**CRITERION 3**

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|  | **CRITERION 3** | | | | | **COURSE OUTCOMES AND PROGRAM OUT COMES** | | | | | | | |  |  | |  |
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| **3.1** | | |  |  | **Establish the correlation between the courses and the Program** | | | | | | |  |  |  | **20** | |  |
|  |  | **Outcomes (POs) and Program Specific Outcomes (PSOs)** | | | | | | |  |  |  |  |
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|  |  |  |  |  | **Course Outcomes (COs) (SAR should include course outcomes of** | | | | | | | |  | |  |  |  |
| **3.1.1** | | |  |  | **one course from each semester of study,** | | | | |  | **however, should be** | |  | | **05** | |  |
|  |  |  |  |  | **prepared for all courses and made available as evidence, if asked)** | | | | | | | |  | |  |  |  |
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|  | **Course Name: Strength of Materials-I (**3CE1A) | | | | | | | | |  | **Year of Study: 2017 -18** | | | | | | |

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|  | **Course Outcomes:** |  |  |  |  |  |  |  |  |

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|  | At the end of the course completion student will be able to |
| **C201.1** | Students will able to understand the ability, behavior of metal under the action of external forces. And detailed study of forces and their effects, along with some suitable protective measures for safe working condition. |
| **C201.2** | Understanding the stability of columns under the action of compressive forces |
| **C201.3** | Students will able to understand the failure of thin cylindrical and spherical shells (boilers, tanks and compressed air receivers) due to an internal pressure. |
| **C201.4** | Understanding the analyze and design of beam on the basis of shear force diagram and bending moment diagram |

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| **Course Name: Civil Engineering Materials (**3CE2A**)** |  | **Year of Study: 2017 -18** |

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|  | At the end of the course completion student will be able to |
| **C202.1** | Understanding the basic properties classification & uses of stone |
| **C202.2** | Understanding the basic properties manufacturing & uses of clay product, cement & lime |
| **C202.3** | Understanding the function, various test & application of mortar and plaster timber & steel |
| **C202.4** | Study & analyzing the concept of environmental friendly building material and miscellaneous materials such as glass, aluminum, asbestos, G.I., plastics in construction |

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| **Course Name: Engineering Geology (**3CE3A**)** |  | **Year of Study: 2017 -18** |

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|  | At the end of the course completion student will be able to |
| **C203.1** | Understands the concepts of general geology & knows about internal structure of earth & minerals. |
| **C203.2** | Understanding the concepts of petrology & know about rocks |
| **C203.3** | Understanding the concept of structural geology & basics of fold & faults & also to know about dip & strike problems. |
| **C203.4** | Basics of geophysical methods for the subsurface analysis of earth and concept of remote sensing & GIS & their applications in civil engineering |

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| **Course Name: Construction Technology (**3CE4A**)** |  | **Year of Study: 2017 -18** |

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|  | At the end of the course completion student will be able to |
| **C204.1** | To Understand The Basic Building Requirement And Construction Techniques. |
| **C204.2** | To Understand About DPC Joints Arches Lintels Etc. |
| **C204.3** | To Understand the Fabrication And Erection Work, Roof And Roof Covering |
| **C204.4** | To Understand Advanced Construction Techniques and About Equipment Management |

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| **Course Name: Fluid Mechanics (**3CE5A**)** |  | **Year of Study: 2017 -18** |

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|  | At the end of the course completion student will be able to |
| **C205.1** | To understand important basic terms used in fluid mechanics with practices of solvig problem |
| **C2052** | To understand hydrostatics and buoyancy with practice of solving problem |
| **C205.3** | To understand euler equation, bernoulli equation in hydro kinematics, rotational flow practice of applications and solving problems. |
| **C205.4** | To understand momentum equation and flow throw pipes practice of solving problems. |

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| **Course Name: Advanced Engineering Mathematics (**3CE6A**)** |  | **Year of Study: 2017 -18** |

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|  | At the end of the course completion student will be able to |
| **C206.1** | Calculate the Fourier series for standard periodic waveforms and demonstrate their understanding of the Dirichlet’s conditions by using them to evaluate infinite series. solve z transform and its difference equations |
| **C206.2** | Calculate the Laplace transform of standard functions and use the techniques to solve second-order ordinary differential equations and partial differential equations. |
| **C206.3** | Calculate the Fourier transform of standard functions and use the techniques to solve second-order ordinary differential equations and partial differential equations. |
| **C206.4** | Use numerical methods to interpolate, differentiate and integrate the functions and solve first order differential equations |

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| **Course Name: Theory of Structures-I(**5CE1A) |  | **Year of Study: 2017 -18** |

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|  | At the end of the course completion student will be able to |
| **C 501.1** | Understand the indeterminacy of structures & can apply the concepts of Maxwell & BETTE theorem & Slope deflection theorem |
| **C501.2** | Understanding the concepts of Moment distribution method |
| **C501.3** | Understanding the concept of Strain energy & application of Castiglione theorems & Unit load method to find the deformations of structures |
| **C501.4** | Basic knowledge of Column analogy method & KANI method & analyze the multistory frames using portal method, factor method, cantilever method & analysis of determinate trusses by Tension coefficient method. |

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| **Course Name: Environment Engineering-I(**5CE2A) |  | **Year of Study: 2017 -18** |

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|  | At the end of the course completion student will be able to |
| **C 502.1** | To understand the basics of environmental science and engineering and importance of water. |
| **C502.2** | To understand the role of civil engineer in environment protection. |
| **C502.3** | To learn various terms of WSS. |
| **C502.4** | To understand various sources, quality and standards of water. |
| **C502.5** | To understand methods, components and designing of water distribution system |

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| **Course Name:** Geotechnical Engineering(5CE3A) |  | **Year of Study: 2017 -18** |

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|  | At the end of the course completion student will be able to |
| **C 503.1** | To Understand basic properties of soil and their identifications. |
| **C503.2** | To Understand behavior of clay mineralogy |
| **C503.3** | TO understand the Stresses in soil mass and Seepage and Seepage Pressure. |
| **C503.4** | Basic knowledge of Mohr’s circle of stress and Principles of soil compaction |

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| **Course Name: Surveying-II (**5CE4A) |  | **Year of Study: 2017 -18** |

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|  | At the end of the course completion student will be able to |
| **C 504.1** | Basic understanding of survey trigonometric leveling for various cases, various correction including effect of earth curvature and refraction |
| **C504.2** | Understanding the basic implementation of horizontal curve on ground for all cases whether centre and radius are accessible or not. |
| **C504.3** | . Understand how adjustment of figure for surveying of any country and all routine work to draw a triangulation system and various types of errors. |
| **C504.4** | Study of astronomical observation based on earth and celestial sphere, and co-ordinate system of earth |

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| **Course Name:** Building Design**(**5CE5A) |  | **Year of Study: 2017 -18** |

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|  | At the end of the course completion student will be able to |
| **C 505.1** | this subject will provide the understanding of different types of loads considered and taken into account when designing the buildings especially DL/LL/IL/EL. |
| **C505.2** | Students will be able to understand the different types of construction and various provisions specified by bureau of Indian standards. |
| **C505.3** | Students will be able to understand the design criteria of the buildings/ roof (general &special)/ building components and the modern techniques involved in construction |

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| **Course Name:** Solid Waste Management **(**5CE6.3A) |  | **Year of Study: 2017 -18** |

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|  | At the end of the course completion student will be able to |
| **C 506.1** | To Understand General Concept & Problems Associated With Waste Management |
| **C506.2** | To Understand Onsite Handling, Storage & Processing Of Solid Waste |
| **C506.3** | To Understand Collection, Transfer & Transport Of Solid Waste |
| **C506.4** | To Understand Disposal Methods & Recovery Methods |

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| **Course Name:**Water Resources Engineering **(**7CE1A) |  | **Year of Study: 2017 -18** |

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|  | At the end of the course completion student will be able to |
| **C 701.1** | Understand basic concepts and terminology of Water Resources Engineering. |
| **C701.2** | To design Canal Irrigation System and understand Water Distribution System. |
| **C701.3** | To understand Distribution of Canal Water and Hydraulics of Alluvial Rivers. |
| **C701.4** | To understand Water Logging, Well Irrigation and Hydrology. |

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| **Course Name:** Design of Steel Structures-**I (**7CE2A) |  | **Year of Study: 2017 -18** |

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|  | At the end of the course completion student will be able to |
| **C 702.1** | Students would be able to understand the use of steel section and plastic analysis. |
| **C702.2** | Students are able to understand use of connections and tension members. |
| **C702.3** | Students would be able to analyze compression member |
| **C702.4** | Students would be able to use different sections for beam. |

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| **Course Name:** Design of Concrete Structures-II  **(**7CE3A) |  | **Year of Study: 2017 -18** |

