration of cement. Aggregate- mechanical and physical classification, properties and tests, **Admixtures:** Function and classification of admixture, Plasticizers, super plasticizers, accelerators, retarders, fly ash, silica fume, ground granulated blast furnace slag.	8
2	**Properties and Tests on Fresh Concrete**:a) Properties: Production of fresh concrete and curing methods, workability, maturity of concrete b) Tests: measurement of workability using slump cone, compaction factor, Vee-Bee consistometer and flow table apparatus.	7
3	**Properties and Tests on Hardened Concrete:** a) Properties: Factors affecting strength, stress-strain relationship, relation between tensile and compressive strength, creep and shrinkage. b) Tests: Destructive tests: compression strength, flexural strength and tensile strength, Nondestructive tests: core test, rebound hammer, ultrasonic pulse velocity	8
4	**Mix Design of Concrete:** a)Concrete Mix Design– Characteristic strength concept and objectives of mix design, factors to be considered, statistical quality control,b) Concrete Mix Design as per IS code	7
5	**Concreting Equipments, Techniques and Special concretes:** a) Concreting Equipments: concrete mixers, pumps, vibrators and compaction equipment's. Concreting techniques- Ready mix concrete, under water concreting, roller compacted concrete,	8

	b) Special concretes: Light weight concrete and its types, self-compacting concrete, high strength concrete, fiber reinforced concrete	
6	**Deterioration and Repairs in Concrete:** a) Deterioration –Durability and factors affecting durability, acid and chloride attack, carbonation of concrete, corrosion of reinforcement. b) Repairs –Diagnosis of cracks in concrete, repair of defects using various types and techniques,	7
	Total	**45**

Text Books:

1. Concrete Technology by M. L. Gambhir, 5th Edition, Tata McGraw-Hill Publication,2013.
2. Concrete Technology: Theory and practice by M. S. Shetty and A. K. Jain, 8th Edition, S Chand Publication,2018.
3. Properties of Concrete by A. M. Neville – 5th Edition, Pearson Publication,2012.

Reference Books:

1. Concrete Technology by A.R. Santhakumar, 2nd Edition, Oxford University Press,2018.
2. Concrete : Microstructure, Properties and Materials by P. Kumar Mehta, Paulo J. M. Monteiro, 4th Edition, McGraw-Hill Education,2014.

IS Codes:

IS 383:2016- Coarse and Fine Aggregate for Concrete Specification
IS 456:2000 with Reaffirmed 2016-Plain and Reinforced concrete- code of practice
IS 516 : 1959 with Reaffirmed 2018- Methods of tests for strength of concrete
IS 1489 (Part 1) : 2015(4 Revision)- Portland pozzolana cement - Specification: Part 1 fly Ash Based
IS 2386 (Part 1 to 5):1963 with Reaffirmed 2021 -Methods of Test for Aggregates for Concrete
IS 4031 (Part 1,10 to 13):1996 with Reaffirmed 2021 -Methods of physical tests for hydraulic cement
IS 9103 : 1999 (1 Revision) with Reaffirmed 2018- Specification for Concrete Admixtures
IS 1199 : Part 1 to 5: 2018 - Fresh Concrete Methods of Sampling, Testing and Analysis
IS 10262 : 2019 (2 Revision)- Concrete Mix Proportioning Guidelines
IS 13311 : Part 2 : 1992 with Reaffirmed 2018- Method of Non-destructive Testing of Concrete-methods of Test : Part 1Ultrasonic Pulse Velocity
IS 13311 : Part 2 : 1992 with Reaffirmed 2018- Method of Non-destructive Testing of Concrete-methods of Test : Part 2 Rebound Hammer

Program:	B. Voc. (Construction & Project Management)				Semester:V	
Course:	Concrete Technology Lab				Course Code: VCM25107	
	Teaching Scheme		Evaluation Scheme			
Practical	Hours	Credit	TW	OR	PR	Total
2	2	1	50	_	_	50

Course Objectives:

1. To develop the ability to perform various tests and interpret results of ingredients of concrete and properties of fresh and hardened concrete.

