**Lecture Plan**

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| Department | Civil engineering |
| Program/Year/Semester/Sec | 7th |
| Course Name/ Course Title | B.Tech |
| Course Code | 00 |
| Name of Faculty  | SHUBHAM SAHU |
| Department of Faculty  | Civil engineering |

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| Pre-requisites for the Course | Students should have interest in learning concrete technology |
| Student should have basic knowledge of cement, concrete and its properties |

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| Type of Course | Theory/Lecture |
| Contact hours | 55 hrs |

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| **Course Outcomes (COs)** |
| At the end of this course students will demonstrate the ability to: |
| CO1 | Understand the properties of constituent material of concrete. |
| CO2 | Apply admixtures to enhance the properties of concrete. |
| CO3 | Evaluate the strength and durability parameters of concrete. |
| CO4 | Design the concrete mix for various strengths using difference methods. |
| CO5 | Use advanced concrete types in construction industry. |

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| **Unit** | **Topic & sub – topic** | **Topics Covered** | **COs** | **Lectures proposed** | **Lecture delivered** | **Date** | **No. of students present** **(38)** | **Sign. of faculty** |
| **1** | Cement |  | CO1 | 1 |  |  |  |  |
| types and cement chemistry of cement |  | CO1 | 1 |  |  |  |  |
| Aggregates |  | CO1 | 1 |  |  |  |  |
| mineralogy of aggregates |  | CO1 | 1 |  |  |  |  |
| Properties of aggregates |  | CO1 | 1 |  |  |  |  |
| test and standards of aggregates |  | CO1 | 1 |  |  |  |  |
| test and standards of aggregates |  | CO1 | 1 |  |  |  |  |
| Quality of water for use in concrete. |  | CO1 | 1 |  |  |  |  |
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| **Total Lectures** | **8** |  |  |  |  |
| **2** | Introduction & study of accelerators, |  | CO2 | 1 |  |  |  |  |
| retarders, water reducers, air entrainers,  |  | CO2 | 1 |  |  |  |  |
| Water proofers, super plasticizers. |  | CO2 | 1 |  |  |  |  |
| Study of supplementary cementing materials |  | CO2 | 1 |  |  |  |  |
| Study of supplementary cementing materials like fly ash, silica fume , ground granulated blast furnace slag, |  | CO2 | 1 |  |  |  |  |
| metakaoline |  | CO2 | 1 |  |  |  |  |
| pozzolana |  | CO2 | 1 |  |  |  |  |
| metakaoline and pozzolana; their production, properties and effect on concrete properties . |  | CO2 | 1 |  |  |  |  |
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| **Total Lectures** | **8** |  |  |  |  |
| **3** | Concert production: |  | CO3 | 1 |  |  |  |  |
| batching, mixing and transportation of concrete. |  | CO3 | 1 |  |  |  |  |
| Workability test: slump test, compacting factor test and Vee Bee test. |  | CO3 | 1 |  |  |  |  |
| Segregation, bleeding and Laitance in concrete |  | CO3 | 1 |  |  |  |  |
| curing of concrete and its methods. |  | CO3 | 1 |  |  |  |  |
| Determination of compressive and flexural strength as per BIS. |  | CO3 | 1 |  |  |  |  |
| Mechanical properties of concrete: elastic modules, |  | CO3 | 1 |  |  |  |  |
| poisson’s ratio, creep, shrinkage and durability of concrete. |  | CO3 | 1 |  |  |  |  |
| **Total Lectures** | **8** |  |  |  |  |
| **4** | Principle of mix proportioning, |  | CO4 | 1 |  |  |  |  |
| properties related to mix design, |  | CO4 | 1 |  |  |  |  |
| Mix design method |  | CO4 | 1 |  |  |  |  |
| IS method |  | CO4 | 1 |  |  |  |  |
| and ACI method |  | CO4 | 1 |  |  |  |  |
| Mix design of concrete, |  | CO4 | 1 |  |  |  |  |
| Rheology |  | CO4 | 1 |  |  |  |  |
| mix design examples |  | CO4 | 1 |  |  |  |  |
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| **Total Lectures** | **8** |  |  |  |  |
| **5** | Study and uses of high strength concrete |  | CO5 | 1 |  |  |  |  |
| self-compacting concrete |  | CO5 | 1 |  |  |  |  |
| fibre reinforced concrete |  | CO5 | 1 |  |  |  |  |
| ferro cement, |  | CO5 | 1 |  |  |  |  |
| ready Mix Concrete, |  | CO5 | 1 |  |  |  |  |
| recycled aggregate |  | CO5 | 1 |  |  |  |  |
| recycled aggregate concrete and status in India. |  | CO5 | 1 |  |  |  |  |
| recycled aggregate concrete and status in India. |  | CO5 | 1 |  |  |  |  |
| **Total Lectures** | **8** |  |  |  |  |

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| **Text Books & References** |
| 1 | Shetty, M.S, "Concrete Technology, Theory and Practice", S. Chand and Company Ltd, New Delhi, 2008.  |
| 2 | Gupta B.L., Amit Gupta, "Concrete Technology", Jain Book Agency, 2010.  |
| 3 | P.K. Mehta and Paulo J.M. Monteiro, "Concrete: microstructure, properties and materials", The Mc GrawHill Companies  |
| 4 | Concrete mix proportioning as per IS 10262:2009 – Comparison with IS 10262:1982 and ACI 211.1-91 M.C. Nataraja and Lelin Das  |
| 5 | IS10262-1982 Recommended Guidelines for Concrete Mix Design, Bureau of Indian Standards, New Delhi, 1998.  |

 Signature of Faculty Signature of HOD

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|  Comments |  |