Title of Course:	**:**	**Geotechnical Site Investigation and Foundation (1 + 1)**			
Course Code	**:**	CET306			
Semester	**:**	6th			
Technology	**:**	Civil Engineering Technology			
Effective	**:**	22 – Batch and onwards			
Pre-requisite	**:**	Nil			
Co-requisite	**:**	Nil			
Assessment	**:**	**Theory**		**Practical**	
	:	Quizzes/Test (s): 05 Marks Assignments/Projects/Presentations: 05 Marks Mid Semester Exam: 15 Marks Final Semester Exam: 25 Marks		Lab Rubrics: 30 % Open Ended Lab/Mini Project : 20 % Final Exam; Objective Test*: 30 % Final Exam; Conduct of Practical/Viva Voce*: 20 % *Appearance in Final Exams is mandatory	
Credit Hours/week	**:**	**Th**	1	**Pr**	1
Minimum Contact Hours	**:**	**Th**	16	**Pr**	48
Marks	**:**	**Th**	50	**Pr**	50

After Completing the Course, each student will be able to:

Sr. No.	Theory/ Practical	CLO	Taxonomy Level	PLO
1	Theory	**INVESTIGATE** the construction site for geotechnical information.	C2	4
2	Theory	**ANALYZE** various problems in foundations and their solutions	C4	1
3	Practical	**PERFORM** various experiments to determine the geotechnical properties of soil used for foundation design	P3	1

Relevant Program Learning Outcomes (PLOs):
The course is designed so that students will achieve the following PLOs:

1	Engineering Technology Knowledge:	√	7	Environment and Sustainability:	
2	Problem Analysis:		8	Ethics:	
3	Design/Development of Solutions:		9	Individual and Team Work:	
4	Investigation:	√	10	Communication:	
5	Modern Tool Usage:		11	Project Management:	
6	The Engineering Technologist & Society:		12	Lifelong Learning:	

OBJECTIVES:

To be able to investigate the construction site for geotechnical information.

COURSE CONTENTS:

Compaction: Definition, Moisture-Density relationship, Laboratory compaction methods: standard and modified Proctor tests, Factors affecting compaction, Compaction in the field, field compaction equipment and machinery, field control and measurements of in-situ density.

Soil Exploration: Importance of soil exploration and planning of soil exploration program, Soil exploration methods: probing, test pits, auger boring, wash percussion and rotary drilling and geophysical methods, Soil samplers, disturbed and undisturbed sampling, In situ tests: standard penetration test, cone penetration test, and field vane shear test, Coring of rocks, Core recovery and RQD. Borehole logs.

Foundations: Purpose and types of foundations, Selection of foundation type, bearing capacities of foundation, Bearing capacity and settlements equations by various methods, Gross Bearing capacity and net pressures on footing, Plate load test, Pile load test.

PRACTICAL WORK TO BE CARRIED OUT:

1. To determine the moisture-density relationship by Standard Proctor Test.
2. To determine the moisture-density relationship by Modified Proctor Test.
3. To determine the CBR value for un-soaked soil sample.
4. To determine the CBR value for soaked soil sample.
5. To determine the field density by Core Cutter Method.
6. To determine the field density by Sand Replacement (Sand Cone) Method and or by Water Replacement/Oil Replacement Method.
7. To determine load settlement behaviour by Plate Load Test.
8. To perform Standard Penetration Test (SPT).
9. To collect UDS from clayey Strata.
10. To obtain shear strength parameters of the collected UDS sample.
11. To obtain consolidation parameters of the collected UDS sample.
12. To observer Percussion drilling Procedures in the field.
13. To observe rotary drilling in field.
14. To observe Pile load test and analysis the result.
15. To perform the open-ended lab.

Recommended Books

1. Foundation Engineering by B.M, Das, Brook/Cole. Latest Edition
2. Introduction to Soil Mechanics Laboratory Testing by Dante Fratta, Jennifer Aguettant and Lynne Roussel-Smith, Latest Edition.
3. Fundamentals of Soil Mechanics by M. Siddique Qureshi and Aziz Akbar, Latest Edition

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	Board of Studies	Res. No.2.4	Dated: 29/05/2024
	Board of Faculty	Res. No. 3.1	Dated: 19/08/2024
	Academic Council	Res. No.108.4(i)	Dated: 31-10-2024