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|  | At the end of the course completion student will be able to |
| **C 703.1** | Students will be able to understand the concept and design of pre-stress concrete. |
| **C703.2** | Students will be able to understand the concept and design of torsion for beams, curved beam and methodology of redistribution of moment. |
| **C703.3** | Understands the design concept of domes and tanks. |
| **C703.4** | Student will be able to understand the concept of yield line theory and retaining walls |
| **C703.5** | Student will be able to understand the design procedure of deck slab and culvert. |

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| **Course Name:** TRANSPORTATION 2 **(**7CE4A) |  | **Year of Study: 2017 -18** |

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|  | At the end of the course completion student will be able to |
| **C 704.1** | Outcome of the unit is to understand basic terminology of railway and designing of railway tracks. |
| **C704.2** | Outcome of unit is to understand geometric design : such that speed , gradients, curves and alignments of tracks. |
| **C704.3** | Outcome of the unit is to understand basic terminology of airpot. |
| **C704.4** | Outcome of the unit is to design the pavements of airport. |

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| **Course Name:** Application of Numerical Methods in  Civil Engineering **(**7CE5A) |  | **Year of Study: 2017 -18** |

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|  | At the end of the course completion student will be able to |
| **C 705.1** | Analyze the error incumbent in any numerical approximation. |
| **C705.2** | Solve nonlinear equations by certain numerical methods. |
| **C705.3** | Solve a system of linear algebraic equations by certain numerical methods with the use of matrices |
| **C705.4** | Fit a curve of a vicariate data and interpolate the desire values with specific interpolation process |

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| **Course Name:** Advance TransportationEngineering  **(**7CE6.1A **)** |  | **Year of Study: 2017 -18** |

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|  | At the end of the course completion student will be able to |
| **C 706.1** | Unit is based on traffic studies like spot speed, traffic volume and its method, accidental studies, o-d studies. |
| **C706.2** | Unit is based on how to collect data from roadways and get probable values of these data for further calculation. |
| **C706.3** | Unit is based on human and vehicular characteristics decided by IRC, rotary design and requirement of it based on IRC recommendation as well as signals designing. |
| **C706.4** | Unit is based on how to manage the traffic to avoid accidents and road safety by laws and ordinances for drivers. |
| **C706.5** | Unit is based on what is the adverse effect of vehicles on environment and how to reduce such effects. |

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| **3.1.2** |  | **CO - PO Matrices of courses selected in 3.1.1 (Six matrices to be** | | | | | | | | | | | **05** | | |
|  |  | **mentioned; one per semester from 3rd to 8th semester)** | | | | | | | | |  |
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| Course Name: **Strength of Materials-I (**3CE1A) | | | | | | | | |  | Year of Study: 2017 -18 | | | | | |
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| **SOM - I** |  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |  | PO12 | |
| **(**3CE1A**)** |  |  |
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| **C201.1** |  | H | H | M | M | L | L | L | M | M | M | M |  | H | |
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| **C201.2** |  | H | H | L | M | L | M | L | H | L | L | M |  | M | |
| M |  |  | HH |  |  | L | M |  |  |  |  |  |  |  | |
| **C201.3** |  | H | H | M | L | L | M | H | M | H | M | H |  | H | |
|  |  |  | H |  |  |  |  |  |  | H |  |  |  |  | |
| **C201.4** |  | H | H | M | M | L | H | -L | M | M | L | M | M | M | |
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| Course Name: **Civil Engineering Materials** (3CE2A) |  | Year of Study: 2017 -18 |

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| **CEM- I** |  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |  | PO12 |
| **(**3CE2A**)** |  |  |
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| **C202.1** |  | H | L | L | M | L | M | M | L | H | M | H |  | H |
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| **C202.2** |  | H | L | L | M | L | M | M | L | H | M | H |  | H |
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| **C202.3** |  | H | L | L | L | L | M | M | L | H | M | H |  | H |
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| **C202.4** |  | H | L | L | L | L | M | -M | L | H | M |  | M | H |
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| Course Name: **Engineering Geology** (3CE3A) |  | Year of Study: 2017 -18 |

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| **EG- I** |  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |  | PO12 |
| **(**3CE3A**)** |  |  |
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| **C203.1** |  | H | L | L | L | L | H | H | M | L | L | H |  | H |
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| **C203.2** |  | H | L | L | L | L | H | H | M | L | L | H |  | H |
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| **C203.3** |  | H | H | M | M | M | L | L | L | L | M | L |  | H |
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| **C203.4** |  | H | L | L | L | L | H | -L | L | L | L | L |  | H |
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| Course Name: : **Construction Technology** (3CE4A) |  | Year of Study: 2017 -18 |

