Central Workshop

National Institute of Technology

Hazratbal, Srinagar-190006, Kashmir

Syllabus

Of

Workshop Practice

B. Tech First Year

Central Workshop

General Workshop Practice

The field of engineering continues to grow rapidly, transcending disciplines & driving economic growth. Workshop practices have become significant in the industrial environment to manufacture products for the service of the mankind. Workshop Practice is a core subject & is highly essential for all engineers & techno craters for formalizing themselves with the latest techniques & concepts of manufacturing & is the basic requirement for all the engineering students. In addition to introduction of various tools, processes & materials, the student has to acquire practical knowledge & skills of using machines & equipment, Various Cutting, measuring & marking tools, performing main operations through simple exercises.

Manual abilities to handle engineering materials with hand tools need to be developed in the students. They will be using different types of tools/ equipments in different engineering trades for fabrication purposes. Before developing the necessary skills, the students will appreciate the importance of quality & safety measures.

Detailed Contents

1. The students are supposed to be in proper workshop dress prescribed by the institute.
2. Wearing shoes in the workshop is compulsory.
3. Importance of safety measures, cleanliness & up keep of tools, equipment in each of the following engineering trades should be explained & practicised.
4. The student should prepare the sketches of various tool/ jobs in their practical note book.
   The practical academic activities of various semesters are carried out in the following seven engineering trades.
   a) Machining Section (Machinist trade & turning trade)
   b) Sheet metal & Spray painting section
   c) Fitting & Bench work section
   d) Welding section
   e) Foundry & Casting section
   f) Smithy & Forging section
   g) Carpentry & Pattern making section

NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR

Central Workshop

Course title: Workshop Practices (WSP)

Course Outcomes: At the end of the course, student will be able to:

CO1	Perform the operations of plain turning, taper turning, facing, knurling, grooving, drilling on a given cylindrical Mild steel work piece using various cutting, measuring & machine tools.
CO2	Distinguish between various tools & joints. Design & develop different components like cylinder, funnel of a galvanized iron sheet work piece using various operations such as marking cutting, measuring, soldering etc.
CO3	Recognize suitable tools to design a single & split piece pattern moulds & casting of these moulds using Aluminum & Lead. Define various testing processes of molding sand. Identify & selection of various tools to perform different operations of forging.
CO4	Develop various joints such as butt joint, lap joint, corner joint using different welding processes such as electrical arc welding, MIG welding & TIG Welding. Understand different welding electrodes & other welding processes such as resistance welding, submerged arc welding.
CO5	Identify & apply suitable hand tools & holding equipments to perform basic operations to make a square plate, snap joint, cross joint of a Mild Steel Work Piece.
CO6	Recognize suitable wood working hand tools & equipments to make various joints like half lap cross joint, mortise-tenon joint & bridle joint of soft wood (Deodar). Understand various pattern making techniques.

COURSE TITLE: - Workshop Practice

(Common for all engineering Branches)

Workshop Practice

Year: First Year (All Branches) **Examination: - 100**
Course No: - WSP **L-T-P: - 0-0-3**

Machining Trade

(Machinist Trade & Turning Section)

(a) **Theoretical Instructions:**

Safety Precautions, Introduction of machine tools such as lathe, Drilling machine & other related metal cutting tools. Parts of lathe & basic metal cutting operations .Introduction of various types of cutting tools (Nomenclature) and their material.

(a) **Practical Demonstrations:**

Demonstration on Lathe & basic operations such as drilling, facing, turning, taper turning, step turning, knurling, chamfering etc. Demonstration of basic measuring instruments.

Job No. 1: TO MANUFACTURE THE JOBS ON THE CENTRE LATHE AS PER GIVEN DRAWING.

Job No. 2: TO PERFORM ADDITIONAL OPERATIONS SUCH AS GROOVING, DRILLING, KNURLING on Job No. 1.

3 HOURS CLASS (2-TURNS)

COURSE TITLE: - Workshop Practice

(Common for all engineering Branches)

Workshop Practice

Year: First Year (All Branches) **Examination: - 100**
Course No: - WSP **L-T-P: - 0-0-3**

Sheet Metal & Spray Painting section

(a) Theoretical Instructions:

Safety precautions, brief introduction of sheet metal, various tools, joints & operations. Soldering, brazing, & shearing, Fluxes & their applications. Introduction of different machines and pattern development in detail. Brief description of paints & varnishes

(b) Practical Demonstrations:

Demonstration of all basic hand tools & equipments. Fabrication of simple joints and jobs. Preparation & painting of surfaces for varnish & painting etc.

Job No. 1: TO DEVELOP A CYLINDRICAL JOB.

Job No. 2: TO DEVELOP A SQUARE ELBOW WITH SOLDERING AS PER THE DRAWING.

