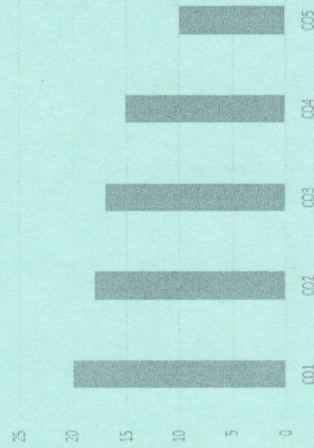


CO1	Identify the various types of cutting tools, mechanics of metal cutting, tool materials.
CO2	Explain the concepts and derive the relationships for shear plane angle, cutting forces, tool life criterion, and effective utilization of the tools, towards decision making processes illustrate them
CO3	Classify and analyze the different dynamometers for measuring forces considering Case studies –Draw conclusions
CO4	Understand the importance of non-traditional machining over traditional machining process
CO5	Decide the best hybrid process and take appropriate decision for live problems faced in the industries especially for machining operations

GRAFICAL REPRESENTATION**Bloom's Level wise Marks Distribution**

■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6

Course Outcome Wise Marks Distribution**Distribution**

ARKA JAIN
University
Jharkhand



Branch
Subject Name
Manufacturing Engineering
Fundamentals of Metal cutting and NTM

Program
Semester
Year
M. Tech
I
March, 2025

- Time: 3 Hour
Max. Marks : 70
- Start writing from 2nd page onwards; don't Write on the 1st Page Backside
 - Answer all Questions of Section A (Compulsory)
 - Answer Any Four out of Six of Section B
 - Answer Any Three out of Five of Section C
 - Possession of Mobile Phones or any kind of Written Material, Arguments with the Invigilator or Discussing with Co-Student will comes under Unfair Means and will Result in the Cancellation of the Papers.

Knowledge Level (KL)
K1 : Remembering
K2 : Understanding
K3 : Applying
K4 : Analysing
K5 : Evaluating
K6 : Creating

END SEM EXAMINATION
School of Engineering & IT

Section A (Each question Carry 02 Marks from Q1- i to x) – 20 Marks

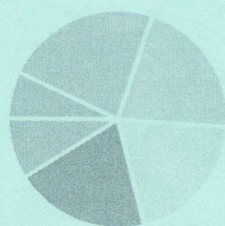
Q. N1	QUESTIONS	Marks	COs	KL	PO
i	What is machining Process?	2	CO1	K1	PO2
ii	What do you understand by additive and subtractive manufacturing?	2	CO2	K1	PO2
iii	What is the effect of positive rake angle in metal cutting?	2	CO2	K2	PO3
iv	Name any two metal cutting tool materials.	2	CO1	K2	PO2
v	What are the criteria of producing discontinuous chips during machining?	2	CO3	K2	PO2
vi	Name any two mechanical Type Non Traditional Machining Process.	2	CO3	K3	PO3
vii	What is the role of clearance angle in metal cutting?	2	CO2	K3	PO2
viii	How to eliminate formation of continuous chip built up edge?	2	CO2	K4	PO3
ix	Milling can be a _____ operation. (a) Gear cutting operation (b) Machining operation (c) Slotting (d) All of them	2	CO2	K2	PO3
x	Arbor is a _____ holding device. (a) Work (b) Tool (c) Both Work & Tool (d) None	2	CO4	K3	PO3

Section B (Answer any FOUR out of SIX) – 20 Marks (Each question 5 Marks)						
Q. No.	QUESTIONS	Marks	COs	KL	PO	
2	Justify “Machining is a value addition process” .	5	CO1	K2	PO1	
3	Write a note on different types of cutting tool materials.	5	CO2	K1	PO2	
4	What do you understand by tool life? Explain the tool life with help of Taylor’s tool life equation.	5	CO3	K3	PO1	
5	Write difference between traditional and non-traditional machining.	5	CO4	K2	PO2	
6	Classify the different non-traditional machining process and also comment on their process capabilities.	5	CO5	K3	PO2	
7	What is the role of cutting fluid in machining? Enlist them.	5	CO3	K3	PO1	
Section C (Answer any THREE out of FIVE) – 30 Marks (Each question Carry 10 Marks)						
Q. No.	QUESTIONS	Marks	COs	KL	PO	
8	Explain the tool nomenclature of single point cutting tool in ASA system.	10	CO1	K1	PO1	
9	Explain the mechanism of chip formation with suitable diagram.	10	CO2	K3	PO2	
10	What do you understand by tool wear? Explain types of tool wear.	10	CO3	K3	PO1	
11	Explain the Abrasive Jet Machining Process with suitable diagram.	10	CO4	K4	PO2	
12	Explain working principle, elements, advantages, limitation and application areas of Electro-Discharge machining (EDM) Process.	10	CO5	K5	PO2	

