COURSE FILE CONTENT

1. Vision and Mission statements of the Institute and Department.
2. PEOs, PSOs and PO statements.
3. VTU, College and Department Calendar.
4. Time Table. (Department and Individual time table)
5. Syllabus copy
6. COs, CO-PO and CO-PSO Mapping and Justification.
7. Students List (Students Attendance Register).
8. Course Plan
9. Course Execution Summary
10. Course Assessment and Evaluation scheme.
11. Assignment Questions-I, II, III
12. Internal Assessment Test –I, II, III (Question Papers)
13. Internal Assessment Test – I, II, III – Scheme of Evaluation.
14. Internal Assessment Test I, II, III Performance Analysis.
15. Remedial and Tutorial Classes information (If any)
16. Final Internal (IA) - CIE and External –SEE Marks.
17. VTU Question papers.
18. Course Exit Survey.
19. Course Self Assessment Report.
20. Final Result Analysis
21. Direct and Indirect Attainment of COs, POs and PSOs.
22. CO Attainment Gap Analysis.
23. Action taken report (ATR) on Gap Analysis.
24. Content beyond syllabus.
25. Instructor report (Innovative Practices)
26. Any other related documents.

VISION AND MISSION OF THE INSTITUTE AND DEPARTMENT

VISION OF THE INSTITUTION

To Produce Professionally Excellent, Knowledgeable, Globally Competitive and Socially Responsible Engineers and Entrepreneurs.

MISSION OF THE INSTITUTION

M1	To Provide Quality Education in Engineering and Management.
M2	To Establish a Continuous Industry-Institute Interaction, Participation and Collaboration to Contribute Skilled Engineers.
M3	To Develop Human Values, Social Values, Entrepreneurship Skills and Professional Ethics among the Technocrats.
M4	To Focus on Innovation and Development of Technologies by Engaging in Cutting Edge Research areas.

VISION OF THE DEPARTMENT

To Produce Professionally Excellent, Knowledgeable, Globally Competitive, Socially Responsible Mechanical Engineers and Entrepreneurs.

MISSION OF THE DEPARTMENT

M1	To provide quality education in Mechanical Engineering and Management.
M2	To establish a continuous industry - institute interaction, participation and collaboration to contribute skilled Mechanical Engineers.
M3	To develop human values, socio-ethical values, entrepreneur skills and professional ethics among Mechanical Engineers.
M4	To focus on Research & Development (R & D) and Innovative Technologies by engaging in cutting edge research areas of Mechanical Engineering.

PROGRAM EDUCATIONAL OBJECTIVES (PEO'S)

PEO1	Graduates of Mechanical Engineering shall Develop Strong Academic Foundation for Successful Professional Career
PEO2	Graduates of Mechanical Engineering Acquires skills to excel in the area of Mechanical Engineering both in Industries and Academics
PEO3	Graduates of Mechanical Engineering Possess awareness towards Higher Education, R & D and Socio-Ethical values

PROGRAM SPECIFIC OUTCOMES (PSO)

PSO 1	Graduates are able to Design, Analyze and Develop Mechanical Systems.
PSO 2	Graduates are Capable of Developing Research Skills in Self Sustainable Energy sources and Composite Materials.

PROGRAM OUTCOMES (PO)

PO 1	Engineering Knowledge	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Problem Analysis	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	Design/ Development of Solutions	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	Conduct investigations of complex problems	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	Modern tool usage	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO 6	The engineer and society	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	Environment and sustainability	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and team work	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	Project management and finance	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life-long learning	Recognize the need for, and have the preparation and ability to engage in Independent and life-long learning in the broadest context of technological change.

