**MOHAMED SATHAK A J COLLEGE OF ENGINEERING**
Sponsored by Mohamed Sathak Trust
(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)
Siruseri IT Park, Egattur, Chennai 603 103

# M.E - STRUCTURAL ENGINEERING

# ANNA UNIVERSITY – AFFILIATED INSTITUTIONS

# REGULATION – 2017

# CHOICE BASED CREDIT SYSTEM (CBCS)

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MOHAMED SATHAK A.J.COLLEGE OF ENGINEERING
34, Rajiv Gandhi Road (OMR), Siruseri, IT Park
Chennai-603 103.

**ANNA UNIVERSITY, CHENNAI**
**AFFLIATED INSTITUTIONS**
**REGULATIONS – 2017**
**CHOICE BASED CREDIT SYSTEM**
**M. E. STRUCTURAL ENGINEERING**

**PROGRAMME EDUCATIONAL OBJECTIVES (PEOs) :**

I. To prepare students to excel in research and to succeed in Structural engineering profession through global, rigorous post graduate education

II. To provide students with a solid foundation in mathematical, scientific and engineering fundamentals required to solve structural engineering problems

III. To train students with good scientific and engineering knowledge so as to comprehend, analyze, design, and create novel products and solutions for the real life problems

IV. To inculcate students in professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach, and an ability to relate structural engineering issues to broader social context.

V. To provide student with an academic environment aware of excellence, leadership, written ethical codes and guidelines, and the life-long learning needed for a successful professional career

**PROGRAMME OUTCOMES (POs):**

On successful completion of the programme,

1. Graduates will demonstrate knowledge of mathematics, science and engineering.
2. Graduates will demonstrate an ability to identify, formulate and solve engineering problems.
3. Graduate will demonstrate an ability to design and conduct experiments, analyze and interpret data.
4. Graduates will demonstrate an ability to design a system, component or process as per needs and specifications.
5. Graduates will demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks.
6. Graduate will demonstrate skills to use modern engineering tools, software and equipment to analyze problems.
7. Graduates will demonstrate knowledge of professional and ethical responsibilities.
8. Graduate will be able to communicate effectively in both verbal and written form.
9. Graduate will show the understanding of impact of engineering solutions on the society and also will be aware of contemporary issues.
10. Graduate will develop confidence for self education and ability for life-long learning.

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| Programme Educational Objectives | Programme Outcomes | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 |
| I | ✓ | ✓ | | ✓ | | | | | | |
| II | | | | | ✓ | ✓ | ✓ | | | |
| III | | | | ✓ | ✓ | ✓ | ✓ | | | |
| IV | | | | | | | ✓ | ✓ | ✓ | |
| V | | ✓ | ✓ | | | | | | ✓ | ✓ |

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| | | | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YEAR 1 | SEM 1 | Advanced Mathematical Methods | ✓ | | | | | | | | | |
| | | Advanced Concrete Structures | | | | ✓ | ✓ | | | | | |
| | | Dynamics of Structures | ✓ | ✓ | ✓ | | ✓ | | | | | |
| | | Theory of Elasticity and Plasticity | ✓ | ✓ | | | | | | | | |
| | | Professional Elective I | | | | | | | | | | |
| | | Professional Elective II | | | | | | | | | | |
| | | | | | | | | | | | | |
| | SEM 2 | Advanced Steel Structures | | ✓ | | ✓ | | | | | ✓ | |
| | | Stability of Structures | | ✓ | | ✓ | | | | | ✓ | |
| | | Earthquake Analysis and Design of Structures | | ✓ | ✓ | | | | | | | |
| | | Experimental Techniques | | ✓ | ✓ | ✓ | | ✓ | | | ✓ | |
| | | Finite Element Analysis of Structures | ✓ | | | | | ✓ | | | ✓ | |
| | | Professional Elective III | | | | | | | | | | |
| | | Professional Elective IV | | | | | | | | | | |
| | | Advanced Structural Engineering Laboratory | | ✓ | | ✓ | ✓ | ✓ | | | | |
| | | Practical Training I (2 weeks) | | | | ✓ | | | ✓ | ✓ | | ✓ |
| | | | | | | | | | | | | |
| YEAR 2 | SEM 1 | Earthquake Analysis and Design of Structures | | | | | | | | | | |
| | | Professional Elective V | | | | | | | | | | |
| | | Professional Elective VI | | | | | | | | | | |
| | | Practical Training II (2 weeks) | | | | ✓ | | | ✓ | ✓ | | ✓ |
| | | Seminar | | | | | | | | ✓ | | |
| | | Project Work (Phase I) | | ✓ | | ✓ | | | ✓ | | | ✓ |
| | | | | | | | | | | | | |
| | SEM 2 | Project Work (Phase II) | | ✓ | | ✓ | | | ✓ | | | ✓ |
| | | Practical Training III (2 weeks) | | | | ✓ | | | ✓ | ✓ | | ✓ |
| | | | | | | | | | | | | |