CO1	Demonstrate the concept of JIT their types, principles and application through real timeexamples
CO2	Assess types of JIT for different manufacturing system making scheduling and sequencing aneasny process
CO3	Demonstrate sequential withdrawal system through real time examples
CO4	Have awareness of how Kanban is implemented in Toyota is enlightened to all users.
CO5	Distinguish between various chain initiative production planning and demand fluctuation
CO6	Demonstrate the concept of JIT their types, principles and application through real timeexamples

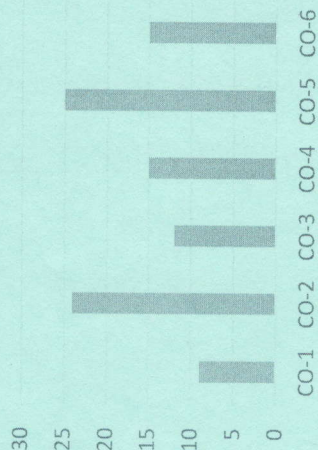
GRAPHICAL REPRESENTATION

Bloom's level wise Marks Distribution



■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6

Course Outcome wise Marks Distribution



JGI	ARKA JAIN University Jharkhand	NAAC GRADE A ACCREDITED UNIVERSITY	END SEM EXAMINATION School of Engineering & IT
Branch	Manufacturing Engineering	Program	M.Tech
Subject Name	Advanced Management Techniques in Manufacturing	Semester	I
Time: 3 Hour Max. Marks : 70	- Start writing from 2nd page onwards; don't Write on the 1st Page Backside - Answer all Questions of Section A (Compulsory) - Answer Any Four out of Six of Section B - Answer Any Three out of Five of Section C - Possession of Mobile Phone or any kind of Written Material, Arguments with the Invigilator or Discussion with Co-Student will comes under <u>Unfair Means</u> and will <u>Result</u> in the <u>Cancellation of the Paper(s)</u>.	Year	March 2025
Knowledge Level (KL)	K1 : Remembering K2 : Understanding	K3 : Applying K4 : Analysing	K5 : Evaluating K6 : Creating

Section A (Each question Carry 02 Marks from Q1-i to x – 20 Marks)

Q. N 1	QUESTIONS	Marks	COs	KL
i	Define CPC (Computer Process Control)	2	CO1	KL1
ii	What are the key functionalities of CPC in industrial applications?	2	CO2	KL2
iii	What is the primary purpose of Just-In-Time (JIT) manufacturing?	2	CO3	KL3
iv	What is the role of Quality Control (QC) and Quality Assurance (QA) in JIT?	2	CO4	KL2
v	What is the Toyota Production System (TPS)	2	CO5	KL1
vi	What is a Kanban, and why is it important in TPS?	2	CO1	KL2
vii	What is the impact of scrap reduction on quality improvement in JIT?	2	CO2	KL3
viii	What are the key elements of the Total Quality Control (TQC) concept?	2	CO3	KL3
ix	What is the role of QC Circles in improving production quality?	2	CO4	KL2
x	Define plant configuration and explain its significance in JIT production.	2	CO5	KL1

