## Competitive Examinations Preparation (CEP): (Extra credits=2)

**Salient Features of CEP:**

- It is optional module
- Motivation, mentoring and preparation of students to pursue higher education
- Modules as per national level technical competitive examination **GATE**
- Motivation, mentoring and preparation of students to join public sector or government organizations like BARC, DRDO etc.
- Motivation, mentoring and preparation of students to join top ranking technical institutes in country like IISc and IIT.
- Module design as per the courses studies in that semester or prior semester by considering syllabus of GATE examination
- Help to sharpen the problem solving skills of students and concerned teachers
- Course mentors will be allotted at the start of academic year
- Two (2) extra credits will be given if
    1. Student submit **Valid Gate Score card**.
    2. Must pass CEP1 to CEP6 in modal question papers given by the faculty
    3. Maintains regular contact with CEP course teachers

**CEP Courses:**

**Semester III:**
**CEP1: Introduction to CEP**

One hour introduction session to entire class about CEP.

Student shall be assigned as 'Teaching Assistant' to Engineering Mathematics Course –I.
Student shall maintain regular contact with the semester III course teachers (once in a week per course). Teacher shall maintain the attendance of the student. Teacher shall mentor student and give assignments with GATE level problems to solve. At least TWO assignments per course shall be submitted by the student.

After End Semester Examination student shall appear for the Model Test paper based on the pattern of the actual GATE Examination. This paper shall be based on the contents of Semester-I and Semester-III courses. The negative marking is applicable as per GATE pattern.
The student shall obtain minimum 10 marks to continue registration in CEP module for next semester onwards.

**Semester IV:**
**CEP2: Problem solving module-I**

Student shall be assigned as 'Teaching Assistant' to Engineering Mathematics Course–II and Basics of electrical Engineering.
Student shall maintain regular contact with the semester IV course teachers (once in a week per course). Teacher shall maintain the attendance of the student. Teacher shall mentor student and give assignments with GATE level problems to solve. At least TWO assignments per course shall be submitted by the student.

After End Semester Examination student shall appear for the Model Test paper based on the pattern of the actual GATE Examination. This paper shall be based on the contents of Semester-II and Semester-IV courses. The negative marking is applicable as per GATE pattern.
The student shall obtain minimum 10 marks to continue registration in CEP module for next semester onwards.

**Semester V:**
**CEP3: Problem solving module-II**

Student shall be assigned as 'Teaching Assistant' to Semester III courses.
Student shall maintain regular contact with the semester V course teachers (once in a week per course). Teacher shall maintain the attendance of the student. Teacher shall mentor student and give assignments with GATE level problems to solve. At least TWO assignments per course shall be submitted by the student.

After End Semester Examination student shall appear for the Model Test paper based on the pattern of the actual GATE Examination. This paper shall be based on the contents of Semester-V courses. The negative marking is applicable as per GATE pattern.
The student shall obtain minimum 10 marks to continue registration in CEP module for next semester onwards.

**Semester VI:**
**CEP4: Problem solving module –III**

Student shall be assigned as 'Teaching Assistant' to Semester IV courses.

Self-Learning: Numerical Ability and Verbal Ability

Student shall maintain regular contact with the semester VI course teachers (once in a week per course). Teacher shall maintain the attendance of the student. Teacher shall mentor student and give assignments with GATE level problems to solve. At least TWO assignments per course shall be submitted by the student.

After End Semester Examination student shall appear for the Model Test paper based on the pattern of the actual GATE Examination. This paper shall be based on the contents of Semester

VI courses and self-learning module on numerical ability and verbal ability. The negative marking is applicable as per GATE pattern.
The student shall obtain minimum 10 marks to continue registration in CEP module for next semester onwards.

**Semester VII:**
**CEP5: Problem solving module-IV**

Student shall be assigned as 'Teaching Assistant' to Semester V courses.

Self-Learning: Contents not covered in any semester of study

Student shall maintain regular contact with the semester VII course teachers (once in a week per course).Teacher shall maintain the attendance of the student. Teacher shall mentor student and give assignments with GATE level problems to solve.
At least TWO assignments per course shall be submitted by the student.

After End Semester Examination student shall appear for the Model Test paper based on the pattern of the actual GATE Examination. This paper shall be based on the contents of entire syllabus of GATE Examination. The negative marking is applicable as per GATE pattern.
The student shall obtain minimum 10 marks to continue registration in CEP module for next semester onwards.

