



**CENTRE FOR ACADEMIC COURSES**  
**ANNA UNIVERSITY**  
CHENNAI - 600 025

Off: 22357077 / 73

22357074

Fax / Dir : 22352272



**Dr. S. HOSIMIN THILAGAR**  
**DIRECTOR**

Letter No:4034/AU/VA/CAC/2022

13.07.2022

To  
The Controller of Examinations  
Anna University  
Chennai - 25.

Sir,

Sub : A.U. - CAC - Non – Autonomous Colleges affiliated to Anna University - Value Added Course - Reg.

Ref : Letter No.AUC005/2022-2023/Odd, dated: 17.06.2022.

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With reference to the letter cited, the following Value Added Courses offered by Jansons Institute of Technology, Coimbatore, Non – Autonomous Colleges affiliated to Anna University are allotted the Course Code as detailed below.

SL. No.	Code Allotted	Title	Credits			
			L	T	P	C
1.	MVA024	Additive Bioprinting	2	0	0	2
2.	MVA025	Autonomous Vehicles	2	0	0	2

This is for your kind information and necessary action at your end.

Yours faithfully,

  
13/7/2022  
DIRECTOR

Copy to:

1. The Chairperson, Faculty of Mechanical Engineering, A.U., Ch -25.
2. The Principal, Jansons Institute of Technology, Karumathampatti, Coimbatore – 641 659.
3. The Stock File – CAC.



Lr.No.AUC005/2022-2023/Odd

17.06.2022

**To**

**The Director,**  
Centre for Academic Courses,  
Anna University: Chennai,  
Chennai - 600025

Sir,

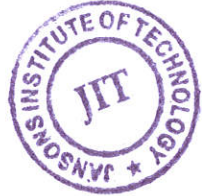
Sub: Requesting approval for conducting Value Added Course for the Academic Year 2022-2023 Odd Semester - Reg.


Ref: 1. Anna University Regulation 2017 UG.  
2. Guidelines for conducting value added course.

We are hereby sending the proposal for conducting value added course for final year students in the Department of Mechanical Engineering. Proposal comprising the Syllabus, Schedule and Details of faculty handling the courses are framed as per the guidelines given under the reference cited above.

We request your kind approval for conducting the same.

Thanking you,



  
**PRINCIPAL**  
**Dr. V. Nagarajan**  
**PRINCIPAL**  
**Jansons Institute of Technology**  
**Coimbatore - 641659.**

**Encl:**

1. Syllabus for VAC, schedule and details of faculty handling the course for Department of Mechanical Engineering as said above.

**Copy To:**

**The Controller of Examinations,**  
Office of Controller of Examinations,  
Anna University: Chennai,  
Chennai - 600025

**JANSONS INSTITUTE OF TECHNOLOGY**

Approved by AICTE & Affiliated to Anna University  
An ISO 9001:2015 Certified Institution

Karumathampatti, Coimbatore - 641 659 Tamil Nadu, INDIA

☎ : 0421- 2264900 (100 LINES) ☎ : 0421 - 2264999 ✉ : info@jit.ac.in, www.jit.ac.in

R2017

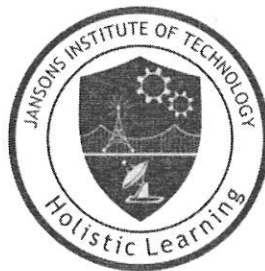
Value Added Course

**“JME701 – ADDITIVE BIOPRINTING”**

AY 2022 - 2023

Odd Semester

Department of Mechanical Engineering



**JANSONS INSTITUTE OF TECHNOLOGY**

Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai

Accredited by NAAC and ISO 9001:2015 certified Institution

Karumathampatti, Coimbatore, Tamil Nadu - 641659

16.06.2022,  
Karumathampatti.

From

The Head of the Department,  
Department of Mechanical Engineering,  
Jansons Institute of Technology,  
Karumathampatti,  
Coimbatore – 641 659.

To

The Principal,  
Jansons Institute of Technology,  
Karumathampatti,  
Coimbatore – 641 659.