V.V. Sangha's

Rao Bahadur Y. Mahabaleswarappa Engineering College, Ballari

Cantonment, P.B. No.: 583104, Tel: 08392-244809, Fax: 08392-242148

CALENDAR OF EVENTS EVEN SEM 2020-21

IMPORTANT DATES

SEM	Even sem Commencement	Last Working Day	Practical Exam	Theory Exam	Odd Sem Commencement
VI/VI/ VIII SEM	19-04-2021	07-08-2021 20-07-2021	09-08-2021	23-08-2021	13-09-2021
MBA & MTECH II/IV SEM	10-05-2021 05-04-2021	25-09-2021 24-07-2021		27-07-2021 To 18-08-2021	08-11-2021

MONTH	MON	TUE	WED	THR	FRI	SAT	SUN	EVENTS
APRIL				1	2	3	4	April 19th Commencement of EVEN semester 2021 – 2022 4th, 6th and 8th semester
	5	6	7	8	9	10	11	
	12	13	14	15	16	17	18	
	19	20	21	22	23	24	25	
	26	27	28	29	30			
MAY						1	2	
	3	4	5	6	7	8	9	
	10	11	12	13	14	15	16	
	17	18	19	20	21	22	23	
	24	25	26	27	28	29	30	
	31							
JUNE		1	2	3	4	5	6	
	7	8	9	10	11	12	13	10th – 12th June 2021 1st Internal Test
	14	15	16	17	18	19	20	20th June 2021 internal Marks and Attendance to parents
	21	22	23	24	25	26	27	24th – 26th June 2021 1st Internal Test (PG)
	28	29	30					
JULY				1	2	3	4	
	5	6	7	8	9	10	11	
	12	13	14	15	16	17	18	16th – 20th July 2021 2nd Internal Test
	19	20	21	22	23	24	25	30th July 2021 internal Marks and Attendance to parents
	26	27	28	29	30	31		
AUGUST							1	
	2	3	4	5	6	7	8	
	9	10	11	12	13	14	15	12th – 18th August 2021 3rd Internal Test 09th – 11th August 2021 2nd Internal Test (PG)
	16	17	18	19	20	21	22	25th August 2021 internal Marks and Attendance to parents
	23	24	25	26	27	28	29	
	30	31						8th – 10th September 2021 3rd Internal Test (PG)

V. V. SANGHA'S

RAO BAHADUR Y MAHABALESHWARAPPA ENGG COLLEGE, BALLARI – 583104.

(Formerly VIJAYANAGARA ENGINEERING COLLEGE)
CANTONMENT, BALLARI-583 104 (KARNATAKA).

DEPARTMENT OF MECHANICAL ENGINEERING

CALENDER OF EVENTS

ACADEMIC YEAR 2020-21 EVEN

Week (Session)	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Institution / Department Events	VTU Holidays
	APRIL 2021								
1				1	2	3	4		2nd Good Friday
2	5	6	7	8	9	10	11	5th HOD meeting	
3	12	13	14	**15**	16	17	18		13th Yugadhi 14th Ambedkar Jayanthi
4	19	**20**	21	22	23	24	25	19th Commencement of Sem	
5	26	27	28	29	30				
	MAY 2021								
6						1	2		1st May day
7	3	4	5	6	7	8	9		
8	**10**	11	12	13	14	15	16		14th Basava Jayanthi
9	17	18	19	20	21	22	23		
10	24	25	26	27	28	29	30		
	JUNE 2021								
10	31 May	1	2	3	4	5	6		
11	7	8	9	10	11	12	13	10th, 11th & 12th IA-I Test	
12	14	15	16	17	18	19	20		
13	21	22	23	24	25	26	27	26th HOD Meeting	
14	28	29	30					Submission of Ist assignment	
	JULY 2021								
				1	2	3	4		
15	5	6	7	8	9	10	11		
16	12	13	14	15	16	17	18	16th, 17th & 18th IA-II Test	
17	19	20	21	22	23	24	25		21st Bakrid
18	26	27	28	29	30	31		Submission of IInd assignment	
19	**AUGUST 2021**								
							1		
20	2	3	4	5	6	7	8	7th last working day	
21	9	10	11	12	13	14	15	9th HOD Meeting	15th Independence Day
22	16	17	18	19	20	21	22	16th, 17th & 18th IA-II Test	
23	23	24	25	26	27	28	29		28th Moharram

Covid-19 pandemic hit the nation again with wave 2, all the classes were online and this batch was promoted.

PROGRAM ASSESSMENT COMMITTEE ★ PAC MECH RYMEC

Head of the Department,
Dept. of Mechanical Engineering.

Head of the Department,
Mechanical Engineering Department.
R.Y.M. Engineering Collage,
Cantonment, BELLARY-583 104

Individual Time Table- 2020-21 (EVEN-Sem) - For Off Line

Dr. Kotresh Sardar Subjects: VIII-B Additive Manufacturing (17ME82), IV I&PE-CAD/CAM									
DAY	9.00-9.55	9.55-10.50	BREAK (10.50 - 11.00)	11.00-11.55	11.55-12.50	LUNCH (12.50 – 2.15)	2.15-3.10	3.10-4.05	4.00-5.00
MON	AM				AM		CAD/CAM		
TUE	CAD/CAM			AM					
WED		CAD/CAM		AM					
THUR		AM		CAD/CAM					
FRI									
SAT									
ADDITIONAL WORK		Coordinator: TTL Lab, TCC, Electives, Publicity, Student Forum, CAD Lab In charge, NBA Cr-3, Mentor							
WORK LOAD									

Individual Time Table- 2020-21 (EVEN-Sem) - For On Line

Dr. Kotresh Sardar Subjects: VIII-B Additive Manufacturing (17ME82), IV I&PE-CAD/CAM			
DAY	9.30 AM-10.30 AM	11.30 AM – 12.30 PM	3.00 PM – 4.00 PM
MON		AM	CAD/CAM
TUE	AM	CAD/CAM	
WED		AM	
THUR		AM	
FRI			CAD/CAM
SAT	CAD/CAM		
ADDITIONAL WORK		Coordinator: TTL Lab, TCC, Electives, Publicity, Student Forum, CAD Lab In charge, NBA Cr-3, Mentor	
WORK LOAD			

PROGRAMME COMMITTEE PC MECH RYMEC

Head of the Department,
Mechanical Engineering Department,
R.Y.M. Engineering College,
Cantonment. BELLARY-583 104

SYLLABUS COPY 2020-21

ADDITIVE MANUFACTURING-17ME82

Module 1 Introduction to Additive Manufacturing: Introduction to AM, AM evolution, Distinction between AM & CNC machining, Advantages of AM, AM process chain: Conceptualization, CAD, conversion to STL, Transfer to AM, STL file manipulation, Machine setup, build , removal and clean up, post processing. Classification of AM processes: Liquid polymer system, Discrete particle system, Molten material systems and Solid sheet system. Post processing of AM parts: Support material removal, surface texture improvement, accuracy improvement, aesthetic improvement, preparation for use as a pattern, property enhancements using non-thermal and thermal techniques. Guidelines for process selection: Introduction, selection methods for a part, challenges of selection AM Applications: Functional models, Pattern for investment and vacuum casting, Medical models, art models, Engineering analysis models, Rapid tooling, new materials development, Bi-metallic parts, Re-manufacturing. Application examples for Aerospace, defence, automobile, Bio-medical and general engineering industries.

Module 2 System Drives and devices: Hydraulic and pneumatic motors and their features, Electrical motors AC/DC and their features Actuators: Electrical Actuators; Solenoids, Relays, Diodes, Thyristors, Triacs, Hydraulic and Pneumatic actuators, Design of Hydraulic and Pneumatic circuits, Piezoelectric actuators, Shape memory alloys. **10 Hours**