**Semester VIII:**
**CEP6: Problem solving module-V**

At the start of the semester student shall appear for the TWO Model Test papers based on the pattern of the actual GATE Examination. This paper shall be based on the contents of entire syllabus of GATE Examination. The negative marking is applicable as per GATE pattern.

**Student shall submit 'Valid GATE Score Card' after declaration of GATE result.**

# Mapping with Syllabus for GATE Exam (Semester-wise)

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| **Semester - I** |
| **Engineering Mathematics-I :**Linear Algebra: Matrices, determinants, system of linear equations, Calculus:. Maxima and minima. |
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| **Semester-II** |
| **Engineering mathematics –II:** Integration. |
| **Programming Methodology and Data Structures:** Programming in C. Recursion. Arrays, stacks, queues, linked lists. |
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| **Semester-III** |
| **Advanced Data Structures:** linked lists, trees, binary search trees, binary heaps, graphs, Graph search, hashing. |
| **Digital Logic Design and Analysis:** Number representations, Combinational and sequential circuits. Minimization. |
| **Discrete Structures and Graph Theory:** Boolean algebra, Propositional and first order logic. Sets, relations, functions, partial orders and lattices. Groups. Graphs: connectivity, matching, coloring.recurrence relations, generating functions. |
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| **Semester-IV** |
| **Applied Mathematics-II:** Linear Algebra: eigenvalues and eigenvectors Matrices, determinants, Probability: Random variables, poisson and binomial distributions. and Bayes theorem. |
| **Analysis of Algorithms:** Searching, sorting, Asymptotic worst case time and space complexity. Algorithm design techniques: greedy, dynamic programming and divide and conquer, minimum spanning trees, shortest paths. |
| **Database Management Systems:** ER-model. Relational model: relational algebra, tuple calculus, SQL. Integrity constraints, normal forms. . Transactions and concurrency control. |
| **Operating Systems:**Processes, threads, inter-process communication, concurrency and synchronization. Deadlock. CPU scheduling. Memory management. File systems. |
| **Computer Organization and Architecture:** computer arithmetic (fixed and floating point), ALU, data path and control unit. Instruction pipelining. Memory hierarchy: cache, main memory and secondary storage; I/O interface (interrupt and DMA mode),virtual memory |
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| **Semester V:** |
| **Computer Networks:** Concept of layering. LAN technologies (Ethernet). Flow and error control techniques, switching. IPv4/IPv6, routers and routing algorithms (distance vector, link state). TCP/UDP and sockets, congestion control. Application layer protocols (DNS, SMTP, POP, FTP, HTTP). Basics of Wi-Fi. Network security: authentication, basics of public key and private key cryptography, digital signatures and certificates, firewalls. |
| **Theory of Computer Science:** Regular expressions and finite automata. Context-free grammars and push-down automata. Regular and contex-free languages, pumping lemma. Turing machines and undecidability. |

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| **Microprocessor :-**Machine instructions and addressing modes. |
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| **Semester VI:** |
| **System Programming and Compiler Construction:** Lexical analysis, parsing, syntax-directed translation. Runtime environments. Intermediate code generation. |
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| **Covered in previous standards:-** |
| Mean, median, mode and standard deviation. Conditional probability, Limits, continuity and differentiability |
| **Not covered in any Semester** |
| LU decomposition, Mean value theorem, Combinatorics: counting, File organization, indexing (e.g., B and B+ trees) |

## Self Learning Module: General Aptitude

**I. Verbal Ability**

1. Grammar
2. Nouns, Pronouns, Articles
3. Verbs, Auxiliaries, Modals
4. Adjectives, Adverbs
5. Prepositions, Conjunctions
6. Active/ Passive Voice, Direct/ Indirect Speech
7. Verbal phrases
8. Sentence Completion
9. Vocabulary
10. Synonyms
11. Antonyms
12. Analogy
13. Reverse Analogy
14. Verbal Reasoning
15. Critical Reasoning
16. Logical Reasoning

**II. Numerical Ability**

**I. Quantitative Aptitude:**

1. Simple Equations
2. Ratio-proportion-variation
3. Numbers
4. Percentage, Profit and Loss
5. Simple Interest and Compound Interest
6. Average, mixtures and Alligations

7. Time and Work
8. Time and Distance
9. Indices, Surds, Logarithms
10. Quadratic Equations
11. Inequalities
12. Progressions
13. Permutations and Combinations
14. Data Interpretation

**II. Reasoning**

1. Number and Letter Series
2. Analogies
3. Odd man out (Classification)
4. Coding and Decoding
5. Blood relations
6. Venn Diagrams
7. Seating Arrangements
8. Puzzles
9. Clocks and Calendars