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| **CT - I** |  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |  | PO12 |
| **(**3CE4A**)** |  |  |
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| **C204.1** |  | H | L | H | M | H | H | H | H | H | H | H |  | H |
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| **C204.2** |  | H | L | H | M | H | H | H | M | H | H | M |  | H |
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| **C204.3** |  | H | L | H | M | H | H | M | M | H | H | H |  | H |
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| **C204.4** |  | H | L | M | M | H | H | H | H | H | H | H |  | H |
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| Course Name: **Fluid Mechanics (**3CE5A) |  | Year of Study: 2017 -18 |

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| **FM** |  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |  | PO12 |
| **(**3CE5A**)** |  |  |
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| **C205.1** |  | H | L | H | M | H | H | H | H | H | H | H |  | H |
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| **C205.2** |  | H | L | H | M | H | H | H | M | H | H | M |  | H |
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| **C205.3** |  | H | L | H | M | H | H | M | M | H | H | H |  | H |
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| **C205.4** |  | H | L | M | M | H | H | -H | H | H | H | H |  | H |
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| Course Name: **Advanced Engineering Mathematics**  **(**3CE6A) |  | Year of Study: 2017 -18 |

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| **AEM** |  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |  | PO12 |
| **(**3CE6A**)** |  |  |
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| **C206.1** |  | H | H | M | L | L | L | L | L | M | M | M |  | M |
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| **C206.2** |  | H | H | M | L | L | L | L | L | M | M | M |  | M |
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| **C206.3** |  | H | H | M | L | L | L | L | L | M | M | M |  | M |
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| **C206.4** |  | H | H | M | H | L | L | -L | L | M | M | M |  | M |
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| Course Name: **Theory of Structures-I (**5CE1A) |  | Year of Study: 2017 -18 |

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| **TOS** |  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |  | PO12 |
| **(**5CE1A**)** |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **C301.1** |  | H | H | L | L | H | H | M | L | H | H | L |  | H |
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| **C301.2** |  | H | HHHHH | L | L | H | H | M | L | L | H | L |  | H |
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| **C301.3** |  | H | H | L | L | H | M | M | L | H | H | L |  | H |
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| **C301.4** |  | H | H | L | L | H | H | M | L | L | H | L |  | H |
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| **EE-I** |  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |  | PO12 |
| **(**5CE2A**)** |  |  |
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| **C302.1** |  | H | L | L | L | L | H | H | H | M | M | M |  | H |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **C302.2** |  | H | M | H | M | L | L | M | M | M | L | L |  | H |
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| **C302.3** |  | H | M | H | H | M | H | H | H | M | M | H |  | H |
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| **C302.4** |  | H | H | H | H | H | H | -M | H | H | M | H |  | H |
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| Course Name: **Environment Engineering-I (**5CE2A) |  | Year of Study: 2017 -18 |

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| Course Name: **Geotechnical Engineering (**5CE3A) |  | Year of Study: 2017 -18 |

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| **GT** |  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |  | PO12 |
| **(**5CE3A**)** |  |  |
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| **C303.1** |  | H | H | L | H | M | M | M | H | H | H | M |  | H |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **C303.2** |  | H | M | H | M | H | M | H | M | H | H | M |  | M |
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| **C303.3** |  | H | M | H | H | M | H | H | M | M | H | M |  | H |
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| **C303.4** |  | H | H | L | H | H | H | -H | H | H | H | M |  | H |
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| Course Name: **Surveying-II (**5CE4A) |  | Year of Study: 2017 -18 |

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| **SUR.** |  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |  | PO12 |
| **(**5CE4A**)** |  |  |
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| **C304.1** |  | H | M | L | M | L | H | M | H | H | H | M |  | H |
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| **C304.2** |  | H | H | M | H | M | H | M | M | H | M | H |  | H |
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| **C304.3** |  | H | M | L | M | L | H | M | H | H | H | M |  | H |
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| **C304.4** |  | L | L | L | H | L | H | -M | H | L | M | L |  | H |
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| Course Name: **Building Design (**5CE5A) |  | Year of Study: 2017 -18 |