Module 3 Polymers & Powder Metallurgy Basic Concepts: Introduction to Polymers used for additive manufacturing: polyamide, PF resin, polyesters etc. Classification of polymers, Concept of functionality, Polydispersity and Molecular weight [MW], Molecular Weight Distribution [MWD] Polymer Processing: Methods of spinning for additive manufacturing: Wet spinning, Dry spinning. Biopolymers, Compatibility issues with polymers. Moulding and casting of polymers, Polymer processing techniques General Concepts: Introduction and History of Powder Metallurgy (PM), Present and Future Trends of PM Powder Production Techniques: Different Mechanical and Chemical methods, Atomisation of Powder, other emerging processes. Characterization Techniques: Particle Size & Shape Distribution, Electron Microscopy of Powder, Interparticle Friction, Compression ability, Powder Structure, Chemical Characterization Microstructure Control in Powder: Importance of Microstructure Study, Microstructures of Powder by Different techniques Powder Shaping: Particle Packing Modifications, Lubricants & Binders, Powder Compaction & Process Variables, Pressure & Density Distribution during Compaction, Isotactic Pressing, Injection Moulding, Powder Extrusion, Slip Casting, Tape Casting. Sintering: Theory of Sintering, Sintering of Single & Mixed Phase Powder, Liquid Phase Sintering Modern Sintering Techniques, Physical & Mechanical Properties Evaluation, Structure-Property Correlation Study, Modern Sintering techniques, Defects Analysis of Sintered Components Application of Powder Metallurgy: Filters, Tungsten Filaments, Self-Lubricating Bearings, Porous Materials, Biomaterials etc. **10 Hours**

Module 4 Nano Materials & Characterization Techniques: Introduction: Importance of Nano-technology, Emergence of Nanotechnology, Bottomup and Top-down approaches, challenges in Nanotechnology Nano-materials Synthesis and Processing: Methods for creating Nanostructures; Processes for producing ultrafine powders- Mechanical grinding; Wet Chemical Synthesis of Nano-materials- sol-gel process; Gas Phase synthesis of Nano-materials Furnace, Flame assisted ultrasonic spray pyrolysis; Gas Condensation Processing (GPC),

Chemical Vapour Condensation(CVC). Optical Microscopy - principles, Imaging Modes, Applications, Limitations. Scanning Electron Microscopy (SEM) - principles, Imaging Modes, Applications, Limitations. Transmission Electron Microscopy (TEM) - principles, Imaging Modes, Applications, Limitations. X- Ray Diffraction (XRD) - principles, Imaging Modes, Applications, Limitations. Scanning Probe Microscopy (SPM) - principles, Imaging Modes, Applications, Limitations. Atomic Force Microscopy (AFM) - basic principles, instrumentation, operational modes, Applications, Limitations. Electron Probe Micro Analyzer (EPMA) - Introduction, Sample preparation, Working procedure, Applications, Limitations. **10 Hours**

Module5. Manufacturing Control And Automation CNC technology: Introduction to NC/CNC/DNC machine tools, Classification of NC /CNC machine tools, Advantage, disadvantages of NC /CNC machine tools, Application of NC/CNC Part programming: CNC programming and introduction, Manual part programming: Basic (Drilling, milling, turning etc.), Special part programming, Advanced part programming, Computer aided part programming (APT) Introduction: Automation in production system principles and strategies of automation, basic Elements of an automated system. Advanced Automation functions. Levels of Automations, introduction to automation productivity Control Technologies in Automation: Industrial control system. Process industry vs discrete manufacturing industries. Continuous vs discrete control. Continuous process and its forms. Other control system components. **10 Hours**

TEXT BOOKS:

1. Chua Chee Kai, Leong Kah Fai, "Rapid Prototyping: Principles & Applications", World Scientific, 2003.
2. G Odian Principles of Polymerization, Wiley Inerscience John Wiley and Sons, 4th edition, 2005.
3. Mark James Jackson, Microfabrication and Nanomanufacturing, CRC Press, 2005.
4. Powder Metallurgy Technology, Cambridge International Science Publishing, 2002.
5. P. C. Angelo and R. Subramanian: Powder Metallurgy- Science, Technology and Applications, PHI, New Delhi, 2008.
6. Mikell P Groover, Automation, Production Systems and Computer Integrated Manufacturing, 3rd Edition, Prentice Hall Inc., New Delhi, 2007.

REFERENCE BOOKS:

1. Wohler's Report 2000 - Terry Wohlers - Wohler's Association -2000.
2. 2. Computer Aided Manufacturing - P.N. Rao, N.K. Tewari and T.K. Kundra Tata McGraw Hill 1999.
3. 3. Ray F. Egerton , Physical Principles of Electron Microscopy: An Introduction to TEM, SEM, and AEM , Springer, 2005.
4. 4. P. C. Angelo and R. Subramanian: Powder Metallurgy- Science, Technology and Applications, PHI, New Delhi, 2008.