Section B (Answer any FOUR out of SIX) – 20 Marks
(Each question Carry 05 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
2	How can businesses use CPC to improve profitability?	5	CO1	KL3
3	How can the implementation of JIT impact CPC?	5	CO2	KL3
4	Explain the primary purpose of the Just-in-Time (JIT) production system. How does JIT help businesses reduce costs and increase profitability?	5	CO3	KL4
5	Discuss the importance of sequencing and scheduling in JIT. How do monthly and daily supplier schedules contribute to the efficiency of the production process?	5	CO4	KL6
6	How do you determine the number of Kanbans needed in a production system?	5	CO5	KL5
7	How can subcontractors be integrated into the TPS for smooth production flow?	5	CO1	KL5

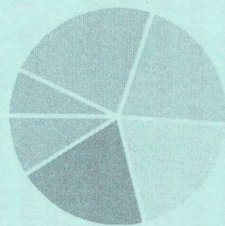
Section C (Answer any THREE out of FIVE) – 30 Marks
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
8	Explain the relationship between CPC and JIT in the context of cost reduction and efficiency. How can the implementation of JIT impact CPC?	10	CO2	KL6
9	What role does standardization play in JIT? How does standardizing operations improve efficiency and reduce waste in production?	10	CO2	K4
10	What is production smoothing in TPS, and why is it important for managing demand fluctuations?	10	CO3	KL2
11	Explain the concept of plant configuration and its influence on production efficiency.	10	CO4	KL3
12	Describe the Total Quality Control (TQC) concept, including its goals, process, and implementation.	10	CO5	KL6

CO1	Apply the gained Knowledge in the field of material and to differentiate properties with respect to conventional material
CO2	Select suitable powder production methods for different materials in order to get the required components.
CO3	Select suitable production technique for composite material.
CO4	Analyse and obtain stiffness and compliance matrix and also study strength parameters of lamina.
CO5	Characterize different types of titanium and nickel base super alloys and choose one which suits the application.

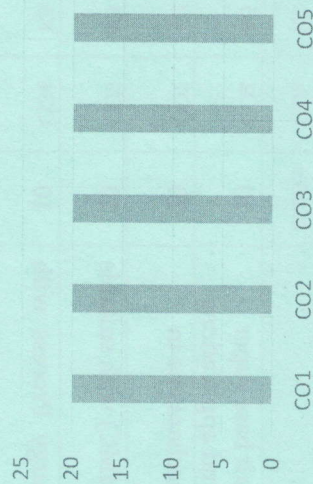
GRAPHICAL REPRESENTATION

Bloom's level wise Marks Distribution



■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6

Course Outcome wise Marks Distribution



ARKA JAIN University
Jharkhand



END SEM EXAMINATION
School of Engineering & IT

Branch Subject Name	Manufacturing Engineering Advanced Material Technology	Program Semester I	M.Tech
Time: 3 Hour Max. Marks : 70	- Start writing from 2nd page onwards; don't Write on the 1st Page Backside - Answer all Questions of Section A (Compulsory) - Answer Any Four out of Six of Section B - Answer Any Three out of Five of Section C - Possession of <u>Mobile Phone</u> or any kind of <u>Written Material, Arguments with the Invigilator or Discussion with Co-Student</u> will come under <u>Unfair Means</u> and will <u>Result in the Cancellation of the Paper(s)</u>.		
Knowledge Level (KL)	K1 : Remembering K2 : Understanding	K3 : Applying K4 : Analysing	K5 : Evaluating K6 : Creating
			Year March, 2025

Section A (Each question Carry 02 Marks from Q1-i to x – 20 Marks)

Q. N 1	QUESTIONS	Marks	COs	KL
i	Differentiate Metal and Alloy with examples	2	CO1	K1
ii	Write down the name of different types of composite materials	2	CO1	K1
iii	List out the name of different properties of materials.	2	CO2	K4
iv	Mention any two live applications of carbon-carbon composites in the field of electronics?	2	CO3	K2
v	What is a lamina and laminate?	2	CO2	K4
vi	Mention the properties of shape memory alloys.	2	CO3	K5
vii	What is the significance of specific surface area of nanomaterials?	2	CO2	K2
viii	Write the applications of MMC	2	CO3	K3
ix	What is the behavior of stress-strain lamina	2	CO4	K4
x	Define and explain zero-dimensional material	2	CO4	K4