Course outcomes: After learning the course, students will be able to

1. Evaluate the different properties of concrete ingredients.
2. Demonstrate the test on fresh and hardened concrete.

Detailed Syllabus:

Assignment	Description	Duration (15 Turns)
1	Determination of consistency of cement Paste.	2
2	Determination of Initial and Final Setting times of Cement and soundness of cement.	2
3	Determination of Compressive Strength of Cement	2
4	Determination of Fineness modulus of Coarse and Fine Aggregates.	2
5	Determination of density and Specific gravity of fine and coarse aggregate	2
6	Workability of concrete by slump cone,	2
7	Determination of Compressive strength test of concrete by crushing and Rebound hammer.	2
8	Site Visit report- To study Properties and Tests onFresh & Hardened Concrete	1
	Total	**15**

Text Books:

1. Concrete Technology by M. L. Gambhir, 5th Edition, Tata McGraw-Hill Publication,2013.
2. Concrete Technology: Theory and practice by M. S. Shetty and A. K. Jain, 8th Edition, S Chand Publication,2018.
3. Properties of Concrete by A. M. Neville – 5th Edition, Pearson Publication,2012.

Reference Books:

1. Concrete Technology by A.R. Santhakumar, 2nd Edition, Oxford University Press,2018.
2. Concrete : Microstructure, Properties and Materials by P. Kumar Mehta, Paulo J. M. Monteiro, 4th Edition, McGraw-Hill Education,2014.

IS Codes:

IS 383:2016- Coarse and Fine Aggregate for Concrete Specification
IS 456:2000 with Reaffirmed 2016-Plain and Reinforced concrete- code of practice
IS 516 : 1959 with Reaffirmed 2018- Methods of tests for strength of concrete

IS 1489 (Part 1) : 2015(4 Revision)- Portland pozzolana cement - Specification: Part 1 fly Ash Based
IS 2386 (Part 1 to 5):1963 with Reaffirmed 2021 -Methods of Test for Aggregates for Concrete
IS 4031 (Part 1,10 to 13):1996 with Reaffirmed 2021 -Methods of physical tests for hydraulic cement
IS 9103 : 1999 (1 Revision) with Reaffirmed 2018- Specification for Concrete Admixtures
IS 1199 : Part 1 to 5: 2018 - Fresh Concrete Methods of Sampling, Testing and Analysis
IS 10262 : 2019 (2 Revision)- Concrete Mix Proportioning Guidelines
IS 13311 : Part 2 : 1992 with Reaffirmed 2018- Method of Non-destructive Testing of Concrete-methods of Test : Part 1Ultrasonic Pulse Velocity
IS 13311 : Part 2 : 1992 with Reaffirmed 2018- Method of Non-destructive Testing of Concrete-methods of Test : Part 2 Rebound Hammer

Program:	B. Voc. (Construction & Project Management)				Semester:V	
Course:	Tenders, Contract and Administration				Course Code: VCM25108	
	Teaching Scheme		Evaluation Scheme			
Lecture	Hours	Credit	FA 1	FA 2	SA	Total
3	3	3	25	25	50	100

Course Objectives:

1. To understand tendering Process
2. To acquire fundamental knowledge of Contract & Administration

Course outcomes: After learning the course, students will be able to

1. Explain the tendering process.
2. Compare and evaluate most suitable tender for construction project
3. Evaluate specific contract conditions
4. Explain arbitration process for dispute resolution

Detailed Syllabus:

Unit	Description	Duration (45 Hrs)
1	**Introduction to Bidding process:** Project Life cycle, importance of bidding process for execution of public work, PWD organization structure, Method of execution of work in PWD, Major and Minor work, piece work	8
2	**Tenders & Contracts:** Definition. Methods of inviting tenders, tender notice, tendering procedure, Pre-bid conference, Pre and post qualification of contractors, tender documents. 3 bid/ 2 bid or single bid system.	7
3	**Selection of Tender:** Qualitative and quantitative evaluation of tenders. Comparative statement, acceptance/ rejection of tenders. Types of Tender open, restricted, E-tendering, Global tendering.	8
4	**Contracts:** Definition, objectives & essentials of a valid contract as per Indian Contract Act (1872), Difference between agreement and Contract, termination of contract, Breach of Contract	7
5	**Forms of contract:** BOT, target Contract, Turn Key contract & FIDIC contract etc, Types of contracts: lump sum, item rate, Percentage rate, Conditions of contract: General and Specific conditions.	8
6	**Introduction to Arbitration-** Meaning of Arbitration, its importance in construction contract, Alternate Dispute resolution board, Techniques and methods of arbitration.	7
	Total	45

Text Books:

1. Building and Engineering Contracts by B.S.Patil , 7th Edition CRC Press 2019

2. The Indian Contract Act (9 of 1872), 1872- Bare Act- 2006 edition, Professional Book Publishers.
3. The Arbitration and Conciliation Act,(1996), 1996 (26 of 1996)- 2006 Edition, Professional Book Publisher.