COURSE COMMITTEE CC MECH RYMEC

COs, CO-PO MAPPING AND JUSTIFICATION 2020-21

CO's	DESCRIPTION
17C410.1	Discuss various Additive manufacturing process and its applications.
17C410.2	Illustrate various motors, Actuators used in the system and design of hydraulic & pneumatic circuits.
17C410.3	Analyze basic concepts, its importance and applications of polymers and powder metallurgy in additive manufacturing.
17C410.4	Examine nanomaterials with various characterization techniques and its applications.
17C410.5	Develop NC, CNC machine programming automated industrial applications.

CO-PO/PSO MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
17C410.1	2			1	3		2	2				2		
17C410.2	2		2	1	2			2				2	1	
17C410.3	2	1	2	1	2			2				2	2	
17C410.4	3	2	2	2	3			2				2	2	
17C410.5	3	2	2	2	3			2				2	2	
Average	2.4	1.6	2	1.4	2.6		2	2				2	1.75	

*Note: - 1.Slight (Low) 2.Modarate (Medium) 3.Substantial (High).

COURSE COMMITTEE CC MECH RYMEC

JUSTIFICATION FOR THE CO WITH THE PO (1-12)

PO1: All the contents of this course are based on the knowledge of science, mathematics and fundamentals of engineering, therefore the CO1, CO2 and CO3 are mapped with moderate correlation 2, and only CO4 and CO5 are mapped with high correlation 3.

PO2: The students apply the knowledge of engineering to identify, formulate and analyze the complex problems. Hence CO4 and CO5 are mapped with moderate correlation 2 and only CO3 is mapped with low correlation 1.

PO3: The students will be able to design and develop the solution for complex engineering problems that meet the specified needs with appropriate consideration for the public. Therefore only CO2, CO3, CO4 and CO5 are mapped with moderate correlation 2.

PO4: Students are able to design and develop the mathematical solutions for various complex problems related to computer integrated manufacturing. Therefore CO4 and CO5 are mapped with moderate correlation 2 and CO1, CO2 and CO3 are mapped with low correlation 1.

PO5: Students are able to use modern tools for analyzing the complex problems and apply appropriate technique of real life applications. Therefore all CO1, CO4 and CO5 are mapped with high correlation 3 and CO2 and CO3 are mapped with moderate correlation 2.

PO6: Social and health issues are not addressed by any of the modules. Therefore none of the CO's is mapped.

PO7: Students are able to understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge. Therefore only CO1 is mapped with moderate correlation 2.

PO8: Students are able to apply ethical principles and commit to professional ethics and responsibilities for engineering practice. Therefore all CO's is mapped with moderate correlation 2.

PO9: Team work is not addressed by any of the modules. Therefore none of the CO's is mapped.

PO10: Communication is not addressed by any of the modules. Therefore none of the CO's is mapped.

PO11: Project management and finance is not addressed by any one of the modules. Therefore none of the CO's is mapped.

PO12: Students are able to recognise the need and have ability to engage in independent principles for lifelong learning for technological change. Therefore all CO's are mapped with moderate correlation 2.

CO-PSO MAPPING MATRIX

CO's \ PSO's	PSO1	PSO2
17c410.1		
17c410.2	1	
17c410.3	2	
17C410.4	2	
17C410.5	2	
Average	1.75	

*Note: - 1.Slight (Low) 2.Modarate (Medium) 3.Substanial (High).

JUSTIFICATION FOR THE CO WITH THE PSO (1-2)

PSO1: The contents of this course are based on design and analysis of the mechanical systems. Hence all the CO3, CO4 and CO5 are mapped with moderate correlation 2 and CO2 is mapped with low correlation1.

PSO2: Contents of this course does not develop any research skills in self sustainable energy sources and composites. Hence none of the CO's is mapped.

