



SYLLABUS

ITI Fitter Course Syllabus

The ITI Fitter course is divided into 4 semesters. Below is the detailed syllabus for each semester:

1st Semester Syllabus

Trade Theory (Professional Knowledge)

Unit 1: Safety

- **Content:**
 - Safety rules and regulations
 - Hazard identification and prevention
 - Use of personal protective equipment (PPE)
 - Emergency procedures and first aid

Unit 2: Basic Fitting

- **Content:**
 - Introduction to fitting
 - Types of fittings
 - Use of fitting tools and equipment
 - Marking, cutting, and filing techniques

Unit 3: Drilling

- **Content:**
 - Drilling machines and operations
 - Types of drills and drill bits
 - Drilling techniques and safety precautions

Unit 4: Fitting Assembly

- **Content:**
 - Assembly techniques
 - Types of assemblies
 - Tolerances and fits
 - Use of assembly tools and equipment

Unit 5: Sheet Metal

- **Content:**
 - Types of sheet metals
 - Sheet metal tools and equipment
 - Cutting and bending operations
 - Sheet metal joints and fasteners

Unit 6: Turning

- **Content:**
 - Lathe machine operations
 - Types of lathes and their components
 - Turning techniques and safety precautions

Unit 7: Welding

- **Content:**
 - Introduction to welding
 - Types of welding and welding equipment
 - Welding techniques and safety precautions

Unit 8: Basic Maintenance

- **Content:**
 - Maintenance procedures
 - Types of maintenance
 - Tools and equipment for maintenance
 - Maintenance safety precautions

2nd Semester Syllabus NATIONAL AND RESEARCH INSTITUTE, HARIDWAR

Trade Theory (Professional Knowledge) विद्या सम्पत्तिः अस्ति

Unit 1: Advanced Fitting and Assembly

- **Content:**
 - Advanced fitting techniques
 - Complex assembly operations
 - Precision fitting and alignment

Unit 2: Drill Jig

- **Content:**
 - Types of drill jigs
 - Design and construction of drill jigs
 - Use of drill jigs in drilling operations

Unit 3: Gauges

- **Content:**
 - Types of gauges
 - Use of gauges in fitting
 - Calibration and maintenance of gauges

Unit 4: Repairing Techniques

- **Content:**
 - Types of repair techniques
 - Tools and equipment for repair
 - Repair procedures and safety precautions

Unit 5: Pipes and Pipe Fittings

- **Content:**
 - Types of pipes and pipe fittings
 - Pipe fitting tools and equipment
 - Pipe fitting techniques and safety precautions

Unit 6: Hydraulics & Pneumatics

- **Content:**
 - Introduction to hydraulics and pneumatics
 - Components of hydraulic and pneumatic systems
 - Operation and maintenance of hydraulic and pneumatic systems

Unit 7: Preventive Maintenance

- **Content:**
 - Importance of preventive maintenance
 - Preventive maintenance procedures
 - Tools and equipment for preventive maintenance

Unit 8: Erection and Testing

- **Content:**
 - Erection procedures
 - Testing methods and equipment
 - Safety precautions in erection and testing

3rd Semester Syllabus

Trade Theory (Professional Knowledge)

Unit 1: Assembly - 1

- **Content:**
 - Advanced assembly techniques

- Types of assemblies and their applications
- Use of assembly tools and equipment

Unit 2: Gauges

- **Content:**
 - Advanced gauge techniques
 - Use of gauges in precision fitting
 - Calibration and maintenance of gauges

Unit 3: Pipes and Pipe Fittings

- **Content:**
 - Advanced pipe fitting techniques
 - Types of pipe fittings and their applications
 - Use of pipe fitting tools and equipment

Unit 4: Hydraulics & Pneumatics

- **Content:**
 - Advanced hydraulics and pneumatics
 - Components and systems
 - Operation, maintenance, and troubleshooting

Unit 5: Preventive Maintenance

- **Content:**
 - Advanced preventive maintenance techniques
 - Tools and equipment for preventive maintenance
 - Safety precautions

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4th Semester Syllabus

Trade Theory (Professional Knowledge)

Unit 1: Erection and Testing

- **Content:**
 - Advanced erection techniques
 - Testing methods and equipment
 - Safety precautions

Unit 2: Project Work / Inplant Training

- **Content:**
 - Real-life applications and project work
 - Inplant training in an industrial setting
 - Application of theoretical knowledge in practical scenarios

Practical ITI Fitter Syllabus

1st Semester (Practical)

Unit 1: Safety

- **Content:**
 - Safety practices and use of PPE
 - Emergency procedures and first aid