Reference Books:

1. Laws for Engineers : Dr. Vandana Bhat and Priyanka Vyas –Published by PRO- CARE, 2010

IS Codes:

1.http://mahapwd.gov.in/
2.https://mjp.maharashtra.gov.in/wp-content/uploads/2022/12/MAHARASHTRA_JEEVAN_PRADHIKARAN__4_.pdf
3.https://theconstructor.org/practical-guide/rate-analysis-of-civil-works-elements-and-requirements/10952/
4. https://cpwd.gov.in/Publication/DAR_Vol2_UPDATE_DEC_2021.pdf

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Program:	B. Voc. (Construction & Project Management)				Semester:V	
Course:	Tenders, Contract and Administration Lab				Course Code: VCM25109	
	Teaching Scheme		Evaluation Scheme			
Practical	Hours	Credit	TW	OR	PR	Total
2	2	1	_	_	50	50

Course Objectives:

1. To understand tendering Process
2. To acquire fundamental knowledge of Contract & Administration

Course outcomes: After learning the course, students will be able to

1. Explain the tendering process.
2. Compare and evaluate most suitable tender for construction project
3. Evaluate specific contract conditions
4. Explain arbitration process for dispute resolution

Detailed Syllabus:

Unit	Description	Duration (45 Hrs)
1	Drafting detailed specifications of any 2 items of building	2
2	Drafting of tender notice for Building Structure	2
3	Preparation of sample Tender Document	2
4	Collection of 3 tender notices for PWD	2
5	Assignment on methods of Arbitration in construction Contract	2
6	Assignment on various indent formats used in PWD	2
7	Report on tendering process adopted by PWD	3
	Total	15

Text Books:

1. Building and Engineering Contracts by B.S.Patil , 7th Edition CRC Press 2019
2. The Indian Contract Act (9 of 1872), 1872- Bare Act- 2006 edition, Professional Book Publishers.
3. The Arbitration and Conciliation Act,(1996), 1996 (26 of 1996)- 2006 Edition, Professional Book Publisher.

Reference Books:

1. Laws for Engineers : Dr. Vandana Bhat and Priyanka Vyas –Published by PRO- CARE, 2010

IS Codes:

1.http://mahapwd.gov.in/
2.https://mjp.maharashtra.gov.in/wp-content/uploads/2022/12/MAHARASHTRA_JEEVAN_PRADHIKARAN__4_.pdf
3.https://theconstructor.org/practical-guide/rate-analysis-of-civil-works-elements-and-requirements/10952/
4. https://cpwd.gov.in/Publication/DAR_Vol2_UPDATE_DEC_2021.pdf

Program:	B. Voc. (Construction & Project Management)				Semester:V	
Course:	Construction Equipment & Management				Course Code: VCM25206	
	Teaching Scheme		Evaluation Scheme			
Lecture	Hours	Credit	FA 1	FA 2	SA	Total
2	2	2	10	10	30	50

Course Objectives:

1. To make aware of the effective utilization, maintenance and cost control of construction equipments
2. To get familiar with working of various equipments for different construction process

Course outcomes: After learning the course, students will be able to

1. Explain the selection criteria, cost associated with equipment and work cycle time
2. Classify different construction equipment based on its application and working.