M.E Struc.



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## Professional Electives (PE)

| Course Name | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Maintenance and Rehabilitation of Structures | | | | | ✓ | ✓ | | | ✓ | |
| Prefabricated Structures | | ✓ | ✓ | ✓ | | | | | ✓ | ✓ |
| Offshore Structures | | ✓ | | | | | | | ✓ | |
| Analysis and Design of Tall Buildings | ✓ | ✓ | | ✓ | | ✓ | | | ✓ | ✓ |
| Theory of Plates | ✓ | | | ✓ | | | | | | |
| Matrix Methods for Structural Analysis | ✓ | | | | | ✓ | | | | |
| Mechanics of Composite Materials | | ✓ | | ✓ | ✓ | | | | | |
| Industrial Structures | | ✓ | | ✓ | | | | | | |
| Pre-stressed Concrete | | ✓ | | ✓ | | ✓ | | | ✓ | ✓ |
| Wind and Cyclone Effects on Structures | | ✓ | | ✓ | | ✓ | | | ✓ | ✓ |
| Nonlinear Analysis Structures | | | ✓ | | | | | | | |
| Design of Sub Structures | ✓ | ✓ | | ✓ | | ✓ | | | ✓ | ✓ |
| Optimization of Structures | ✓ | | | | | ✓ | | | | |
| Design of Steel Concrete Composite Structures | | ✓ | | ✓ | | | | | | |
| Design of Bridges | | ✓ | | ✓ | | ✓ | | | | |
| Design of Shell and Spatial Structures | | | | ✓ | | ✓ | | | | |
| Computer Aided Analysis and Design | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | |

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**CHOICE BASED CREDIT SYSTEM**
**CURRICULA AND SYLLABI**

## SEMESTER I

| S.No. | COURSE CODE | COURSE TITLE | CATEGORY | CONTACT PERIODS | L | T | P | C |
|---|---|---|---|---|---|---|---|---|
| **THEORY** | | | | | | | | |
| 1. | MA5151 | Advanced Mathematical Methods | FC | 4 | 4 | 0 | 0 | 4 |
| 2. | ST5101 | Advanced Concrete Structures | PC | 3 | 3 | 0 | 0 | 3 |
| 3. | ST5102 | Dynamics of Structures | PC | 3 | 3 | 0 | 0 | 3 |
| 4. | ST5103 | Theory of Elasticity and Plasticity | PC | 3 | 3 | 0 | 0 | 3 |
| 5. | | Professional Elective I | PE | 3 | 3 | 0 | 0 | 3 |
| 6. | | Professional Elective II | PE | 3 | 3 | 0 | 0 | 3 |
| | | | **TOTAL** | **19** | **19** | **0** | **0** | **19** |