Unit 2: Drilling

- **Content:**
 - Drilling machine operations
 - Drilling techniques and safety precautions

Unit 3: Basic Fitting

- **Content:**
 - Use of fitting tools and equipment
 - Marking, cutting, and filing techniques

Unit 4: Fitting Assembly

- **Content:**
 - Assembly techniques and use of assembly tools

Unit 5: Sheet Metal

- **Content:**
 - Cutting and bending operations
 - Sheet metal joints and fasteners

Unit 6: Turning

- **Content:**
 - Lathe machine operations
 - Turning techniques and safety precautions

Unit 7: Welding

- **Content:**
 - Welding techniques and safety precautions

Unit 8: Basic Maintenance

- **Content:**
 - Maintenance procedures and safety precautions

2nd Semester (Practical)

Unit 1: Advanced Fitting and Assembly

- **Content:**
 - Advanced fitting techniques
 - Complex assembly operations

Unit 2: Drill Jig

- **Content:**
 - Design and construction of drill jigs
 - Use of drill jigs in drilling operations

Unit 3: Gauges

- **Content:**
 - Use of gauges in fitting
 - Calibration and maintenance of gauges

Unit 4: Repairing Techniques

- **Content:**
 - Tools and equipment for repair
 - Repair procedures and safety precautions

Unit 5: Pipes and Pipe Fittings

- **Content:** EDUCATIONAL AND RESEARCH INSTITUTE, HARIDWAR
 - Pipe fitting techniques and safety precautions

Unit 6: Hydraulics & Pneumatics

- **Content:**
 - Operation and maintenance of hydraulic and pneumatic systems

Unit 7: Preventive Maintenance

- **Content:**
 - Preventive maintenance procedures and safety precautions

Unit 8: Erection and Testing

- **Content:**
 - Erection procedures and testing methods
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3rd Semester (Practical)

Unit 1: Assembly - 1

- **Content:**
 - Advanced assembly techniques
 - Use of assembly tools and equipment

Unit 2: Gauges

- **Content:**
 - Advanced gauge techniques
 - Use of gauges in precision fitting

Unit 3: Pipes and Pipe Fittings

- **Content:**
 - Advanced pipe fitting techniques
 - Use of pipe fitting tools and equipment

Unit 4: Hydraulics & Pneumatics

- **Content:**
 - Advanced hydraulics and pneumatics
 - Operation, maintenance, and troubleshooting

Unit 5: Preventive Maintenance

- **Content:**
 - Advanced preventive maintenance techniques
 - Safety precautions

4th Semester (Practical)

Unit 1: Erection and Testing

- **Content:**
 - Advanced erection techniques
 - Testing methods and equipment

Unit 2: Project Work / Inplant Training

- **Content:**
 - Real-life applications and project work
 - Inplant training in an industrial setting
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Workshop Calculation & Science (Common for All Engineering Trades)

1st Year

Unit 1: Mathematics and Physics Applications

- **Content:**
 - Unit and fractions
 - Square root, ratio, and proportions
 - Percentage calculations
 - Material science
 - Mass, weight, volume, and density
 - Speed and velocity
 - Work, power, and energy
 - Heat and temperature
 - Basic electricity
 - Profit and loss
 - Mensuration
 - Levers and simple machines

2nd Year

Unit 2: Advanced Mathematics and Physics Applications

- **Content:**
 - Friction
 - Centre of gravity
 - Area of cut-out regular surfaces
 - Area of irregular surfaces
 - Algebra
 - Elasticity
 - Pressure
 - Heat treatment
 - Estimation and costing
 - Trigonometry

Engineering Drawing (Common to all 1-year and 2-year Engineering Trades)

1st Year

Unit 1: Engineering Drawing Fundamentals

- **Content:**
 - Introduction and importance of engineering drawing
 - Line types and applications
 - Drawing instruments and their uses
 - Drawing geometrical figures
 - Dimensioning, lettering, and numbering

- Free-hand drawing
- Presentation methods of engineering drawings
- Drawing sheet sizes and layouts
- Symbolic representation

2nd Year

Unit 2: Advanced Engineering Drawing

- **Content:**

- Construction of scales and diagonal scales
- Conic sections (ellipse and parabola)
- Freehand drawing of nuts, bolts, screw threads, and locking devices
- Sketches of foundation, rivets, welded joints, and pipes
- Orthographic projection from isometric projection
- Reading of fabrication drawings
- Drawing of shaft and pulley, belt, gear, gear drives
- Assembly view of Vee blocks, bush & bearing, and different types of couplings