Detailed Syllabus:

Unit	Description	Duration (30 Hrs)
1	Construction Equipment Management: Introduction to equipment management in construction projects, Selection criteria for construction equipment, Sources of construction equipment: purchase of old or new, rent and lease of equipment, economics of construction equipment.	7
2	Work cycle time of any equipment with corrective factors, depreciation analysis, Preventive maintenance, merits and demerits of maintenance, Equipment‘s safety management.	8
3	Construction Equipments: Earthmoving equipment, compaction equipment, Drilling and Blasting equipment, tunneling equipment.	7
4	Equipment for dewatering and Grouting, Pile Driving Equipment, Material handling equipment.	8
	Total	30

Text Books:

1. Construction planning, equipment and methods by Peurifoy, R.L., Ledbetter, W.B. and Schexnayder, C, TataMcGraw Hill, Singapore, 2006.
2. Construction equipment management for engineers, estimators, and owners by Gransberg, D. D., Popescu, C.M.; Ryan, R. C. (2nd ed.). CRC Press, 2006
3. Construction Equipment and Management by Sharma S.C., Khanna Publishers, New Delhi, 5th edition, 2015
4. Construction Equipment Planning and Applications by Dr. Mahesh Varma,Metropolitan Book Company, New Delhi. 1988.
5. Materials Management An Integrated Approach , by P. Gopalakrishnan and Sundaresan, Prentice Hall of India,23rd reprint, 2011
6. Materials of Construction by Ghose, Tata- McGraw Hill Publication,1989

Reference Books:

1. Construction Planning, Equipment and methods – Peurifoy McGraw Hill Publication,9 th edition,2011
2. Journals such as CE & CR. Construction world, International Construction.
3. Construction Technology by Roy Chudley and Roger Greeno, Prentice Hall, 2005

Program: B. Voc. (Construction and Project Management)				Semester: - V		
Course: Internship V:On Job Training				Code: VCM25606		
Teaching Scheme			Evaluation Scheme			
Practical	Hours	Credit	TW	PR	OR	Total
20	20	10	-	200	-	200

Course Outcomes: After learning the course, students will be able to

1. Construct a site Plan of the Residential Building
2. Generate a simple Building drawing in AutoCAD.
3. Demonstrate technical skills and expertise in site supervision.

Guidelines: Students will take on-the-job training in the industry in the domain of Construction Management as per the following job description and personal attributes.

Job Description

- Individuals should be able to understand the basic skills of computer-based engineering drawings using AutoCAD s e.g. layers, block, insert, group, divide, measure, design center, text gradient, dimension style, leader, layouts, model space.
- Generate line segment in AutoCAD importing data from Excel worksheet.
- The individual should be able to hold interest in technology changes; demonstrate strong technical expertise and possess good oral and written communications skills.

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Course Syllabus
Semester-VI

Program:	B. Voc. (Construction & Project Management)				Semester:VI	
Course:	Quantity Surveying & Cost Estimation				Course Code: VCM26110	
	Teaching Scheme		Evaluation Scheme			
Lecture	Hours	Credit	FA 1	FA 2	SA	Total
3	3	3	25	25	50	100

Course Objectives:

1. To make students aware about quantity surveys for the preparation of preliminary and detailed estimates.
2. To teach the students cost analysis of individual items above for the estimation purpose.
3. To make the students aware of those factors that affect the cost of construction work and to analyze the influences
that affect change in these factors.
4. To inculcate a habit of systematic recording of all those statistics which are required for cost estimation.

Course outcomes: After learning the course, students will be able to

1. Prepare the approximate cost of the projects through preliminary and detailed estimates.
2. Record the measurements of the items of work for the calculation of quantities, Prepare schedule of quantities required to
be attached with the tender documents.
3. Prepare estimation of quantities and cost of structure other than buildings
4. Perform rate analysis for items of work as per provisions in Specifications

Detailed Syllabus:

Unit	Description	Duration (45 Hrs)
1	**Introduction to Estimates and related terms:** Definitions of estimation and valuation. Purpose of estimation. Type of estimates, data required for estimation as a prerequisite. Meaning of an item of work, and enlisting the items of work for different Civil Engineering projects. Units of measurement. Mode of measurement of building items/ works. Introduction to components of estimates: face sheet, Schedule A & B abstract sheet (BOQ), measurement sheet, Rate Analysis, lead- Lift statement. Provisional sum & prime cost items, contingencies, work charged establishment, centage charges. Introduction to SSR, Approximate Estimates Numericals	7
2	**Taking out quantities:** Methods of estimating - P.W.D. and center-line methods of working out quantities. Quantity Surveying. Detailed estimates, Factors to be considered while Preparing detailed Estimates.	8
3	**Detailed Estimate :** Detailed estimates of Load bearing and R.C.C framed structures, Calculation of quantities and detailed estimate for Load bearing and framed structures. Deduction rules for different items of work as per IS: 1200. Abstracting quantities, preparing BOQ. Bar Bending Schedule	7
4	**Estimates of other construction works, mis item:** Earthwork for road work, estimate of septic tank, , estimate of Community well, estimate of a culvert, estimate of an Underground water tank.	8