Section B (Answer any FOUR out of SIX) - 20 Marks
(Each question Carry 05 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
2	Elaborate classification of engineering materials with examples.	05	CO1	K2
3	Discuss Titanium, Nickel, Cobalt and its alloys with suitable examples and applications	05	CO1	K3
4	Differentiate Metal matrix Composites (MMC) and Ceramic Matrix Composites (CMC)	05	CO2	K4
5	Explain Different Steps Involved in powder metallurgy with suitable examples.	05	CO2	K4
6	Differentiate Metal and Alloy with examples, Write down the name of different types of composite materials	05	CO3	K4
7	List out the name of different properties of materials.	05	CO4	K5

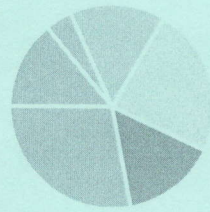
Section C (Answer any THREE out of FIVE) - 30 Marks
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL
8	Discuss Nickel base super alloys, Cobalt base super alloys with its chemical composition and applications.	10	CO2	K5
9	Write a short note on strengthening mechanisms in single-crystal nickel base super alloys.	10	CO1	K2
10	Elaborate Metal matrix Composites (MMC) with suitable diagram	10	CO3	K3
11	Explain any one of powder metallurgy Process with suitable examples.	10	CO4	K5
12	Explain any 5 types of Engineering materials properties with ASTM Test procedure.	10	CO4	K1

CO1	Learn about a working principle and construction of Additive Manufacturing
CO2	Apply Knowledge to support design and manufacturing, modern development in additive manufacturing process
CO3	Assess and implement AM techniques for specific application leading to better ROI for the company that uses Laser AM machines
CO4	Enhance the production sequence of tooling process by choosing the correct material for the job
CO5	Develop and incorporate the productivity sequence by choosing the right AM technology

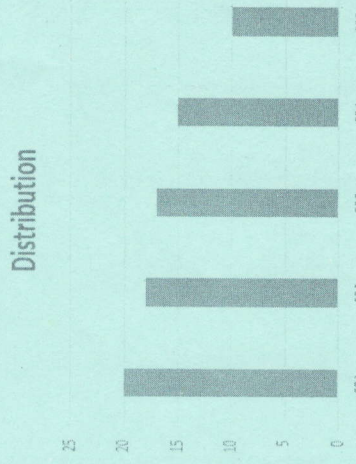
GRAPHICAL REPRESENTATION

Bloom's Level wise Marks Distribution



■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6

Course Outcome Wise Marks Distribution



ARKA JAIN University
Jharkhand

NAAC
GRADE **A**
ACCREDITED UNIVERSITY

END SEM EXAMINATION
School of Engineering & IT

Branch	Manufacturing Engineering	Program	M. Tech
Subject Name	Additive Manufacturing	Semester	I
		Year	March, 2025
Time: 3 Hour Max. Marks : 70	- Start writing from 2nd page onwards; don't Write on the 1st Page Backside - Answer all Questions of Section A (Compulsory) - Answer Any Four out of Six of Section B - Answer Any Three out of Five of Section C - Graph Paper / Drawing Sheet/ Log Book/ Ledger (please Mention if any) - Possession of Mobile Phones or any kind of <u>Written Material, Arguments with the Invigilator or Discussing with Co-Student</u> will comes under <u>Unfair Means</u> and will <u>Result</u> in the <u>Cancellation of the Papers.</u>		
Knowledge Level (KL)	K1 : Remembering	K3 : Applying	K5 : Evaluating
	K2 : Understanding	K4 : Analysing	K6 : Creating

Section A (Each question Carry 02 Marks from Q1-i to x) – 20 Marks

Q. N	QUESTIONS	Marks	COs	KL	PO
i	Explain the significance of additive manufacturing in modern industries.	2	CO1	K2	PO2
ii	Describe the concept of Reverse Engineering and its applications.	2	CO2	K1	PO2
iii	List and classify the materials commonly used in rapid prototyping.	2	CO2	K3	PO3
iv	Explain the process of photo polymerization and its role in additive manufacturing.	2	CO1	K4	PO2
v	Define Additive Manufacturing with suitable examples.	2	CO3	K1	PO2
vi	Compare and contrast different additive manufacturing techniques.	2	CO3	K5	PO3
vii	Analyze the importance of Reverse Engineering in product development.	2	CO2	K4	PO2
viii	Evaluate the suitability of different materials for rapid prototyping based on their properties	2	CO2	K5	PO3
ix	Design an experiment to study the effects of photo polymerization parameters on final product quality.	2	CO2	K6	PO3
x	Develop a structured flowchart to illustrate the 3D printing process	2	CO2	K6	PO3