Title of Course:	**:**	**Construction of Steel Structure (1 + 1)**			
Course Code	**:**	CET308			
Semester	**:**	6th			
Technology	**:**	Civil Engineering Technology			
Effective	**:**	22 – Batch and onwards			
Pre-requisite	**:**	Nil			
Co-requisite	**:**	Nil			
Assessment	**:**	**Theory**		**Practical**	
	:	Quizzes/Test (s): 05 Marks Assignments/Projects/Presentations : 05 Marks Mid Semester Exam: 15 Marks Final Semester Exam: 25 Marks		Lab Rubrics: 30 % Open Ended Lab/Mini Project : 20 % Final Exam; Objective Test*: 30 % Final Exam; Conduct of Practical/Viva Voce*: 20 % *Appearance in Final Exams is mandatory	
Credit Hours/week	**:**	**Th**	1	**Pr**	1
Minimum Contact Hours	**:**	**Th**	16	**Pr**	48
Marks	**:**	**Th**	50	**Pr**	50

After Completing the Course, each student will be able to:

Sr. No.	Theory/ Practical	CLO	Taxonomy Level	PLO
1	Theory	**Explain** specifications and design philosophy of structural steel members.	C2	1
3	Theory	**Design** different components of steel structures and develop shop drawing according to the latest code.	C5	3
4	Practical	**Perform** various experiments of structural steel.	P3	9
6	Practical	**Contribute** actively to the lab work.	A2	9

Relevant Program Learning Outcomes (PLOs):

The course is designed so that students will achieve the following PLOs:

1	Engineering Technology Knowledge:	√	7	Environment and Sustainability:	
2	Problem Analysis:		8	Ethics:	
3	Design/Development of Solutions:	√	9	Individual and Team Work:	√
4	Investigation:		10	Communication:	
5	Modern Tool Usage:		11	Project Management:	

6	The Engineering Technologist & Society:		12	Lifelong Learning:	

OBJECTIVES:

Design components of steel roof truss and develop shop drawing according to the latest LRFD code.

COURSE CONTENTS:

Introduction: Loads, structural steels and their specifications, structural elements, steel vs. Concrete and timber, design specifications as per LRFD, structural layout, strength and stiffness considerations, and efficiency of cross-section, safety, and serviceability considerations. Steel structures at three different levels: the overall structural system (multi-story buildings, wide-span buildings, bridges, masts, and towers); the components of a structural system (floor systems, plate girders, frames, and beams); the details of structural components (connection types, welding, and bolting).

Construction Process: Steel Structures, History, Manufacturing and Fabrication of Steel, Steel Structures (Building and Other Structures), Properties & Shapes, Shop Drawings and Detailing, Steel Construction Process (Erection), Steel Construction Productivity.

Riveted/Bolted Connection: Riveting and bolting, their types, failure of riveted joint, efficiency of a joint, design of riveted joint, concentric riveted joints, advantages and disadvantages of bolted connections, stresses in bolts.

Welded Connection: Types of welded joints, welded joints subjected to eccentric loads, and simple, semi-rigid and rigid connections. **Tension and Compression Members:** Types of tension members, net area, net effective area for angles, tees, tension splice, and lug angles. Axially loaded columns, effective length, slenderness ratio, and allowable stresses, general specifications, laced and battened columns, built up compression members, eccentrically loaded columns, column splice, and encased columns. Column Bases, Introduction to Column Bases, slab base, gusseted base, column base subjected to moment, grillage foundation.

Flexural Members (Beams): Design criteria, permissible stresses, laterally supported beams and their design laterally unsupported beams, web buckling, web crippling, built up beams, encased beams, members subjected to bending and compression.

Plastic Theory for Steel Structures: Introduction, advantages and disadvantages, strength of tension and compression members, theory of plastic bending, plastic hinge mechanism, collapse load analysis, static and mechanism method, distributed loading.

Plate Girders: Introduction, weight and economic depth

Steel Bridges: Introduction to design of steel structural members in bridges

PRACTICAL WORK TO BE CARRIED OUT:

1. Draw stress strain curve using UTM.
2. Extract various mechanical parameters from stress-strain curve and compare them with standard values.
3. Draw the layout of different types of Rivet connections.
4. Draw the neat sketch of staggered joints and show pitch, gauge and edge distance.
5. Draw the plan and elevation of Grillage foundation.
6. Draw the plan and elevation of slab base.

7. Draw the neat sketch of column made by channel section with necessary arrangement of lacing and battening.
8. Draw the neat sketch of column made by angle section with necessary arrangement of lacing and battening.
9. Study the bucking of struts with different end conditions
10. To perform open ended lab project.