3 HOURS CLASS (2-TURNS)

COURSE TITLE: - Workshop Practice

(Common for all engineering Branches)

Workshop Practice

Year: First Year (All Branches) **Examination: - 100**
Course No: - WSP **L-T-P: - 0-0-3**

Fitting & Bench Work section

(a) Theoretical Instructions:

Safety precautions, introduction to fitting & bench work. Demonstration of basic hand tools, holding devices and basic fitting operations such as measuring, marking, filing, sawing. drilling, tapping, buffing.

(b) Practical Demonstrations:

Demonstration of all basic hand tools/ measuring tools & equipments. Demonstration of simple operations such as marking, punching, filing, sawing, scrapping, drilling.

Job No. 1: TO FABRICATE A SQUARE PLATE OF MILD STEEL WORK PIECE 50X50X7 mm.

Job No. 2: TO ASSEMBLE THE MILD STEEL WORK PIECE WITH SNAP FITTING.

3 HOURS CLASS (2-TURNS)

COURSE TITLE: - Workshop Practice

(Common for all engineering Branches)

Workshop Practice

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Course No: - WSP **L-T-P: - 0-0-3**

Welding Section

(a) Theoretical Instructions:

Safety Precautions, Introduction of welding processes like electric arc welding, Gas Welding, MIG Welding, TIG welding, Submerged arc welding & spot welding.. Various Fluxes & electrodes used in welding. Introduction of ac & dc welding and its applications.

(b) Practical Demonstrations:

Demonstration of all basic tools & personal protective equipments. Demonstration of different types of joints by using arc welding & gas welding etc.

Job No. 1 : TO MAKE A SINGLE-V BUTT JOINT OF MILD STEEL 80x50x8mm

Job No. 2 : TO MAKE A LAP JOINT OF MILD STEEL 85x35x6mm

3 HOURS CLASS (2-TURNS)

COURSE TITLE: - Workshop Practice

(Common for all engineering Branches)

Workshop Practice

Year: First Year (All Branches) **Examination: - 100**
Course No: - WSP **L-T-P: - 0-0-3**

Smithy & Forging section

(a) Theoretical Instructions:

Safety precautions, introduction of forging tools .Materials & their heat treatments. Description of all forging operations such as hand forging, upsetting, drawing & punching. Introduction of various forging methods. Comparison of hot & cold working.

(b) Practical Demonstrations:

Demonstration & practice of different smithy operations like forging, cutting, punching, bending etc. Demonstration & practice of MS rod into forged MS ring & octagonal cross section.

Job No. 1: TO PREPARE MS-SQUARE 20X20MM FROM MS ROUND BY USING DIFFERENT FORGING HAND TOOLS.

Job No. 2:TO PREPARE A SQUARE HEADED BOLT FROM MS-ROUND 60x30mm

3 HOURS CLASS (2-TURNS)

COURSE TITLE: - Workshop Practice

(Common for all engineering Branches)

Workshop Practice

Year: First Year (All Branches) **Examination: - 100**
Course No: - WSP **L-T-P: - 0-0-3**

Carpentry & Pattern Making section

(a) Theoretical Instructions:

Safety Precautions, Introduction of carpentry & joinery, different tools used in carpentry. Seasoning of wood and defects of wood. Various types of joints. Brief description of wood working machines and pattern making.

(b) Practical Demonstrations:

Demonstration & practice of different carpentry operation like Planning, sawing & chiseling and joints. Demonstration of pattern making tools & materials.

Job No. 1: TO PREPARE HALF LAP CROSS JOINT.
Job No. 2: TO PREPARE A BRIDLE JOINT

3 HOURS CLASS (2-TURNS)

COURSE TITLE: - Workshop Practice

(Common for all engineering Branches)

Workshop Practice

Year: First Year (All Branches) **Examination: - 100**
Course No: - WSP **L-T-P: - 0-0-3**

Foundry & Casting Section

(a) Theoretical Instructions:

Safety precautions, Brief Introduction to foundry. Different casting processes. Hand tools & gating system. Molding sands & its properties. Types of pattern, allowances, gates. Selection of pattern. Core Sand & Core making. Defects & remedies. Cupola furnace. Molding sand tests. Melting temperature of different metals.

(b) Practical Demonstrations:

Demonstration & practice of mould making & metal pouring. use of split patterns & cores, sand preparation & testing . Use of hand tools to prepare the mould.

Job No. 1: TO PREPARE A GREEN SAND MOULD BY USING SINGLE PIECE PATTERN.

Job No. 2: TO PREPARE A CASTING OF SINGLE PIECE PATTERN.

3 HOURS CLASS (2-TURNS)

List of recommended books:-

1) **Workshop Technology by Chapman.**
2) **Workshop Technology by Hajra Chowdhary**
3) **Workshop Technology by Swarn Singh**
4) **Workshop Technology by Virender narula**