



**Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore**  
**Shri Vaishnav Institute of Technology and Science**  
**Choice Based Credit System (CBCS) Scheme in light of NEP-2020**  
**Vocational Course for UG (V-Semester)**  
**(Onwards 2022-Batch)**

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME									
			THEORY			PRACTICAL			L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*					
VUME501	VC	ADVANCE WORKSHOP SKILLS	0	0	0	60	40	0	2	4	4	

**Legends:** L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

\***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

### Course Objectives:-

The primary objectives of the course is to knowledge and skills of (A) Metal cutting and cutting tools (B) lathe machines and lathe operations on job (C) milling & milling operations (D) Welding Fabrication and CNC machines.

### Course Outcomes:-

After completion of this course:

1. Students will be able to understand & describe metal cutting principles and cutting tools.
2. Students will be able to perform various lathe operations and make jobs.
3. Students will be able to perform milling operations and make jobs.
4. Students will be able to perform welding operations and fabricated jobs.
5. Students will be able to learn CNC working principles and make jobs.

## Syllabus

### Unit-I

**Introduction to Machine Tools:** Introduction to metal cutting & cutting tools, Basic shape of cutting tool, types of cutting tools, geometry of single point cutting tool, tool materials, tool wear & cutting forces.

### Unit-II

**Centre Lathe:** The centre lathe and its principle of working, Types of lathes, Lathe specification and size, Lathe operations, lathe cutting tools, capstan and turret lathes, their advantages and disadvantages over centre lathe, types of job done on them.

### Unit-III

**Milling Machines:** Types of milling machines, constructional features of horizontal & vertical milling machine, types of milling cutters, milling operations like plane milling, space milling, angular milling form milling, straddle milling, gang milling, negative rake milling, cutting speed, Simple, compound and differential indexing.

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#### **Unit-IV**

**Welding Fabrication:** Introduction, welding terminology, safety measures, various types of welding, types of welding joints, welding positions, drawing interpretation, fabrication process, inspection and testing, surface preparation and installation & commissioning, prepare jobs using arc welding and gas welding.

#### **Unit-V**

Introduction to CNC & CNC Machine Tools, Development of CNC Technology, Principles, Features of NC, DNC and CNC, G&M codes, Part Programming.

#### **Text and Reference Books:**

1. “Fundamentals of Metal Cutting and Machine Tools” by B.L. Juneja and G.S. Sekhon, New Age International, 2003.
2. “Metal Cutting Theory and Practice” by Bhattacharya, New Central Book Agency, 2000.
3. “Principles of Metal Cutting” by G. Kuppaswamy, Universities Press, 1996.
4. “Workshop Technology” by W. A. J. Chapman part I, II & III, 5<sup>th</sup> ed., 2001.
5. “Manufacturing Technology” by P. N. Rao, Vol. 1 and 2, 2018.
6. “Automation, Production Systems, and Computer-Integrated Manufacturing” by Mikell P. Groover, Pearson, 4<sup>th</sup> ed. 2015.
7. “Fundamentals of Machining and Machine Tools” by D.G. Boothroy and W.A. Knight, Marcel Dekker, NY, 2007.
8. “Elements of Workshop Technology” by Hazra Chaudhary Vol I, II, 12<sup>th</sup> ed., 2007.
9. “Mechanical Workshop Practice” by John K.C., 2<sup>nd</sup> Ed. PHI, 2010.

#### **List of Experiments:**

1. To study of single point cutting tool geometry
2. To study center lathe and compare with capstan and turret lathes.
3. To perform step turning and taper turning operations on the given work piece (Lathe Machine).

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4. To perform thread cutting and knurling operation on the given work piece (Lathe Machine).
5. Study of milling machine
6. To machine a groove in the given work piece using vertical milling machine.
7. To make a job of various welding joints using the two M.S pieces by arc welding.
8. Fabricate a cubical box or three piece elbow using arc welding.
9. Fabricate a simple job using gas welding.
10. Study principle and basic elements of NC, DNC and CNC.
11. Study of various functions and codes used in CNC programming.
12. Write a program to obtain the facing in the CNC lathe and make a job.
13. Write a program to obtain the step turning and taper turning cycle in the CNC lathe and make a job.
14. Develop and simulate CNC milling part program and prepare a job on it.

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