## SEMESTER II

| S.No. | COURSE CODE | COURSE TITLE | CATEGORY | CONTACT PERIODS | L | T | P | C |
|---|---|---|---|---|---|---|---|---|
| **THEORY** | | | | | | | | |
| 1. | ST5201 | Advanced Steel Structures | PC | 3 | 3 | 0 | 0 | 3 |
| 2. | ST5202 | Stability of Structures | PC | 3 | 3 | 0 | 0 | 3 |
| 3. | ST5203 | Experimental Techniques | PC | 3 | 3 | 0 | 0 | 3 |
| 4. | ST5204 | Finite Element Analysis of Structures | PC | 3 | 3 | 0 | 0 | 3 |
| 5. | | Professional Elective III | PE | 3 | 3 | 0 | 0 | 3 |
| 6. | | Professional Elective IV | PE | 3 | 3 | 0 | 0 | 3 |
| **PRACTICAL** | | | | | | | | |
| 7. | ST5211 | Advanced Structural Engineering Laboratory | PC | 4 | 0 | 0 | 4 | 2 |
| 8. | ST5212 | Practical Training I (2 weeks) | EEC | 0 | 0 | 0 | 0 | 1 |
| | | | **TOTAL** | **22** | **18** | **0** | **4** | **21** |

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## SEMESTER III

| S.No. | COURSE CODE | COURSE TITLE | CATEGORY | CONTACT PERIODS | L | T | P | C |
|---|---|---|---|---|---|---|---|---|
| **THEORY** | | | | | | | | |
| 1. | ST5301 | Earthquake Analysis and Design of Structures | PC | 3 | 3 | 0 | 0 | 3 |
| 2. | | Professional Elective V | PE | 3 | 3 | 0 | 0 | 3 |
| 3. | | Professional Elective VI | PE | 3 | 3 | 0 | 0 | 3 |
| **PRACTICAL** | | | | | | | | |
| 4. | ST5311 | Practical Training II (2 weeks) | EEC | 0 | 0 | 0 | 0 | 1 |
| 5. | ST5312 | Seminar | EEC | 2 | 0 | 0 | 2 | 1 |
| 6. | ST5313 | Project Work (Phase I) | EEC | 12 | 0 | 0 | 12 | 6 |
| | | | **TOTAL** | **23** | **9** | **0** | **14** | **17** |

## SEMESTER IV

| S.No. | COURSE CODE | COURSE TITLE | CATEGORY | CONTACT PERIODS | L | T | P | C |
|---|---|---|---|---|---|---|---|---|
| **PRACTICAL** | | | | | | | | |
| 1. | ST5411 | Practical Training III (2 weeks) | EEC | 0 | 0 | 0 | 0 | 1 |
| 2. | ST5412 | Project Work (Phase II) | EEC | 24 | 0 | 0 | 24 | 12 |
| | | | **TOTAL** | **24** | **0** | **0** | **24** | **13** |

**TOTAL NO. OF CREDITS: 70**

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## FOUNDATION COURSES (FC)

| S.No. | COURSE CODE | COURSE TITLE | CATEGORY | CONTACT PERIODS | L | T | P | C |
|---|---|---|---|---|---|---|---|---|
| 1. | MA5151 | Advanced Mathematical Methods | FC | 4 | 4 | 0 | 0 | 4 |

## PROFESSIONAL CORE (PC)

| S.No. | COURSE CODE | COURSE TITLE | CATEGORY | CONTACT PERIODS | L | T | P | C |
|---|---|---|---|---|---|---|---|---|
| 1. | ST5101 | Advanced Concrete Structures | PC | 3 | 3 | 0 | 0 | 3 |
| 2. | ST5102 | Dynamics of Structures | PC | 3 | 3 | 0 | 0 | 3 |
| 3. | ST5103 | Theory of Elasticity and Plasticity | PC | 3 | 3 | 0 | 0 | 3 |
| 4. | ST5201 | Advanced Steel Structures | PC | 3 | 3 | 0 | 0 | 3 |
| 5. | ST5202 | Stability of Structures | PC | 3 | 3 | 0 | 0 | 3 |
| 6. | ST5203 | Experimental Techniques | PC | 3 | 3 | 0 | 0 | 3 |
| 7. | ST5204 | Finite Element Analysis of Structures | PC | 3 | 3 | 0 | 0 | 3 |
| 8. | ST5211 | Advanced Structural Engineering Laboratory | PC | 4 | 0 | 0 | 4 | 2 |
| 9. | ST5301 | Earthquake Analysis and Design of Structures | PC | 3 | 3 | 0 | 0 | 3 |