5	**Specifications :** Meaning & purpose, types. Drafting detailed specifications for materials, quality, workmanship, method of execution, mode of measurement and payment for major items like, excavation, stone/ brick masonry, plastering, ceramic tile flooring, R.C.C. work.	8
6	**Rate Analysis :** Meaning and factors affecting rate of an item of work, materials, sundries, labour, tools & plant, overheads & profit. Working out Rate Analysis for the items mentioned in specifications above. Task work or out turn, factors affecting task work	9
	Total	45

Text Books:

1. Estimating and Costing in Civil Engineering: Theory and Practice: B.N. Dutta – S. Dutta & Company, Lucknow. 27 th Edition 2020.
2. Estimating, Costing Specifications & Valuation in Civil Engineering: M. Chakraborty. 11th Edition 2020
3. Estimating and Costing: R. C. Rangwala - Charotar Publ. House, Anand 17th Edition 2017

IS Codes:

1. IS 1200- Measurement rules for Items of work
2. IS 650 – 1991- Specification for standard sand testing
3. IS 14032 – 1988- Specification for standard Cement testing

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Program:	B. Voc. (Construction & Project Management)				Semester:VI	
Course:	Quantity Surveying & Cost Estimation Lab				Course Code: VCM26111	
	Teaching Scheme		Evaluation Scheme			
Practical	Hours	Credit	TW	OR	PR	Total
2	2	1	-	-	50	50

Course Objectives:

1. Understanding various methods of estimation
2. Analyzing the rate of various materials and labours based on current market rates of materials and wages of labours.
3. Familiar with various Formats used for estimation of cost

Course outcomes: After learning the course, students will be able to

1. Evaluate quantities of various items of work
2. Evaluate probable cost of construction
3. Analyze rates of various items of work based on material & labour charges.

Detailed Syllabus:

Assignment	Description	Duration (15 Hrs)
1	Report on contents and use of current SSR.	2
2	Calculate quantities of items of work for simple simple Building elements: a) Simple Steps, b) Foundation, c)Chajja , d) Compound wall etc.	2
3	Working out quantities using C-L and PWD method for a small single storied load bearing structure and working out cost of building using SSR(Regional)	3
4	Detailed estimate of a two storied R. C. C. framed building using S.S.R	4
5	Working out quantities of steel reinforcement for a column footing, a column, a beam, stairs with waist slab and a RCC slab by preparing bar bending schedule.	2
6	Estimating quantities for any one of the following: a) community well b) Underground Water Tank c) Pipe Culvert, d) Earthwork for road project e) Septic tank	2
	Total	15

Text Books:

1. Estimating and Costing in Civil Engineering: Theory and Practice: B.N. Dutta – S. Dutta & Company, Lucknow. 27 th Edition 2020.
2. Estimating, Costing Specifications & Valuation in Civil Engineering: M. Chakraborty. 11th Edition 2020
3. Estimating and Costing: R. C. Rangwala - Charotar Publ. House, Anand 17th Edition 2017

IS Codes:

1. IS 1200- Measurement rules for Items of work
2. IS 650 – 1991- Specification for standard sand testing
3. IS 14032 – 1988- Specification for standard Cement testing

Program:	B. Voc. (Construction & Project Management)				Semester:VI	
Course:	Green Building & Eco-friendly Construction Materials				Course Code: VCM26207	
	Teaching Scheme		Evaluation Scheme			
Lecture	Hours	Credit	FA1	FA2	SA	Total
2	2	2	10	10	30	50

Course Objectives:

1. To Understanding the Importance of Green Building Construction.
2. To study principles of Green Building Construction.
3. To understand the rating system for Green Building Certification.

Course outcomes: After learning the course, students will be able to

1. To imbibe the basics of green design and sustainable development concepts.
2. To identify various areas of implementing strategies for green design in projects to enhance the built environment.
3. To learn institutional guidelines for development and certification of green designs.