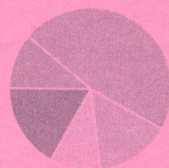
Section B (Answer any FOUR out of SIX) – 20 Marks (Each question Carry 05 Marks)					
Q. No.	QUESTIONS	Marks	COs	KL	PO
2	Explain the role of 3D printing in the present scenario.	5	CO1	K2	PO1
3	Differentiate between additive manufacturing and CNC machining.	5	CO2	K1	PO2
4	Analyze the reverse engineering process in the context of additive manufacturing.	5	CO3	K3	PO1
5	Describe the process for preparing CAD models for 3D printing.	5	CO4	K2	PO2
6	Discuss the role of lasers in Laser Rapid Manufacturing.	5	CO5	K3	PO2
7	Examine the different modes of the Directed Energy Deposition process.	5	CO3	K3	PO1
Section C (Answer any THREE out of FIVE) – 30 Marks (Each question Carry 10 Marks)					
Q. No.	QUESTIONS	Marks	COs	KL	PO
8	Illustrate and explain the complete process of additive manufacturing with the help of a flowchart.	10	CO1	K1	PO1
9	Identify and describe the different types of additive manufacturing processes.	10	CO2	K3	PO2
10	Analyze how effective 3D components can be produced using the Powder Bed Fusion process. Explain in detail.	10	CO3	K3	PO1
11	Define cladding and explain the laser cladding process in additive manufacturing.	10	CO4	K4	PO2
12	Evaluate the process of laser-based joining of metallic and non-metallic materials in terms of its effectiveness and applications.	10	CO5	K5	PO2

CO1	The students will be able to apply interpolation methods and find approximate solution of algebraic and transcendental equations.
CO2	The students will be able to compute several statistical measures and analyze any given bivariate data.
CO3	The students will be able to deal with the treatment of random variables and their probability distributions.
CO4	The students will be able to apply Statistical techniques of the Analysis of Variance and the Designs of Experiments.
CO5	The students will be able to have idea of Queuing system and Queuing Models.

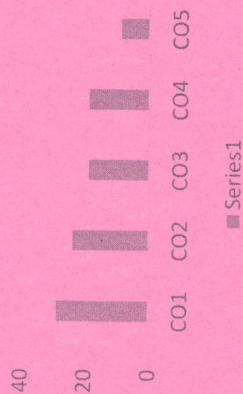
GRAPHICAL REPRESENTATION

Bloom's level wise Marks Distribution

■ K1 ■ K2 ■ K3 ■ K4 ■ K5 ■ K6



Course outcome wise Marks Distribution



ARKA JAIN
University
Jharkhand

NAAC
GRADE A
ACCREDITED UNIVERSITY

END SEM EXAMINATION
School of Engineering & IT

Branch	ME / CSE / EVT	Program	M. Tech
Subject Name	Advanced Engineering Mathematics and Experimental Methods	Semester	I
		Year	March, 2025
Time: 3 Hour Max. Marks : 70	- Start writing from 2nd page onwards; don't Write on the 1st Page Backside - Answer all Questions of Section A (Compulsory) - Answer Any Four out of Six of Section B - Answer Any Three out of Five of Section C - Possession of Mobile Phone or any kind of Written Material, Arguments with the Invigilator or Discussion with Co-Student will comes under <u>Unfair Means</u> and will <u>Result</u> in the <u>Cancellation of the Paper(s)</u>.		
Knowledge Level (KL)	K1 : Remembering K2 : Understanding	K3 : Applying K4 : Analysing	K5 : Evaluating K6 : Creating

Section A (Each question Carry 02 Marks from Q1- i to x – 20 Marks)