Recommended Books

1. Subramanya, N, Design of Steel Structures, N. Subramanian, Oxford University Press (2008).
2. Duggal, S.K. Limit State Design of Steel structures, McGraw Hill (2009) Reference Books:
3. Ajmani, A. L. and Arya, A. S., Design of Steel Structures, Nem Chand and Brothers (2000).
4. Dunham, C.W., Planning of Industrial Structures, John Wiley and Sons (2001).
5. Gary, W., Steel Designer's Manual, Prentice Hall (2008).
6. Glover, F., Structural Pre-cast Concrete, Oxford Publishers

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	Academic Council	Res. No.108.4(i)	Dated: 31-10-2024

Title of Course:	**:**	**Irrigation Technology (2 + 0)**			
Course Code	**:**	CET307			
Semester	**:**	6th			
Technology	**:**	Civil Engineering Technology			
Effective	**:**	22 – Batch and onwards			
Pre-requisite	**:**	Nil			
Co-requisite	**:**	Nil			
Assessment	**:**	**Theory**		**Practical**	
	:	Quizzes/Test (s): 05 Marks Assignments/Projects/Presentations: 05 Marks Mid Semester Exam: 15 Marks Final Semester Exam: 25 Marks		-	
Credit Hours/week	**:**	**Th**	2	**Pr**	0
Minimum Contact Hours	**:**	**Th**	32	**Pr**	0
Marks	**:**	**Th**	50	**Pr**	0

After Completing the Course, each student will be able to:

Sr. No.	Theory/ Practical	CLO	Taxonomy Level	PLO
1	Theory	**Examine** the various irrigation concepts and soil- water-crop relationships.	C3	1
2	Theory	**Analyze** problems related to irrigation canals and other hydraulic structures.	C4	2

Relevant Program Learning Outcomes (PLOs):
The course is designed so that students will achieve the following PLOs:

1	Engineering Technology Knowledge:	√	7	Environment and Sustainability:	
2	Problem Analysis:	√	8	Ethics:	
3	Design/Development of Solutions:		9	Individual and Team Work:	
4	Investigation:		10	Communication:	
5	Modern Tool Usage:		11	Project Management:	
6	The Engineering Technologist & Society:		12	Lifelong Learning:	

OBJECTIVES:
To be able to examine the various irrigation concepts and soil-water-crop relationships.
COURSE CONTENTS:

- **Introduction:** Definition, Necessity, Scope, Benefits, and ill effects of irrigation engineering.
- **Methods of Irrigation:** Pressurized and non-pressurized irrigation methods, Factors affecting choice of irrigation methods, Uniformity

coefficient.

- **Soil-Water-Crop Relationship:** Soil and its physical and chemical properties, Root zone soil water, Crops of Pakistan and Crop rotation.
- **Water Requirement of Crops:** Functions of irrigation water, Standards for irrigation water, Definition of some common terms, Factors affecting and improving duty, Classes of soil water, Equilibrium points-soil moisture tension, Depth of effective root zone, Depth and Frequency of irrigation, Evapotranspiration, Estimation of evapotranspiration, Irrigation efficiencies, Gross irrigation requirements, Use of computer models.
- **Canal Irrigation System:** Alluvial and non-alluvial canals, Alignment of canals, Distribution system for canal irrigation, Determination of canal capacity, Canal losses and Channel section for minimum seepage loss.
- **Lined Channels:** Canal Lining and its types, permissible velocities in lined channels.
- **Diversion Head Works:** Weir and barrage, Types and components of diversion weir, Head regulator and cross regulator, Canal regulation and silt control at the head works, Silt excluders and silt ejectors.
- **Canal Outlets:** Definition, Types, Essential requirements and characteristics of outlets, Tail cluster and tail escape.
- **Water logging and salinity:** Causes and effects of water logging, reclamation of waterlogged soils, Drains and tube wells, Causes and effects of salinity and alkalinity of lands in Pakistan.

Recommended Books

1. Irrigation and Hydraulic Structures: Theory, Design and Practice, Dr. Iqbal Ali, Institute of environmental Engineering Research, NED University Karachi, Latest Edition.
2. Irrigation and Drainage Engineering, Iqtidar H. Siddiqui, Oxford University Press, Latest Edition.
3. Irrigation Engineering and Hydraulic Structures, Santosh Kumar Garg, Khanna Publishers, Latest Edition.
4. Irrigation Technology by S R Bhakar and Y P Rao, Agrotech Publishing Academy, Latest Edition.