COURSE COMMITTEE
CC
MECH
RYMEC

RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI
Department of Mechanical Engineering

STUDENTS LIST

Sl.No	USN	NAME	Sl.No	USN	NAME
B - 1	3VC16ME001	A M SHASHANK	B - 31	3VC17ME076	TARUN KUMAR P
B - 2	3VC16ME020	BHAVANARI BHARGAV	B - 32	3VC17ME077	V D S S UDAYAKUMAR
B - 3	3VC16ME045	MANJUNATH GOUDA Y	B - 33	3VC17ME079	VIJAY PATIL
B - 4	3VC16ME047	MANOHARA G	B - 34	3VC17ME080	VIKAS GOUDA G
B - 5	3VC16ME079	S AFZAL HUSSAIN	B - 35	3VC17ME082	VINAYAKA V M
B - 6	3VC16ME095	SHIVARAJ M P	B - 36	3VC17ME083	VIVEK R
B - 7	3VC16ME123	RAHUL R	B - 37	3VC17ME084	V JETHA NAIK
B - 8	3VC16ME124	B AKHIL CHOWDARY	B - 38	3VC17ME087	YASHWANTH RAJ
B - 9	3VC16ME126	J VAMSHI	B - 39	3VC18ME400	AJAY KUMAR H
B - 10	3VC17ME034	M K GURURAJA	B - 40	3VC18ME403	AZHAR B
B - 11	3VC17ME036	MANIL KUMAR	B - 41	3VC18ME404	BALAJI D
B - 12	3VC17ME038	MD AJMAL S	B - 42	3VC18ME407	GOVARDHAN C R
B - 13	3VC17ME042	MOHAMMED TANVEER	B - 43	3VC18ME409	DEVARAJA
B - 14	3VC17ME044	MUNDALAMANE SHAMSHUDDIN	B - 44	3VC18ME412	HARISH K
B - 15	3VC17ME045	NAGARAJ B M	B - 45	3VC18ME416	KARTHIK KUMAR S
B - 16	3VC17ME050	PAVAN KUMAR M	B - 46	3VC18ME417	KARTHIK VD
B - 17	3VC17ME051	PINJARA MAHAMMAD SHAREEF	B - 47	3VC18ME419	KOTRESH K
B - 18	3VC17ME052	PRAJWAL ABBIGERI	B - 48	3VC18ME422	LOKESH P H
B - 19	3VC17ME053	PRAVEEN KUMAR	B - 49	3VC18ME428	MD ARSHAD
B - 20	3VC17ME056	RAHUL BEDDADI	B - 50	3VC18ME438	RAJA T
B - 21	3VC17ME057	D RAVI SHANKAR	B - 51	3VC18ME439	RAMZAN SAB
B - 22	3VC17ME059	S SHIVAKUMARA	B - 52	3VC18ME440	S P VISHAL
B - 23	3VC17ME060	SACHIN YALABURGI	B - 53	3VC18ME445	SHARUKANTHA P
B - 24	3VC17ME062	SAI SHASHANK	B - 54	3VC18ME448	SHIVARAJU M
B - 25	3VC17ME063	SAMEER BASHA	B - 55	3VC18ME450	SHUJAHATH ALI S
B - 26	3VC17ME070	SHARANABASAVA H M	B - 56	3VC18ME452	SOMANAIK K
B - 27	3VC17ME071	SOMASHEKAR R H	B - 57	3VC18ME453	SURESH G M
B - 28	3VC17ME072	SREEKANTH NAIK	B - 58	3VC18ME456	UNCHE NAVEEN
B - 29	3VC17ME074	SUMIT S KORLAHALLI	B - 59	3VC18ME463	YALIPI SHAIK MD HASHEEM PEER
B - 30	3VC17ME075	SURYA BABA G			

RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI
Department of Mechanical Engineering

COURSE PLAN 2020-21

Staff Name: Dr. Kotresh Sardar	**Course Type:** Core	**Sem / Sec:** VIII /B Sec
Course Name: Additive Manufacturing	**Course Code:** C410	**Total Number of Lecture Hours:** 50