Q.N	QUESTIONS	Marks	COs	KL
1				
i	What do you mean by interpolation?	2	CO1	K1
ii	Write down formula used for finding roots under Regula Falsi method.	2	CO1	K1
iii	What is the effect of change of origin and change of scale on correlation coefficient?	2	CO2	K2
iv	Write down the equations of two regression lines.	2	CO2	K2
v	What do you mean by probability function of a random variable?	2	CO3	K1
vi	The mean of a binomial variate with parameters n and p are 4 and 2 respectively. Evaluate p	2	CO3	K5
vii	What is meant by two-way classification of Analysis of Variance?	2	CO4	K2
viii	Write down any two advantages of R.B.D. over C.R.D.	2	CO4	K2
ix	Explain reneging.	2	CO5	K2
x	Explain FCFS.	2	CO5	K2

Section B (Answer any FOUR out of SIX) - 20 Marks
(Each question Carry 05 Marks)

Q. No.	QUESTIONS	Marks	COs	KL																						
2	The following data is given, prepare difference table: <table><tr><td>Arguments</td><td>4</td><td>7</td><td>10</td><td>13</td><td>16</td></tr><tr><td>Entries</td><td>5</td><td>12</td><td>20</td><td>30</td><td>45</td></tr></table>	Arguments	4	7	10	13	16	Entries	5	12	20	30	45	05	CO1	K3										
Arguments	4	7	10	13	16																					
Entries	5	12	20	30	45																					
3	What is correlation? How it is measured? Mention the limits of correlation coefficient.	05	CO2	K2																						
4	Find rank correlation coefficient for the following data: <table><tr><td>Rank in honesty</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr><tr><td>Rank in intelligence</td><td>3</td><td>4</td><td>1</td><td>8</td><td>2</td><td>6</td><td>5</td><td>7</td><td>10</td><td>9</td></tr></table>	Rank in honesty	1	2	3	4	5	6	7	8	9	10	Rank in intelligence	3	4	1	8	2	6	5	7	10	9	05	CO2	K5
Rank in honesty	1	2	3	4	5	6	7	8	9	10																
Rank in intelligence	3	4	1	8	2	6	5	7	10	9																
5	Define binomial random variable. What are its parameters? Also write expressions for its mean and variance.	05	CO3	K1																						
6	Explain the Lay-out of a Randomized Block Design.	05	CO4	K2																						
7	Explain any one Queuing Model.	05	CO5	K2																						

Section C (Answer any THREE out of FIVE) - 30 Marks
(Each question Carry 10 Marks)

Q. No.	QUESTIONS	Marks	COs	KL																						
8	Estimate $f(8)$ by applying suitable interpolation formula for the data given below: <table><tr><td>x</td><td>6</td><td>7</td><td>9</td><td>11</td></tr><tr><td>$f(x)$</td><td>12</td><td>25</td><td>40</td><td>54</td></tr></table>	x	6	7	9	11	$f(x)$	12	25	40	54	10	CO1	K5												
x	6	7	9	11																						
$f(x)$	12	25	40	54																						
9	Apply Bisection method to find the approximate root of the equation $x^2 + x - 3 = 0$ up to 4th approximation.	10	CO1	K3																						
10	Find the regression line of Y on X for the following bivariate data: <table><tr><td>X</td><td>8</td><td>10</td><td>11</td><td>13</td><td>15</td><td>16</td><td>18</td><td>20</td><td>22</td><td>23</td></tr><tr><td>Y</td><td>10</td><td>11</td><td>10</td><td>12</td><td>14</td><td>16</td><td>17</td><td>18</td><td>18</td><td>20</td></tr></table>	X	8	10	11	13	15	16	18	20	22	23	Y	10	11	10	12	14	16	17	18	18	20	10	CO2	K4
X	8	10	11	13	15	16	18	20	22	23																
Y	10	11	10	12	14	16	17	18	18	20																
11	Define Random variable. Distinguish between discrete and continuous random variable. Also explain probability function of a random variable.	10	CO3	K2																						
12	Write an essay on Analysis of Variance.	10	CO4	K2																						