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Title of Course:	**:**	**Quantity Surveying and Estimation (2 + 1)**			
Course Code	**:**	CET309			
Semester	**:**	6th			
Technology	**:**	Civil Engineering Technology			
Effective	**:**	22 – Batch and onwards			
Pre-requisite	**:**	Nil			
Co-requisite	**:**	Nil			
Assessment	**:**	**Theory**		**Practical**	
	:	Quizzes/Test (s): 05 Marks Assignments/Projects/Presentations: 05 Marks Mid Semester Exam: 15 Marks Final Semester Exam: 25 Marks		Lab Rubrics: 30 % Open Ended Lab/Mini Project : 20 % Final Exam; Objective Test*: 30 % Final Exam; Conduct of Practical/Viva Voce*: 20 % *Appearance in Final Exams is mandatory	
Credit Hours/week	**:**	**Th**	2	**Pr**	1
Minimum Contact Hours	**:**	**Th**	32	**Pr**	3
Marks	**:**	**Th**	50	**Pr**	48

After Completing the Course, each student will be able to:

Sr. No.	Theory/ Practical	CLO	Taxonomy Level	PLO
1	Theory	**APPLY** concept and skills for quantity take-off for different civil Engineering works.	C3	2
2	Theory	**DESCRIBE** various terms related to Quantity Surveying and Estimation	C3	2
3	Practical	**ORGANIZE** programmed spreadsheet-based cost estimates and bills.	P4	5
5	Practical	**RESPOND** to assigned tasks actively.	A2	9

Relevant Program Learning Outcomes (PLOs):
The course is designed so that students will achieve the following PLOs:

1	Engineering Technology Knowledge:		7	Environment and Sustainability:	
2	Problem Analysis:	√	8	Ethics:	
3	Design/Development of Solutions:		9	Individual and Team Work:	√

4	Investigation:		10	Communication:	
5	Modern Tool Usage:	√	11	Project Management:	
6	The Engineering Technologist & Society:		12	Lifelong Learning:	

OBJECTIVES:

- To be able to apply concept and skills for quantity take-off for different civil Engineering works.

COURSE CONTENTS:

Material Quantities Take-off: Working out earthwork quantities for various civil engineering constructions. Calculating quantities for road embankments in plain and hilly areas and for irrigation channels. Quantities for roads, buildings and their components, reservoirs, water supply, drainage projects, steel works and bridge construction. Estimates using computer spreadsheets

Rate Analysis: Scheduled and non-scheduled rates. Analysis of rates, abstract of costs. Significance of rate analysis and its application to market rates of material and labor. Rate analysis for various items of civil engineering works, contract and its types.

Cost Estimates: Systematic and logical approach to the estimating and costing of civil engineering works, rough cost & detailed estimates, bill of quantities and part bills for construction, costs and profit margins to be considered in the cost estimates. Estimates for roads, buildings, reservoirs, water supply, drainage projects, steel works and bridge construction. Estimates using computer spreadsheets.

PRACTICAL WORK TO BE CARRIED OUT:

1. Workout quantities for earthwork for site-grading and leveling using geometric cross- sectional/grid method.
2. Workout quantities for mass excavation for a raft footing,
3. Prepare Measurement sheet (MS) for 1:2:4 concrete for substructure of a building (Foundations, columns below plinth and plinth beams.)
4. Prepare Measurement Sheet (MS) for 1:2:4 concrete for columns above plinth roof beams, roof slabs and projections.
5. Prepare Bar Bending Schedule (BBS) for single span and multi-span beam reinforcement from given drawing.
6. Workout the quantities slab reinforcement from given drawing
7. Workout the quantities of overhead water tank concrete and its reinforcement.
8. Workout the quantities of RCC retaining wall concrete and its reinforcement.
9. Prepare material estimate for a single room complete in all respect.
10. Prepare Material List of a steel truss.
11. Prepare Material List of a metal frame structure (low-rise)
12. Prepare a detailed estimate of an RCC water overhead reservoir of 20,000 gallon capacity.
13. Prepare detailed estimate of a manhole.
14. Prepare detailed estimate of a septic tank and soakage pit.
15. Prepare bill of quantity and abstract of cost for a manhole and septic tank.
16. Estimate the quantities of all necessary items of work required for 1 Km flexible

pavement

17. Estimate the cost of construction of Rigid Pavement.
18. Calculate the volume of earth work from contour map.
19. Calculate the volume of earth work for irrigation channel (i) fully in cutting (ii) partially in cutting and filling.