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| **BD** |  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |  | PO12 |
| **(**5CE5A**)** |  |  |
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| **C305.1** |  | H | H | H | H | H | M | H | M | M | L | L |  | H |
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| **C305.2** |  | H | M | H | H | M | L | H | L | M | L | L |  | M |
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| **C305.3** |  | H | M | H | H | H | M | H | M | M | L | L |  | L |
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| Course Name: **Solid Waste Management**  **(**5CE6.3A) |  | Year of Study: 2017 -18 |

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| **SWM** |  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |  | PO12 |
| **(**5CE6.3A**)** |  |  |
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| **C306.1** |  | H | M | L | L | L | M | H | H | L | M | L |  | H |
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| **C306.2** |  | H | L | L | M | M | H | H | H | H | M | M |  | H |
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| **C306.3** |  | H | L | M | M | H | H | H | H | H | M | M |  | H |
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| **C306.4** |  | H | L | M | M | H | H | -H | H | H | M | H |  | H |
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| Course Name: **Water Resources Engineering**  **(**7CE1A) |  | Year of Study: 2017 -18 |

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| **WRE** |  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |  | PO12 |
| **(7**CE1A**)** |  |  |
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| **C401.1** |  | H | M | M | H | M | M | M | H | H | M | M |  | H |
| H |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **C401.2** |  | H | H | H | M | M | L | M | M | H | M | L |  | M |
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| **C401.3** |  | M | M | H | M | L | M | M | L | M | L | M |  | M |
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| **C401.4** |  | M | H | M | M | H | M | M | L | M | M | H |  | M |
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| Course Name: **Design of Steel Structures-I** (7CE2A) |  | Year of Study: 2017 -18 |

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| **DSS-I** |  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |  | PO12 |
| **(7**CE2A**)** |  |  |
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| **C402.1** |  | H | H | H | H | M | H | H | L | H | H | L |  | H |
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| **C402.2** |  | H | H | H | M | M | H | M | L | H | H | L |  | H |
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| **C402.3** |  | H | H | H | H | M | H | M | L | H | H | M |  | H |
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| **C402.4** |  | H | H | H | M | M | H | H | L | H | H | M |  | H |
| H |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

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| Course Name: **Design of Concrete Structures-II** **(**7CE3A) |  | Year of Study: 2017 -18 |

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| **DCS-II** |  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |  | PO12 |
| **(7**CE3A**)** |  |  |
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| **C403.1** |  | H | H | H | H | L | M | M | M | H | L | M |  | H |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **C403.2** |  | H | H | H | H | H | M | M | M | H | M | M |  | M |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **C403.3** |  | H | H | H | H | L | M | M | M | H | M | M |  | M |
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| **C403.4** |  | M | M | M | M | M | L | L | L | M | M | M |  | H |
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| Course Name: **Transportation 2**  **(**7CE4A) |  | Year of Study: 2017 -18 |

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| **TE-II** |  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |  | PO12 |
| **(7**CE4A**)** |  |  |
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| **C404.1** |  | H | H | M | M | M | H | M | H | M | M | L |  | H |
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| **C404.2** |  | M | M | L | H | M | H | H | M | M | M | M |  | H |
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| **C404.3** |  | H | H | H | H | L | H | M | M | H | H | H |  | H |
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| **C404.4** |  | H | M | L | M | H | L | M | M | H | H | H |  | M |
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| Course Name: **Application of Numerical Methods in**  **Civil Engineering (**7CE5A) |  | Year of Study: 2017 -18 |

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| **ANMCE** |  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |  | PO12 |
| **(7**CE5A**)** |  |  |
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| **C405.1** |  | H | H | M | L | M | L | L | L | M | M | M |  | M |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **C405.2** |  | H | H | M | L | M | L | L | L | M | M | M |  | M |
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| **C405.3** |  | H | H | M | L | M | L | L | L | M | M | M |  | M |
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| **C405.4** |  | H | H | H | L | M | L | L | L | M | M | M |  | M |
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| Course Name: **Advance Transportation Engineering** **(**7CE6.1A) |  | Year of Study: 2017 -18 |

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| **ATE** | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| **(7**CE6.1A**)** |
| **C406.1** | H | H | M | M | M | L | M | H | M | M | L | M |
| **C406.2** | H | M | M | L | M | M | M | M | L | M | M | H |
| **C406.3** | M | M | H | M | L | H | M | L | H | M | H | H |
| **C406.4** | M | L | H | M | H | L | M | L | M | H | L | H |
| **C406.5** | M | L | H | M | M | H | L | M | L | M | L | H |