

Civil and Infrastructure Engineering

Semester VII						
S. No	Course Code	Course Name	L	T	P	C
1	CE309T	<u>Construction Engineering and Management</u>	2	1	0	6
2	CE401C	<u>Civil and Infrastructure Engineering Design</u>	1	0	1	3
3		Institute Elective-V				6
4		HSS Basket 1 or 2 (Elective-II)				6
5		BTP-I/Program Elective-I	0	0	6	6
		Total Credits				27

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1	Title of the course (L-T-P-C)	Construction Engineering and Management 2-1-0-6
2	Pre-requisite courses(s)	NIL
3	Course content	<p>Fundamentals of construction project management: Introduction, Project Initiation, and Planning, Time Value of Money, Investment Analysis, Cost-Benefit Analysis; Construction schedule management: Work Breakdown Structures, Development of project activity networks, Precedence Diagram Method, Critical Path Method (CPM), Program Evaluation and Review Technique (PERT), Line Balance Methods in scheduling.</p> <p>Construction material management: Resources in construction, Resource levelling, the crashing of project schedules, earned value analysis</p> <p>Construction Quality and safety: Safety and occupational hazards in construction, Fundamentals of quality control in construction, Safety in construction - Cost of Accidents - Safety norms - Safety aids</p> <p>Introduction to Construction Contracts: Estimation, Tenders & Contracts - EOI-Prequalification - Types of Contracts - Terminology used, fundamentals of delay analysis and claims, Construction Finances – decision making,</p> <p>Advances in construction management: Introduction to Building Information Modelling (BIM), Lean construction, and Integrated Project Delivery in construction</p>
4	Texts/References	<p>Reading:</p> <ol style="list-style-type: none"> 1. Kumar Neeraj Jha, “Construction Project Management: theory and practice” Pearson Education India; 2nd edition, 2015. 2. F. Lawrence Bennett, “The Management of Construction: A Project Lifecycle Approach”, Routledge; 1st edition, 2016. 3. S. Choudhury “Project Management”, McGraw Hill Education, 2017. <p>References:</p> <ol style="list-style-type: none"> 1. Riggs, James L., David D. Bedworth, and Sabah U. Randhawa., “Engineering Economics”, McGraw Hill Education; 4th edition, 2004. 2. Garold D. Oberlender, “Project management for engineering and construction”, McGraw Hill Education; Second edition, 2014. 3. Chitkara, K. K. “Construction Project Management”, McGraw-Hill; Forth Edition, 2019.

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1	Title of the course (L-T-P-C)	Civil and Infrastructure Engineering Design (2-1-0-6)
2	Pre-requisite courses(s)	Nil
3	Course content	<p>Introduction and Scope of Civil Engineering: Basics of Engineering and Civil Engineering; Broad disciplines of Civil Engineering; Importance of Civil Engineering, History of Civil Engineering: Early constructions and developments over time, ancient monuments of the world, Civil Engineering aspects of Indian heritage structures. Civil Engineering Specializations: Structural Engineering, Geotechnical Engineering, Water Resources Engineering, Environmental Engineering, Transportation Engineering, Construction Management, Ocean Engineering, Remote Sensing and GIS, Energy and Sustainable Infrastructure.</p> <p>Megastructures of Civil Engineering: Design, Construction and Structural Details of Some of the Megastructures of the World. Mega Civil Engineering Projects of India and world. Futuristic Mega Projects in Civil Engineering. Failure Case Studies in Civil Engineering: Structures, Foundations, Dams, Pavement Systems, and the Geo-environment. Some Major Civil Engineering Challenges</p> <p>Materials in Civil Engineering: Stones, bricks, mortars, Plain, Reinforced & Prestressed Concrete, Construction Chemicals, Structural Steel, High Tensile Steel, Carbon Composites, Plastics in Construction, 3D printing, Recycling of Construction & Demolition wastes, Sustainable Building Materials.</p> <p>Introduction to Plan Reading, and Construction Techniques: Scale drawings of floor plans, sections, and elevations; Plan types, Interpretation of plans. Components of a building. Typical loads and forces in Civil Engineering structures. Introduction to estimation and costing.</p> <p>Smart Cities and Current Trends in Construction Industry: Application of Machine Learning (ML) and Artificial Intelligence (AI) in Civil Engineering. Position of construction industry vis-à-vis other industries, plan outlays for construction; current budgets for infrastructure works; Possible scopes for a career, Importance of ethics in engineering.</p>
4	Texts/References	<p>READING:</p> <ol style="list-style-type: none"> Gordon, J. E. (2003). <i>STRUCTURES: Or Why Things Don't Fall Down</i>, 3rd Ed., Da Capo Press; Cambridge, USA Paul A. B., Pamalee A. B, Norbert J. D., Parfitt, M. K. (2013). <i>Failure Case Studies in Civil Engineering: Structures, Foundations, and the Geoenvironment</i>, 2nd Ed., American Society of Civil Engineers, Reston. Varghese, P. C. (2015). <i>Building Materials</i>, 2nd Ed., Prentice Hall India Learning Private Limited, New Delhi. Anglin, G. (2019). <i>Introduction to Estimating, Plan Reading and Construction Techniques</i>, 1st Ed., Routledge, New York. Xu, Y. L., Jia, H. (2019). <i>Smart Civil Structures</i>, 1st Ed., CRC Press, New York. <p>REFERENCES:</p> <ol style="list-style-type: none"> Samui, P., Kim, D., Iyer, N. R, Chaudhary, S. (2020). <i>New Materials in Civil Engineering</i>, 1st Ed., Butterworth-Heinemann, Oxford. Moaveni, s. (2011). <i>Engineering Fundamentals: An Introduction to Engineering</i>, 4th Ed., Cengage Learning India Pvt. Ltd., New Delhi Gordon, J. E. (2020). <i>The New Science of Strong Materials – Or Why You Don't Fall through the Floor</i>, Princeton University Press, New Jersey. BIS, "National Building Code of India", Bureau of Indian Standards, 2017. Martin M. W., and Schinzinger, R. (2017). <i>Ethics in Engineering</i>, 4th Ed., McGraw Hill Education, New Delhi.

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		6. Bhavikatti, S. S. and Chitawadagi, M. V. (2019). <i>Building Planning and Drawing</i> , 1 st Ed., Dreamtech Press, New Delhi.
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