Recommended Books

1. Estimating and Costing in Civil Engineering, S. Dutta, Latest Edition,S. Dutta & Company, Lucknow, Latest Edition • Estimating, Costing and Accounts, DD
2. Kohli, S. Chand & Company (Pvt) Ltd, Latest Edition •
3. Fundamentals of construction. Estimating & Cost Accounting, Keith Collier, McGraw Hill Book Company, Latest Edition

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	Academic Council	Res. No.108.4(i)	Dated: 31-10-2024

Title of Course:	**:**	**Maintenance and Repair of Civil Works (1 + 1)**			
Course Code	**:**	CET310			
Semester	**:**	6th			
Technology	**:**	Civil Engineering Technology			
Effective	**:**	22 – Batch and onwards			
Pre-requisite	**:**	Nil			
Co-requisite	**:**	Nil			
Assessment	**:**	**Theory**		**Practical**	
	:	Quizzes/Test (s): 05 Marks Assignments/Projects/Presentations: 05 Marks Mid Semester Exam: 15 Marks Final Semester Exam: 25 Marks		Lab Rubrics: 30 % Open Ended Lab/Mini Project : 20 % Final Exam; Objective Test*: 30 % Final Exam; Conduct of Practical/Viva Voce*: 20 % *Appearance in Final Exams is mandatory	
Credit Hours/week	**:**	**Th**	1	**Pr**	1
Minimum Contact Hours	**:**	**Th**	16	**Pr**	3
Marks	**:**	**Th**	50	**Pr**	50

After Completing the Course, each student will be able to:

Sr. No.	Theory/ Practical	CLO	Taxonomy Level	PLO
1	Theory	**RECOGNIZE** various defects in civil structures with respect to the design guidelines	C2	4
2	Theory	**EXAMINE** the advance materials and their utilization for the repairing of the structures.	C4	2
3	Practical	**PERFORM** different tests by using various repair and maintenance techniques	P3	9

Relevant Program Learning Outcomes (PLOs):
The course is designed so that students will achieve the following PLOs:

1	Engineering Technology Knowledge:		7	Environment and Sustainability:	
2	Problem Analysis:	√	8	Ethics:	
3	Design/Development of Solutions:		9	Individual and Team Work:	√
4	Investigation:	√	10	Communication:	
5	Modern Tool Usage:		11	Project Management:	

6	The Engineering Technologist & Society:		12	Lifelong Learning:	

OBJECTIVES:

- To recognize various defects in civil structures with respect to the design guidelines and examine the advance materials and their utilization for the repairing of the structures.

COURSE CONTENTS:

Need for Maintenance

Importance and significance of repair and maintenance of civil structures, meaning of maintenance, objectives of maintenance, factors influencing the repair and maintenance.

Factors Causing Deterioration (Sources, Causes, Effects)

Definition of deterioration/decay, Factors causing deterioration, their classification, Effects of various agencies of deterioration on various construction materials i.e., bricks, timber, concrete, paints, metals, plastics, stones.

Investigation and Diagnosis of Defects

Systematic approach/procedure of investigation, Sequence of detailed steps for diagnosis of structural defects/problems, List non-destructive and others tests on structural elements and materials to evaluate the condition of the structure and study of their most commonly used tests.

Buildings:

Types of Building Repair and Maintenance Services

- Day to Day Repairs.
- Special Repairs.
- Additions and Alterations.
- Preventive Maintenance.

Various types of retrofitting methods for repair and rehabilitation of concrete structure failure.

- Guniting.
- Shotcreting.
- Concrete Stitching.
- Resin Injections.
- Dry packing.
- Polymer impregnation.
- Vacuum impregnation.

Pavements and Bridges:

Routine maintenances activities are categorized into five levels: performance monitoring, preservative, functional concrete pavement repair (CPR), structural CPR, and remove and replace.

Distress Identification:

Preservative: Edge Drop-Off, Joint Failure, Joint Sealant Damage, Joint Separation, Longitudinal Cracks, Transverse Cracks.

Functional CPR: Bumps, Crack Spalling, Faulting, Joint Spalling, Settlement.