Respected Sir,

**Sub: Proposal for the Value Added Course “JME701 – ADDITIVE BIOPRINTING” – reg.,**

As per the guidelines of Anna University, the Department of Mechanical Engineering have proposed to offer a Two Credit Value Added Course (VAC) titled, “JME701 – ADDITIVE BIOPRINTING” for the 2019-2023 Batch students (R2017).

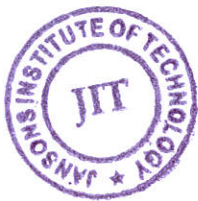
Have herewith, attached the syllabus, committee members and the course schedule for your kind perusal.

Thanking you.

Yours truly,



Dr.M.Muthukumaran  
**Dr.M.Muthukumar M.E.,Ph.D**  
Professor & Head  
Dept.of Mechanical Engineering  
Jansons Institute of Technology  
Karumathampatti, Coimbatore -641 659.



**Dr.V.Nagarajan**  
PRINCIPAL  
Jansons Institute of Technology  
Coimbatore - 641659.

**ANNA UNIVERSITY, CHENNAI**  
**B.E. MECHANICAL ENGINEERING**  
**REGULATIONS – 2017**  
**Value Added Course Syllabus**

<b>JME701</b>	<b>ADDITIVE BIOPRINTING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>2</b>	<b>0</b>	<b>1</b>	<b>2</b>

**Objectives:**

- To provide knowledge on additive manufacturing of components and technology development in bioprinting of human organs and tissues.

**Unit – I AN INTRODUCTION TO 3D PRINTING 6**

History of 3D Printing - Technologies in 3D Printing - Applications of 3D Printing - Design for Additive Manufacturing - Case Study on the Applications of 3D Printing in Healthcare

**Unit – II AN INTRODUCTION TO 3D BIOPRINTING AND TECHNOLOGIES 6+4**

Introduction to 3D Bioprinting - Introduction to 3D Bioprinting Technologies - Distinction between 3D Printers and 3D Bioprinters - Inkjet-based bioprinting, Pressure-assisted bioprinting and Laser-assisted bioprinting - Applications of 3D Bioprinting

**Unit – III BIOLOGY AND BIOMATERIALS IN 3D BIOPRINTING 6+4**

Introduction to Cells, Tissues, Organs and ECM - In-Vitro Cell Handling for 3D Bioprinting - Types of Cells used in 3D Bioprinting and their limitations - Sterility in 3D Bioprinting - Hydrogels and Biomaterials -

**Unit – IV INTRODUCTION TO BIOINKS 4**

Introduction to Bioinks and Types of Bioinks - Various Bioinks and Their Applications in 3D Bioprinting

**Total Periods : 22+8**

**OUTCOMES:**

Upon the completion of this course the students will be able to:

- CO1:** Describes all aspects of the bioprinting process, from bioink processing through design for bioprinting, bioprinting techniques, bioprinter technologies, organ printing, applications, and future trends  
**CO2:** Understand how slicing of the components affect the time, material cost.

**TEXT BOOKS:**

- Ibrahim T. Ozbolat, 3D Bioprinting Fundamentals, Principles and Applications Imprint, Academic Press, Elsevier Inc. 2016
- Arindam Bit, Jasjit S Suri and Sharda Gupta, "3D bioprinting in tissue engineering and regenerative medicine," IOP Publishing Ltd, 2020

**REFERENCE BOOKS:**

- Sabrie Soloman, "Additive Manufacturing Technology - 3D Printing & Design - The 4th Industrial Revolution: 3D Printing & Design: 1 (3D Printing - Bioprinting), Kindle Edition, 2020
- Chee Kai Chua and Wai Yee, "Bioprinting Principles and Applications", <https://doi.org/10.1142/9193>, 2015.

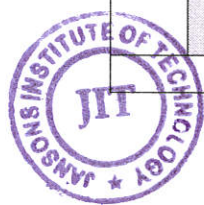



*Dr. V. Nagarajan*  
**Dr. V. Nagarajan**  
**PRINCIPAL**  
**Jansons Institute of Technology**  
Coimbatore - 641659.