Sl. No.	Topic covered	Hours Required	Assessment Strategy
1	Introduction to AM, AM evolution, Distinction between AM & CNC machining, Advantages of AM	1	I.A. & F.E.
2	Conceptualization, CAD, conversion to STL, Transfer to AM, STL file manipulation	2	I.A. & F.E.
3	Liquid polymer system, Discrete particle system	1	I.A. & F.E.
4	Molten material systems and Solid sheet system.	1	I.A. & F.E.
5	Support material removal, surface texture improvement, accuracy improvement, aesthetic improvement	1	I.A. & F.E.
6	preparation for use as a pattern, property enhancements using non-thermal and thermal techniques	1	I.A. & F.E.
7	selection methods for a part, challenges of selection AM Applications: Functional models	1	
8	Pattern for investment and vacuum casting, Medical models, art models, Engineering analysis models	1	I.A. & F.E.
9	Rapid tooling, new materials development, Bi-metallic parts, Re-manufacturing. Application examples	1	I.A. & F.E.
10	Hydraulic and pneumatic motors and their features	1	I.A. & F.E.
11	Electrical motors AC/DC and their features Actuators	1	I.A. & F.E.
12	Electrical Actuators; Solenoids	1	I.A. & F.E.
13	Relays, Diodes	1	I.A. & F.E.
14	Thyristors, Triacs	1	I.A. & F.E.
15	Hydraulic and Pneumatic actuators	1	I.A. & F.E.
16	Design of Hydraulic circuits	1	I.A. & F.E.
17	Design of Pneumatic circuits	1	I.A. & F.E.
18	Piezoelectric actuators	1	I.A. & F.E.
19	Shape memory alloys	1	I.A. & F.E.
20	Polyamide, PF resin, polyesters etc. Classification of polymers, Concept of functionality	1	I.A. & F.E.

21	Polydispersity and Molecular weight [MW], Molecular Weight Distribution [MWD] Polymer Processing	1	I.A. & F.E.
22	Methods of spinning for additive manufacturing: Wet spinning	1	I.A. & F.E.
23	Dry spinning. Biopolymers, Compatibility issues with polymers	1	I.A. & F.E.
24	Moulding and casting of polymers, Polymer processing techniques General Concepts	1	I.A. & F.E.
25	History of Powder Metallurgy (PM), Present and Future Trends of PM Powder Production Techniques	1	I.A. & F.E.
26	Mechanical and Chemical methods, Atomisation of Powder, other emerging processes	1	I.A. & F.E.
27	Particle Size & Shape Distribution, Electron Microscopy of Powder, Interparticle Friction, Compression ability, Powder	1	I.A. & F.E.
28	Sintering: Theory of Sintering, Sintering of Single & Mixed Phase Powder, Liquid Phase Sintering Modern Sintering Techniques	1	I.A. & F.E.
29	Defects Analysis of components Application of Powder Metallurgy	1	I.A. & F.E.
30	Importance of Nano-technology, Emergence of Nanotechnology, Bottomup and Top-down approaches	1	I.A. & F.E.
31	challenges in Nanotechnology Nano-materials Synthesis and Processing	1	I.A. & F.E.
32	Processes for producing ultrafine powders- Mechanical grinding; Wet Chemical Synthesis of Nano-materials- sol-gel process	1	I.A. & F.E.
33	Gas Phase synthesis of Nano-materials Furnace, Flame assisted ultrasonic spray pyrolysis	1	I.A. & F.E.
34	Gas Condensation Processing (GPC), Chemical Vapour Condensation (CVC). Optical Microscopy	1	I.A. & F.E.
35	Scanning Electron Microscopy (SEM), TEM and XRD	1	I.A. & F.E.
36	SFM and AFM	1	I.A. & F.E.
37	Electron Probe Micro Analyzer (EPMA) - Introduction, Sample preparation	1	I.A. & F.E.
38	Applications and limitations of Characterization Techniques	1	I.A. & F.E.
39	Applications and limitations of Characterization Techniques	1	I.A. & F.E.
40	Introduction to NC/CNC/DNC machine tools, Classification of NC /CNC machine tool	1	I.A. & F.E.
41	Advantage, disadvantages of NC /CNC machine tools	1	I.A. & F.E.
42	Application of NC/CNC Part programming: CNC programming	1	I.A. & F.E.
43	Manual part programming Basic Drilling, milling, turning etc.	1	I.A. & F.E.
44	Special part programming, Advanced part programming, Computer aided part programming (APT)	1	I.A. & F.E.
45	Automation in production system principles and strategies of automation	1	I.A. & F.E.
46	Advanced Automation functions. Levels of Automations	1	I.A. & F.E.

