Agni College of Technology
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ISO 9001:2015 Certified Institution: Estd.2001
OMR, Thalambur, Chennai - 600 130. Phone: 044 6740 9441 Mobile: 9445024081 www.act.edu.in

DEPARTMENT OF MECHANICAL ENGINEERING

HANDS-ON DISCOVERY LEARNING

Academic year	: 2022-2023
Degree	: B.E.
Year & Semester	: II/IV
Course Code & Title	: ME3493 / Manufacturing Technology
Name of the Faculty Member	: Dr L.Ranganathan
Date	: 22/02/2023
Innovative Practice	: Hands-on Discovery Learning
Topic	: Study the concepts and basic mechanics of metal cutting
Total Students Participated	: 16

Introduction

Hands-on Discovery Learning is an experiential teaching approach in which students actively explore, observe, and infer fundamental concepts through direct interaction with tools, materials, and processes. Instead of passively receiving information, learners construct knowledge by experimenting, questioning, and discovering relationships on their own. In the metal cutting, understanding concepts such as chip formation, cutting forces, tool geometry, cutting speed, feed, depth of cut, and surface finish is essential. Through hands-on activities using machining setups, cutting tools, and work materials, students directly observe the mechanics of metal cutting and relate them to theoretical principles. This experiential exposure enables learners to visualize abstract concepts and understand the cause-and-effect relationship between cutting parameters and machining performance.

Methodology

Hands-on Laboratory Demonstrations

- **Chip Formation Observation in Turning**
  Students perform turning operations on a lathe and visually observe different chip types (continuous, discontinuous, serrated) formed under various cutting conditions.

- **Effect of Cutting Parameters Experiment**
  Conduct trials by varying cutting speed, feed, and depth of cut to study their influence on chip thickness, surface finish, and tool wear.

Outcomes

- Students gained knowledge about identify different types of chips (continuous, discontinuous, serrated) and understand the influence of material properties and cutting conditions on chip formation.
- Students learned how cutting speed, feed, and depth of cut affect chip thickness, surface finish, cutting forces, and tool wear.
- Students gained practical knowledge of tool angles and be able to observe and categorize different types of tool wear, enhancing understanding of tool life and machining efficiency.

Student Participation

- Total Students: 16
- Participation Mode: Laboratory
- Engagement: Students actively discussed, clarified doubts, and provided feedback to their peers.

Relavant PO's :

PO1	PO 2	PO 3	PO 4	PO 5	PO 6

Participant Name List

S. NO	REGISTER NO	STUDENTS NAME
1	312821114002	Divya N
2	312821114003	Gokul P
3	312821114004	Guna S
4	312821114005	HariRaghavan C
5	312821114006	Kalaiselvan R
6	312821114007	Kannan S
7	312821114008	Karthick K
8	312821114010	Reshav Raj
9	312821114011	Sibi Raynord U
10	312821114012	Sivasakthi J
11	312821114013	Yuvaraj A
12	312821114301	Gokul S
13	312821114302	Meera T M
14	312821114303	Mohammed Jameel S
15	312821114305	Umar Faruk N
16	312821114306	Yuvaraj M

Hands-on Discovery Learning Method conducted on 22.02.2023 by Dr.L.Ranganathan for Manufacturing Technology Course

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The valuable feedbacks can be provided in the below link for the above innovative teaching method.

https://docs.google.com/forms/d/1dDP1-ysdbpxqxe3uO7cKdtjFxKJbmyrNclgkEAS_Gw8

Faculty In charge

HoD/Mech