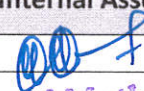
*Dr. M. Muthukumaran*  
**Dr. M. Muthukumaran M.E., Ph.D**  
**Professor & Head**  
**Dept. of Mechanical Engineering**  
**Jansons Institute of Technology**  
Methanatti, Coimbatore - 641 659.

## Schedule

Department of Mechanical Engineering Value Added Course <b>"JME701- ADDITIVE BIOPRINTING"</b> Academic Year 2022-2023 Odd Semester				
Sl No	Date	Day & Time	Topics to be covered	No. of hours
<b>UNIT I - AN INTRODUCTION TO 3D PRINTING</b>				
1	18-08-2022	Thursday 5 PM to 7 PM	History of 3D Printing - Technologies in 3D Printing	2
2	22-08-2022	Monday 5 PM to 7 PM	Applications of 3D Printing - Design for Additive Manufacturing	2
3	23-08-2022	Thursday 5 PM to 7 PM	Case Study on the Applications of 3D Printing in Healthcare	2
<b>UNIT II - AN INTRODUCTION TO 3D BIOPRINTING AND TECHNOLOGIES</b>				
4	29-08-2022	Monday 5 PM to 7 PM	Introduction to 3D Bioprinting - Introduction to 3D Bioprinting Technologies	2
5	01-09-2022	Thursday 5 PM to 7 PM	Distinction between 3D Printers and 3D Bioprinters - Inkjet-based bioprinting,	2
6	05-09-2022	Monday 5 PM to 7 PM	Pressure-assisted bioprinting and Laser-assisted bioprinting - Applications of 3D Bioprinting	2
	06-09-2022	Tuesday 5 PM to 6.30 PM	<b>Continuous Internal Assessment - I</b>	-
7	07.09.2022	Wednesday 1.30 PM to 5.30 PM	Practical: Simulation on 3D Bioprinters	2
8	08-09-2022	Thursday 1.30 PM to 5.30 PM	Practical: Simulation on Laser-assisted bioprinting	2
<b>UNIT III - BIOLOGY AND BIOMATERIALS IN 3D BIOPRINTING</b>				
9	09.09.2022	Friday 5 PM to 7 PM	Introduction to Cells, Tissues, Organs and ECM In-Vitro Cell Handling for 3D Bioprinting	2
10	12-09-2022	Monday 5 PM to 7 PM	Types of Cells used in 3D Bioprinting and their limitations -	2
11	15-09-2022	Thursday 5 PM to 7 PM	Sterility in 3D Bioprinting - Hydrogels and Biomaterials -	2
12	19-09-2022	Monday 1.30 PM to 5.30 PM	Practical: Simulation on ECM Vitro Cell	2
13	20.09.2022	Tuesday 1.30 PM to 5.30 PM	Practical: Simulation on Sterility	2
<b>UNIT IV - INTRODUCTION TO BIOINKS</b>				
14	22-09-2022	Thursday 5 PM to 7 PM	Introduction to Bioinks, Types of Bioinks	2
15	26-09-2022	Monday 5 PM to 6 PM	Various Bioinks and Their Applications in 3D Bioprinting.	2
	27-09-2022	Tuesday 5 PM to 6.30 PM	<b>Continuous Internal Assessment - II</b>	-
<b>Total Hours</b>				<b>22+8</b>



  
**Dr. V. Nagarajan**  
 PRINCIPAL  
 Jansons Institute of Technology  
 Phone: 641659.

  
**Dr. M. Muthukumaran M.E., Ph.D**  
 Professor & Head  
 Dept. of Mechanical Engineering

## Details of Faculty


Faculty Handling the VAC : Mr.V.Murali / Asst. Prof / Mech

### Evaluation Committee

- i. Faculty Handling VAC : Mr.V.Murali / Asst. Prof / Mech
- ii. Senior Faculty - VAC coordinator : Dr.L.Anojkumar / Asso. Professor / Mech
- iii. HoD : Dr.M.Muthukumaran / Professor / Mech



**Dr. M. Muthukumaran M.E., Ph.D**  
Professor & Head  
Dept. of Mechanical Engineering  
Jansons Institute of Technology  
Karumathampatti, Coimbatore - 641 659.



**Dr. V. Nagarajan**  
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