Structural CPR: Patch Deterioration, Pumping

Remove and Replace: Corner Break, Punchouts, Shattered Slabs

Hydraulic Structures:

Symptom of distress for hydraulic structure are: Active / passive cracks, sagging of members, swelling of concrete, discoloration, white/brown patches, spalling of concrete,

exposure of bars and erosion of surface.
Selection of repair scheme based on factors such as type and extent of damage, environmental conditions, load intensity, accessibility, time constraints, availability of experienced agency, etc.
Few repair techniques are:

- Patching techniques
- Substitution of members
- Strengthening of existing members by Shotcreting
- Wrapping / bonding techniques
- Encasement with concrete / free flow micro concrete
- Chloride extraction / passivating technique
- Electro – chemical remedies
- Pressure grouting
- Providing waterproof barriers
- Surface protection

Materials for Repair, maintenance, and protection
Compatibility aspects of repair materials, State application of following materials in repairs.

PRACTICAL WORK TO BE CARRIED OUT:

The practical work will be conducted on the basis of theory.

Recommended Books

1. Building Defects and Maintenance Management by Gahlot P.S. and Sanjay Sharma; CBS
2. Publishers, New Delhi
3. Maintenance Engineering for Civil Engineers by Nayak, BS; Khanna Publishers, Delhi
4. Maintenance, Repair & Rehabilitation and Minor Works of Buildings (English, Paperback,
5. Varghese P.C.).

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Title of Course:	**:**	**Technoprenurship (2 + 0)**			
Course Code	**:**	CETM302			
Semester	**:**	6^{th}			
Technology	**:**	Civil Engineering Technology			
Effective	**:**	22 – Batch and onwards			
Pre-requisite	**:**	Nil			
Co-requisite	**:**	Nil			
Assessment	**:**	**Theory**		**Practical**	
	:	Quizzes/Test (s): 05 Marks Assignments/Projects/Presentations: 05 Marks Mid Semester Exam: 15 Marks Final Semester Exam: 25 Marks		-	
Credit Hours/week	**:**	**Th**	2	**Pr**	0
Minimum Contact Hours	**:**	**Th**	32	**Pr**	0
Marks	**:**	**Th**	50	**Pr**	0

After Completing the Course, each student will be able to:

Sr. No.	Theory/ Practical	CLO	Taxonomy Level	PLO
1	Theory	**UNDERSTAND** the concept of technopreneurship and characteristics of successful entrepreneurs.	C2	6
2	Theory	**ANALYZE** technopreneurship ideas by developing technopreneurship potential by carrying out work individually and in teams.	C4	9

Relevant Program Learning Outcomes (PLOs):
The course is designed so that students will achieve the following PLOs:

1	Engineering Technology Knowledge:		7	Environment and Sustainability:	
2	Problem Analysis:		8	Ethics:	
3	Design/Development of Solutions:		9	Individual and Team Work:	√
4	Investigation:		10	Communication:	
5	Modern Tool Usage:		11	Project Management:	
6	The Engineering Technologist & Society:	√	12	Lifelong Learning:	

OBJECTIVES:

- To recognize various defects in civil structures with respect to the design guidelines and examine the advance materials and their utilization for the repairing of the structures.

COURSE CONTENTS:

Fundamentals of entrepreneurship: Definition of entrepreneur and entrepreneurship, Entrepreneurs versus inventors, Entrepreneurial process, Entrepreneurial Mind Set.

Creating and starting the venture: Sources of ideas, Methods of generating idea, Creative problem solving, Innovation, Opportunity recognition, Opportunity Analysis, Product Planning and Development Process.

Intellectual Property: What is intellectual property, Patents, Start-up without patent, Trademarks, Copyrights, Trade secret, Licensing **Fundamentals of Business Plan**: What is business plan, Who should write it, Scope and value of business plan, Information needs, Why some business plan fail

Writing the Business Plan: Introductory page, Executive summary, Environmental and Industry Analysis, Description of Venture, Production Plan, Marketing Plan, Organizational Plan, Assessment of Risk, Financial Plan.

Financing the Venture: Sources of capital-Debt or equity, Venture Capitalist, Valuing your company

Strategies for Growth: Growth strategies- market penetration, market development, product development and diversification, Implications for growth.

Recommended Books

1. Entrepreneurship, Robert Hisrich, Michael Peters, Dean Shepherd, 10th Edition
2. The guide to entrepreneurship by Michael Sycher, CRC Press, Boca Raton, Latest Edition

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