## PROFESSIONAL ELECTIVES

### SEMESTER I

### ELECTIVE I & II

| S.No. | COURSE CODE | COURSE TITLE | CATEGORY | CONTACT PERIODS | L | T | P | C |
|---|---|---|---|---|---|---|---|---|
| 1. | ST5001 | Maintenance and Rehabilitation of Structures | PE | 3 | 3 | 0 | 0 | 3 |
| 2. | ST5002 | Prefabricated Structures | PE | 3 | 3 | 0 | 0 | 3 |
| 3. | ST5003 | Offshore Structures | PE | 3 | 3 | 0 | 0 | 3 |
| 4. | ST5004 | Matrix Methods for Structural Analysis | PE | 3 | 3 | 0 | 0 | 3 |

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## SEMESTER II

### ELECTIVE III & IV

| S.No. | COURSE CODE | COURSE TITLE | CATEGORY | CONTACT PERIODS | L | T | P | C |
|---|---|---|---|---|---|---|---|---|
| 1. | ST5005 | Theory of Plates | PE | 3 | 3 | 0 | 0 | 3 |
| 2. | ST5006 | Mechanics of Composite Materials | PE | 3 | 3 | 0 | 0 | 3 |
| 3. | ST5007 | Analysis and Design of Tall Buildings | PE | 3 | 3 | 0 | 0 | 3 |
| 4. | ST5008 | Industrial Structures | PE | 3 | 3 | 0 | 0 | 3 |
| 5. | ST5009 | Prestressed Concrete | PE | 3 | 3 | 0 | 0 | 3 |
| 6. | ST5010 | Wind and Cyclone Effects on Structures | PE | 3 | 3 | 0 | 0 | 3 |

## SEMESTER III

### ELECTIVE V & VI

| S.No. | COURSE CODE | COURSE TITLE | CATEGORY | CONTACT PERIODS | L | T | P | C |
|---|---|---|---|---|---|---|---|---|
| 1. | ST5011 | Nonlinear Analysis of Structures | PE | 3 | 3 | 0 | 0 | 3 |
| 2. | ST5012 | Design of Sub Structures | PE | 3 | 3 | 0 | 0 | 3 |
| 3. | ST5013 | Optimization of Structures | PE | 3 | 3 | 0 | 0 | 3 |
| 4. | ST5014 | Design of Steel Concrete Composite Structures | PE | 3 | 3 | 0 | 0 | 3 |
| 5. | ST5015 | Design of Bridges | PE | 3 | 3 | 0 | 0 | 3 |
| 6. | ST5016 | Design of Shell and Spatial Structures | PE | 3 | 3 | 0 | 0 | 3 |
| 7. | ST5017 | Computer Aided Analysis and Design | PE | 4 | 2 | 0 | 2 | 3 |

## EMPLOYABILITY ENHANCEMENT COURSES (EEC)

| S.No. | COURSE CODE | COURSE TITLE | CATEGORY | CONTACT PERIODS | L | T | P | C |
|---|---|---|---|---|---|---|---|---|
| 1. | ST5212 | Practical Training I (2 weeks) | EEC | - | - | - | - | 1 |
| 2. | ST5311 | Practical Training II (2 weeks) | EEC | - | - | - | - | 1 |
| 3. | ST5411 | Practical Training III (2 weeks) | EEC | - | - | - | - | 1 |
| 4. | ST5312 | Seminar | EEC | 2 | 0 | 0 | 2 | 1 |
| 5. | ST5313 | Project Work (Phase I) | EEC | 12 | 0 | 0 | 12 | 6 |
| 6. | ST5412 | Project Work (Phase II) | EEC | 24 | 0 | 0 | 24 | 12 |

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