

**DEPARTMENT OF EARTHQUAKE ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

Program Code : **XXX M.Tech. (Structural Dynamics)**
 Department : **Department of Earthquake Engineering**
 Year : **I**
 Model : **2**

| Teaching Scheme | | | | | Contact Hours/Week | | | Exam Duration | |
|-----------------------------|--------------|--|--------------|--------------|--------------------|---|---|---------------|-----------|
| S.No. | Subject Code | Course Title | Subject Area | Credits | L | T | P | Theory | Practical |
| Semester-I (Autumn) | | | | | | | | | |
| 1. | EQC-503 | Finite Element Method | PCC | 4 | 3 | 0 | 2 | 3 | 0 |
| 2. | EQC-511 | Structural Dynamics | PCC | 4 | 3 | 0 | 2 | 3 | 0 |
| 3. | EQC-513 | Earthquake Resistant Design of Structures | PCC | 4 | 3 | 0 | 2 | 3 | 0 |
| 4. | EQC-515 | Continuum Mechanics of Solids | PCC | 3 | 2 | 1 | 0 | 3 | 0 |
| 5. | | Program Elective-I | PEC | 3/4 | - | - | - | - | - |
| 6. | | Social Science Course | SSC | 2 | - | - | - | - | - |
| | | Total | | 20/21 | | | | | |
| Semester-II (Spring) | | | | | | | | | |
| 1. | | Program Elective-II | PEC | 4 | - | - | - | - | - |
| 2. | | Program Elective-III | PEC | 4 | - | - | - | - | - |
| 3. | | Program Elective-IV | PEC | 4 | - | - | - | - | - |
| 4. | | Science, Technology, and Advanced Research-tools | STAR | 3 | - | - | - | - | - |
| 5. | EQC-700 | Seminar | SEM | 2 | - | - | - | - | - |
| | | Total | | 17 | | | | | |

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INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

Program Code : **XXX M.Tech. (Structural Dynamics)**
 Department : **Department of Earthquake Engineering**
 Year : **II**
 Model : **2**

| Teaching Scheme | | | | | Contact Hours/Week | | | Exam Duration | |
|-----------------------------|--------------|----------------------------|--------------|-----------|--------------------|---|---|---------------|-----------|
| S.No. | Subject Code | Course Title | Subject Area | Credits | L | T | P | Theory | Practical |
| Semester-I (Autumn) | | | | | | | | | |
| 1. | EQC-691 | Internship Social Activity | ISA | 3 | - | - | - | - | - |
| 2. | EQC-701A | Thesis Stage-I | THESIS | 10 | - | - | - | - | - |
| | | Total | | 13 | | | | | |
| Semester-II (Spring) | | | | | | | | | |
| 1. | EQC-701B | Thesis Stage-II | THESIS | 14 | - | - | - | - | - |
| | | Total | | 14 | | | | | |

| Summary | | | | |
|------------------------------------|--------------|----|----|----|
| Semester | 1 | 2 | 3 | 4 |
| Semester-wise Total Credits | 20/21 | 17 | 13 | 14 |
| Total Credits | 64/65 | | | |

M.Tech. (Structural Dynamics)

