

BARC OCES Syllabus 2023

BARC OCES Syllabus for Engineering Stream

Civil Engineering

- ✓ Structural Analysis
- ✓ Environmental Engineering
- ✓ Strength of Materials
- ✓ Surveying
- ✓ Soil Engineering
- ✓ Construction Materials & Concrete Structures
- ✓ Fluid Mechanics
- ✓ Design of Steel Structures
- ✓ Transportation Engineering
- ✓ Hydrology & Irrigation
- ✓ Engineering Mathematics: Probability, Differential Equations, Laplace, Linear Algebra, Calculus.

Computer Science

- ✓ Algorithms
- ✓ Programming and Data Structures
- ✓ Computer Networks
- ✓ Computer Organization and Architecture
- ✓ Databases
- ✓ Operating System
- ✓ Digital Logic
- ✓ Theory of Computation & Compiler Design
- ✓ Discrete Mathematics
- ✓ Software Engineering
- ✓ Engineering Mathematics: Probability, Differential Equations, Laplace, Linear Algebra, Calculus.

Electrical Engineering

- ✓ Electromagnetics
- ✓ Analog Electronics
- ✓ Digital Electronics

- ✓ Measurement & Instrumentation
- ✓ Control Systems
- ✓ Power System
- ✓ Network Theory
- ✓ Electrical Machines
- ✓ Power Electronics
- ✓ Signals & System
- ✓ Engineering Mathematics: Probability, Differential Equations, Laplace, Linear Algebra, Calculus.

Electronics & Communication 2022

- ✓ Analog Electronics
- ✓ Digital Electronics
- ✓ Electronic Devices and Circuits
- ✓ Networks
- ✓ Computer Engineering
- ✓ Measurements and Instrumentation
- ✓ Control Systems
- ✓ Signals & Systems
- ✓ Communication
- ✓ Electromagnetics
- ✓ Engineering Mathematics: Probability, Differential Equations, Laplace, Linear Algebra, Calculus.

Mechanical Engineering

- ✓ Strength of Materials
- ✓ Thermodynamics
- ✓ Machine Design
- ✓ Fluid Mechanics
- ✓ Production
- ✓ Theory of Machines
- ✓ Heat transfer
- ✓ Engineering Mechanics
- ✓ Industrial Engineering

- ✓ Engineering Materials
- ✓ Engineering Mathematics: Probability, Differential Equations, Laplace, Linear Algebra, Calculus.

Instrumentation Engineering

- ✓ Electrical Circuits
- ✓ Signals and Systems
- ✓ Control Systems
- ✓ Analog Electronics
- ✓ Digital Electronics
- ✓ Measurements
- ✓ Sensors and Industrial Instrumentation
- ✓ Communication and Optical Instrumentation
- ✓ Engineering Mathematics: Probability, Differential Equations, Laplace, Linear Algebra, Calculus

Chemical Engineering

- ✓ Process Calculations and Thermodynamics
- ✓ Fluid Mechanics and Mechanical Operations
- ✓ Heat Transfer
- ✓ Mass Transfer
- ✓ Chemical Reaction Engineering
- ✓ Instrumentation and Process Control
- ✓ Plant Design and Economics
- ✓ Chemical Technology
- ✓ Engineering Mathematics: Probability, Differential Equations, Laplace, Linear Algebra, Calculus.

BARC OCES Syllabus for Science Stream

1- Chemistry

➤ PHYSICAL CHEMISTRY

- ✓ Basic Mathematical Concepts:
- ✓ Atomic and Molecular Structure:
- ✓ Theory of Gases:
- ✓ Solid-state:
- ✓ Chemical Thermodynamics:

- ✓ Chemical and Phase Equilibria:
- ✓ Electrochemistry:
- ✓ Chemical Kinetics:
- ✓ Adsorption:
- ✓ Spectroscopy:

➤ **ORGANIC CHEMISTRY**

- ✓ Basic Concepts in Organic Chemistry and Stereochemistry:
- ✓ Organic Reaction Mechanism and Synthetic Applications:
- ✓ Qualitative Organic Analysis:
- ✓ Natural Products Chemistry:
- ✓ Aromatic and Heterocyclic Chemistry:

➤ **INORGANIC CHEMISTRY**

- ✓ Periodic Table:
- ✓ Chemical Bonding and Shapes of Compounds:
- ✓ Main Group Elements (s and p blocks):
- ✓ Transition Metals (d block):
- ✓ Bioinorganic Chemistry:
- ✓ Instrumental Methods of Analysis:
- ✓ Analytical Chemistry:

2- Geology

- ✓ The Planet Earth
- ✓ Geomorphology
- ✓ Structural Geology
- ✓ Paleontology
- ✓ Stratigraphy
- ✓ Mineralogy
- ✓ Petrology
- ✓ Economic Geology
- ✓ Applied Geology

3- Bioscience

- ✓ General Biology:
- ✓ Basics of Biochemistry:
- ✓ Molecular Biology:
- ✓ Biophysics:
- ✓ Microbiology:
- ✓ Cell Biology:
- ✓ Immunology:
- ✓ Mathematical Sciences:

4- Physics

- ✓ Mathematical Methods:
- ✓ Mechanics and General Properties of Matter:
- ✓ Oscillations, Waves, and Optics:
- ✓ Electricity and Magnetism:
- ✓ Kinetic theory, Thermodynamics:
- ✓ Modern Physics:
- ✓ Solid State Physics, Devices and Electronics: