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| Image result for nit meghalaya logo | **National Institute of Technology Meghalaya**An Institute of National Importance | **CURRICULUM** |
| Programme | **Bachelor of Technology in Civil Engineering** | Year of Regulation | **2019-20** |
| Department | **Civil Engineering** | Semester | **IV** |
| CourseCode | Course Name | **Pre requisite** | Credit Structure | Marks Distribution |
| L | T | P | C | INT | MID | END | Total |
| **CE216** | **Earthquake Engineering** | **Nil** | **3** | **0** | **0** | **3** | **50** | **50** | **100** | **200** |
| CourseObjectives | To introduce the basics of Earthquake Engineering  | Course Outcomes | CO1 | Able to apply the basics of Earthquake Engineering  |
| To understand the mechanism of earthquake wave propagation  | CO2 | Able to understand the earthquake wave generation and its propagation mechanism  |
| To explain about seismic measuring devices and scales  | CO3 | knowledge on earthquake measuring scales and instruments  |
| To explain how to do hazard assessment and mitigation and explain how do prepare a risk and microzonation mapping  | CO4 | Able to understand the quantification of earthquake intensity and ground motion.  |
| To explain about various seismic protection methods  | CO5 | Able to identify the method to protect the structure from seismic forces. |
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| No. | COs | Mapping with Program Outcomes (POs) | Mapping with PSOs |
| PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| 1 | CO1 | 3 | 3 | 2 | 2 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 3 |
| 2 | CO2 | 3 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 3 |
| 3 | CO3 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 3 |
| 4 | CO4 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 3 |
| 5 | CO5 | 3 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | CO6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SYLLABUS |
| No. | Content | Hours | COs |
| I | **Introduction**Importance of earthquake engineering, earth structure, plate tectonics, faults, earthquake generation mechanism, terminologies | 06 | CO1 |
| II | **Earthquake propagation**Seismic waves in earthquake shaking, body waves and surface waves, attenuation of wave amplitudes, local site effects, Indian seismicity, seismic zones of India | 08 | CO1, CO2 |
| III | **Measurement of earthquakes**Intensity scales, seismographs and seismograms, magnitude scales, seismic moment and moment magnitude, accelerographs and accelerograms | 08 | CO1, CO3 |
| IV | **Seismic hazard assessment** Ground motion intensity at given site and in given time interval, probabilistic and semi-probabilistic approaches, seismic zonation and microzonation maps | 08 | CO3, CO4 |
| V | **Seismic protection methods**Base isolation, energy dissipating devices, codal provisions | 06 | CO5 |
| **Total Hours** | **36** |  |
| **Essential Readings** |
| 1. R. Villaverde, “Fundamental Concepts of Earthquake Engineering”, 1st Edition, CRC Press, 2009
 |
| 1. S. Elnashai and L. Di Sarno, “Fundamentals of Earthquake Engineering”, 1st Edition, John Wiley and Sons, 2008
 |
| 1. P. Agarwal and M. Shrikhande, “Earthquake Resistant Design of Structures”, Prentice- Hall of India, New Delhi, 2003.
 |
| **Supplementary Readings** |
| 1. K.E. Bullen K.E, “Introduction to the Theory of Seismology”, Great Britain at the University Printing houses, Cambridge University Press 1996.
 |
| 1. Krammer S.L., Geotechnical Earthquake Engineering, Prentice Hall, International Series, Pearson Education (Singapore) Pvt. Ltd., 2004.
 |
| 1. S K Duggal, “Earthquake Resistant Design of Structures”, Oxford University Press, 2007.
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| 1. IS-1893 (part-1), “Criteria for earthquake resistant design of structures” - general provision of buildings, 2016
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