Program Elective Courses

| Teaching Scheme | | | | | Contact Hours/Week | | | Exam Duration | |
|-----------------|--------------|---|--------------|---------|--------------------|---|---|---------------|-----------|
| S.No. | Subject Code | Course Title | Subject Area | Credits | L | T | P | Theory | Practical |
| 1. | EQL-501 | Dynamic Soil Structure Interaction | PEC | 4 | 3 | 1 | 0 | 3 | 0 |
| 2. | EQL-502 | Ground Improvement Techniques | PEC | 4 | 3 | 1 | 0 | 3 | 0 |
| 3. | EQL-503 | Machine Foundation | PEC | 4 | 3 | 1 | 0 | 3 | 0 |
| 4. | EQL-504 | Seismic Slope Stability: Earth Dams & Retaining Walls | PEC | 4 | 3 | 1 | 0 | 3 | 0 |
| 5. | EQL-505 | Constitutive Modelling in Soil Dynamics | PEC | 4 | 3 | 1 | 0 | 3 | 0 |
| 6. | EQL-506 | Offshore Geotechnical Engineering | PEC | 4 | 3 | 1 | 0 | 3 | 0 |
| 7. | EQL-507 | Numerical Methods for Dynamic Systems | PEC | 4 | 3 | 1 | 0 | 3 | 0 |
| 8. | EQL-508 | Advanced Earthquake Resistant Design of Structures | PEC | 4 | 3 | 1 | 0 | 3 | 0 |
| 9. | EQL-509 | Earthquake Resistant Design of Masonry Structures | PEC | 4 | 3 | 1 | 0 | 3 | 0 |
| 10. | EQL-510 | Seismic Evaluation and Retrofitting of Structures | PEC | 4 | 3 | 1 | 0 | 3 | 0 |
| 11. | EQL-511 | Earthquake Resistant Design of Bridges | PEC | 4 | 3 | 1 | 0 | 3 | 0 |
| 12. | EQL-512 | Earthquake Resistant Design of Steel Structures | PEC | 4 | 3 | 1 | 0 | 3 | 0 |
| 13. | EQL-513 | Structural Response Control for Seismic Protection | PEC | 4 | 3 | 1 | 0 | 3 | 0 |
| 14. | EQL-514 | Random Vibration | PEC | 4 | 3 | 1 | 0 | 3 | 0 |
| 15. | EQL-515 | Reliability Based Design | PEC | 4 | 3 | 1 | 0 | 3 | 0 |
| 16. | EQL-516 | Earthquake Resistant Design of Special Structures | PEC | 4 | 3 | 1 | 0 | 3 | 0 |
| 17. | EQL-517 | Experimental Techniques in Earthquake Engineering | PEC | 4 | 3 | 0 | 2 | 3 | 0 |
| 18. | EQL-518 | Mechanics of Deformable Media | PEC | 4 | 3 | 1 | 0 | 3 | 0 |
| 19. | EQL-519 | Seismic Microzonation | PEC | 4 | 3 | 1 | 0 | 3 | 0 |
| 20. | EQL-520 | Earthquake Precursors and Early Warning Systems | PEC | 4 | 3 | 1 | 0 | 3 | 0 |
| 21. | EQL-521 | Physics of Earthquakes | PEC | 4 | 3 | 1 | 0 | 3 | 0 |
| 22. | EQL-522 | Geoinformatics | PEC | 4 | 3 | 1 | 0 | 3 | 0 |
| 23. | EQL-523 | Risk Management and Insurance | PEC | 4 | 3 | 1 | 0 | 3 | 0 |

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Program Elective Courses

| Teaching Scheme | | | | | Contact Hours/Week | | | Exam Duration | |
|-----------------|--------------|--|--------------|---------|--------------------|---|---|---------------|-----------|
| S.No. | Subject Code | Course Title | Subject Area | Credits | L | T | P | Theory | Practical |
| 24. | EQC-501 | Dynamics of Soil and Structures | PEC | 4 | 3 | 0 | 2 | 3 | 0 |
| 25. | EQC-505 | Geotechnical Earthquake Engineering | PEC | 4 | 3 | 0 | 2 | 3 | 0 |
| 26. | EQC-507 | Earthquake Resistant Design of Foundations | PEC | 3 | 2 | 1 | 0 | 3 | 0 |
| 27. | EQC-521 | Seismological Modelling and Simulation | PEC | 4 | 3 | 0 | 2 | 3 | 0 |
| 28. | EQC-523 | Seismic Vulnerability and Risk Analysis | PEC | 4 | 3 | 0 | 2 | 3 | 0 |
| 29. | EQC-525 | Seismic Hazard Assessment | PEC | 3 | 2 | 1 | 0 | 3 | 0 |

Science, Technology, and Advanced Research-tools Basket

| Teaching Scheme | | | | | Contact Hours/Week | | | Exam Duration | |
|-----------------|--------------|---------------------------------------|--------------|---------|--------------------|---|---|---------------|-----------|
| S.No. | Subject Code | Course Title | Subject Area | Credits | L | T | P | Theory | Practical |
| 1. | EQT-501 | High Performance Scientific Computing | STAR | 3 | 3 | 0 | 0 | 3 | 0 |