

# **DARBHANGA COLLEGE OF ENGINEERING**

## **COURSE FILE OF MACHINE TOOLS AND MACHINERY ( 02 1514)**



Mr. Rajat Gupta

Assistant Professor

Department of Mechanical Engineering

<b>College Name</b>	<b>Darbhanga College of Engineering</b>		
<b>Program Name</b>	<b>B.Tech Mechanical Engineering</b>		
<b>Course Name</b>	<b>Non Conventional Manufacturing</b>		
<b>Course Code</b>	<b>02 1514</b>	<b>Course Credit</b>	<b>5</b>
<b>Lecture/Tutorial Per Week</b>	<b>03/01</b>		
<b>Course Coordinator Name</b>	<b>Mr. Rajat Gupta</b>		

### **Vision**

- To strengthen the region through imparting superior quality technical education and research; which enables the fulfillment of industrial challenge and establish itself as a Centre of Excellence in the field of Mechanical Engineering.

### **Mission**

- To build an academic environment of teaching and lifelong learning for students to make them competitive in context with advance technological, economical and ecological changes.
- To enable the students to enhance their technical skills and communications through research, innovation and consultancy projects.
- To share and explore the accomplishments through didactic, enlightenment, R & D programs with technical institution in India and abroad.

## **Student's Outcomes**

Students who complete the B.TECH degree in ME will be able to:

1. An ability to apply the knowledge of mathematics, basic sciences and engineering concepts to solve the complex engineering problems.
2. The ability to conduct experiments and to critically analyze and interpret the experimental data to reach at substantial outcomes.
3. An ability to design systems, components, or processes to meet appropriate needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
4. An ability to identify, formulates, and solves the complex engineering problems.
5. An ability to function on multi-disciplinary teams that leads the multi-disciplinary projects.
6. An understanding of professional and ethical responsibility.
7. An ability to communicate effectively with written, oral, and visual means.
8. An ability to understand the impact of engineering solutions in a global, environmental, economical and societal context.
9. An ability to recognize the need to engage in life-long learning.
10. An ability to attain knowledge of contemporary issues.
11. An ability to use the techniques, skills, and modern tools necessary for Mechanical engineering practice.

12. Possess ability to estimate costs, estimate quantities and evaluate materials for design and manufacturing purposes.

### **Course Outcomes**

At the end of the course students will be able to

CO1: Understand the cutting tool geometry, mechanism of chip formation and mechanics of orthogonal cutting.

CO2: Identify basic parts and operations of machine tools including lathe, shaper, planer, drilling, boring, milling and grinding machine.

CO3: Design locating and clamping devices to produce a component.

CO4: Select a machining operation and corresponding machine tool for a specific application in real time.

CO5: Select a measuring instrument to inspect the dimensional and geometric features of a given component.

CO6: Understanding the computer controlled manufacturing such as CNC, NC, DNC, CAM & Robotics.

### **Text Books**

TB 1 : Manufacturing Technology ,Volume 2; P.N.Rao, Tata McGraw-Hill Private limited, 2009.

TB 2 : Production Technology; R.K.Jain, Khanna Publishers, 2009.

## **Reference books**

RB 1: Manufacturing Science; Amitabha Ghosh and Asok Kumar Mallik, East- West Private limited, 2007.

## **Other readings and relevant websites :**

- [https://www.youtube.com/redirect?q=http%3A%2F%2Fnptel.iitm.ac.in&v=4VPbMk9ZUgU&event=video\\_description&redir\\_token=PNibp24frbZgZk9ldc9iNsv06Mh8MTUzODcwNzQyOUAxNTM4NjIxMDI5](https://www.youtube.com/redirect?q=http%3A%2F%2Fnptel.iitm.ac.in&v=4VPbMk9ZUgU&event=video_description&redir_token=PNibp24frbZgZk9ldc9iNsv06Mh8MTUzODcwNzQyOUAxNTM4NjIxMDI5)
- [https://www.youtube.com/watch?v=Q1S\\_23uAA2U&list=PL2C105C94D2955C8B&index=2](https://www.youtube.com/watch?v=Q1S_23uAA2U&list=PL2C105C94D2955C8B&index=2)
- [https://youtu.be/A0dTvf\\_Q8BA](https://youtu.be/A0dTvf_Q8BA)
- [https://youtu.be/Q1S\\_23uAA2U](https://youtu.be/Q1S_23uAA2U)
- <https://youtu.be/81Fdif5e85c>

## **Evaluation Scheme**

<b>Component 1</b>	Mid semester examination	20
<b>Component 2</b>	class test	5
<b>Component 3</b>	TA	5
<b>Component 4</b>	End Semester Examination	70
<b>Total</b>		100

## **Syllabus**

<b>Topics</b>	<b>No. of lectures</b>	<b>Weightage</b>
Metal cutting and Machine Tools : Metal cutting : Mechanics of metal cutting, Geometry of tool and nomenclature, Tool materials, Orthogonal vs oblique cutting. Mechanics of chip formations, types of chips, tools angles, shear angle, Merchant's force circle diagram, Cutting forces, power required, Cutting fluids/lubricants, Tools wear and tool life.	12	6%
Machine Tools :  (a) Lathe : Principle, types, operations, turret/capstan, semi/automatic, Tool layout.  (b) Shaper, slotted, planer, operation, drive.  (c) Milling, milling cutter, up & down milling, dividing head indexing, Max chip thickness, power required.  (d) Drilling and boring, reaming tools, geometry of twist drill, grinding, grinding wheel, abrasive, cutting action, grinding wheel specification, Grinding wheel wear, alterations, wear, fracture wear, dressing and trimming. Max chip thickness and guest criteria, Flat and cylindrical grinding, Centreless grinding, Superfinishing, Honing lapping, Polishing	12	28%
Computer controlled manufacturing process : NC, CNC,	10	28%

DNC, part programming, introduction to computer aided manufacturing and robotics.		
Metrology : Tolerance and limit systems, limit gauges, measurement of surface roughness, inspection of gears and screw threads.	4	10%
Jigs and Fixtures : Locating elements, clamping devices, principles of jigs and fixtures design.	4	28%

**7. This document is approved by**

<b>Designation</b>	<b>Name</b>	<b>Signature</b>
<b>Course Co-ordinator</b>	Rajat Gupta	
<b>HOD</b>	Mr.Visnu Kumar Singh	
<b>Principal</b>	Prof Achintya	