Detailed Syllabus:

Unit	Description	Duration (30 Hrs)
1	**Green Building Concept:** Overview of green building movement; Concept of Green building and sustainable development; Issues and strategies of Green building and sustainable development; Objectives Principles and Benefits of Green building design; Introduction to High performance building; integrated design process of high performance building; Green project requirements and strategies; Overview of various green rating systems worldwide.	7
2	**Green Building Materials and Indoor Environment Quality:** Introduction; Low emitting materials; Building and material reuse; Construction waste management; Regional materials; Life cycle cost assessment of building materials and products; Factors affecting indoor environment quality; Ventilation and filtration; Building materials and finishes- Emittance level; Indoor Environment quality best practice..	8
3	**Water: Reduce, Reuse and Recycle:** Introduction; Wastewater strategy and water reuse/recycling; Water fixtures and water use reduction strategies.)	7
4	**Energy efficient designs:** Building energy efficiency standards- Lighting system design- Lighting economics and aesthetics- Impacts of lighting efficiency- Energy audit and energy targeting- Technological options for energy management. Thermal comfort. Green Building Certification (IGBC, LEED, GRIHA)	8
	Total	30

Text Books:

1. Alternative Building Materials and Technologies – By K S Jagadeesh, B V Venkata Rama Reddy & K S Nanjunda Rao – New Age International Publishers
2. Integrated Life Cycle Design of Structures – By AskoSarja – SPON Press

3. Non-conventional Energy Resources – By D S Chauhan and S K Sreevasthava – New Age International Publishers
4. Green Buildings (McGraw hill publication): by Gevorkian
5. Emerald Architecture: case studies in green buildings, The Magazine of Sustainable Design
6. Understanding Green Building Guidelines: For Students and Young Professionals, Traci Rose Rider ,W. W. Norton & Company Publisher.
7. Understanding Green Building Materials, Traci Rose Rider, W. W. Norton & Company Publisher

Reference Materials:

1. IGBC reference guide
2. Free abridged versions of LEED reference guides
3. ECBC latest version
4. US GBC's Reference Material

Program: B. Voc. (Construction and Project Management)				**Semester: VI**		
Course: Project II				**Code: VCM26607**		
Teaching Scheme			**Evaluation Scheme**			
Practical	**Hours**	**Credit**	**TW**	**PR**	**OR**	**Total**
4	**4**	**2**	**-**	**50**	**-**	**100**

Course Objectives:

1. To build, design and implement real time applications using available platforms.

Course outcomes:

After learning the course, students will be able to

1. Design real time application
2. Prepare a technical report based on the Mini project.
3. Develop first-hand experience and confidence amongst the students to enable them to use and apply knowledge and skills to solve practical problems in the construction projects.

Guidelines to the Students:

1. Group Size: The student will carry the project work individually or by a group of students. Optimum group size is in 3 students. However, if project complexity demands a maximum group size of 4 students, the review committee should be convinced about such complexity and scope of the work.
2. Selection and approval of Topic: Topic preferably related to real life applications/ Thrust areas in the above application fields/ prototype development/ testing/ Numerical Simulation/ Analysis.
3. Students are expected to prepare the results and report.

Note: The group should maintain a logbook of activities. It should have entries related to the work done, problems faced, solution evolved etc., duly signed by internal/external guides. Project report must be submitted in the prescribed format only. No variation in the format will be accepted.

Detailed Syllabus:

A Project based learning approach will be followed for this course and hence they can work on topics related to construction technology, construction project management, Construction software's, or any domain related to construction project management.

Program: B. Voc. (Construction and Project Management)				Semester: - VI		
Course: Internship VI:On Job Training				Code: VCM26608		
Teaching Scheme			Evaluation Scheme			
Practical	Hours	Credit	TW	PR	OR	Total
20	20	10	-	200	-	200

Course Outcomes: After learning the course, students will be able to

1. Construct a site Plan of the Residential Building
2. Understand structural drawings
3. Demonstrate technical skills and expertise required for site supervision.

Guidelines: Students will take on-the-job training in the industry in the domain of Construction Management as per the following job description and personal attributes.

Job Description

- Individual should be able to understand the basic skills of computer-based engineering drawings using AutoCAD s e.g. layers, block, insert, group, divide, measure, design center, text gradient, dimension style, leader, layouts, model space.
- Generate line segment in AutoCAD importing data from Excel worksheet.
- The individual should be able to hold interest in technology changes; demonstrate strong technical expertise and possess good oral and written communications skills.

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