47	Control Technologies in Automation: Industrial control system	1	I.A. & F.E.
48	Process industry vs discrete manufacturing industries.	1	I.A. & F.E.
49	Continuous process and its forms. Other control system components.	1	I.A. & F.E.
		50	

Assessment Strategy:

Assignment	CIE	SEE	Seminar
Mention if any other required:			

Teaching and Learning Tools: Blackboard/PowerPoint presentation.

TEXT BOOKS:

1. Chua Chee Kai, Leong Kah Fai, "Rapid Prototyping: Principles & Applications", World Scientific, 2003.
2. G Odian Principles of Polymerization, Wiley Inerscience John Wiley and Sons, 4th edition, 2005.
3. Mark James Jackson, Microfabrication and Nanomanufacturing, CRC Press, 2005.
4. Powder Metallurgy Technology, Cambridge International Science Publishing, 2002.
5. P. C. Angelo and R. Subramanian: Powder Metallurgy- Science, Technology and Applications, PHI, New Delhi, 2008.
6. Mikell P Groover, Automation, Production Systems and Computer Integrated Manufacturing, 3rd Edition, Prentice Hall Inc., New Delhi, 2007.

REFERENCE BOOKS:

1. Wohler's Report 2000 - Terry Wohlers - Wohler's Association -2000.
2. 2. Computer Aided Manufacturing - P.N. Rao, N.K. Tewari and T.K. Kundra Tata McGraw Hill 1999.
3. 3. Ray F. Egerton , Physical Principles of Electron Microscopy: An Introduction to TEM, SEM, and AEM , Springer, 2005.
4. 4. P. C. Angelo and R. Subramanian: Powder Metallurgy- Science, Technology and Applications, PHI, New Delhi, 2008.

Digital Library:

1. **\\192.168.8.4\gdlc1\Mechanical Reference Books**
2. **\\192.168.8.4\gdlc1\EngineeringLibrary-1**

Contents beyond Syllabus:

Note: Planning of syllabus to be covered as per units given in VTU syllabus

Staff Signature

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Head of the Department,
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RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI
Department of Mechanical Engineering

COURSE EXECUTION SUMMARY 2020-21

Staff Name: Prof. Dr. Kotresh Sardar	**Course Type: Core**	**Sem / Sec: 8th B**
Course Name: Additive Manufacturing	**Course Code: 17ME82**	**Total No. of Lecture Hours: 50**
Max marks: 60	**Prerequisites: CAD/CAM, CIM Automation & Robotics**	

Sl. No.	Date	Time/Period	Topic covered	Remarks
01	26.04.2021	11.30 AM – 12.30 PM /II	Introduction to AM, AM evolution, Distinction between AM & CNC machining, Advantages of AM	
02	27.04.2021	9.30 AM- 10.30 AM/I	Conceptualization, CAD, conversion to STL, Transfer to AM, STL file manipulation	
03	28.04.2021	3.30 PM- 4.30 AM/III	Conceptualization, CAD, conversion to STL, Transfer to AM, STL file manipulation	
04	29.04.2021	11.30 AM – 12.30 PM /II	Liquid polymer system, Discrete particle system	
05	01.05.2021	9.30 AM- 10.30 AM/I	Molten material systems and Solid sheet system.	
06	03.05.2021	11.30 AM – 12.30 PM/II	Support material removal, surface texture improvement, accuracy improvement, aesthetic improvement	
07	04.05.2021	9.30 AM- 10.30 AM/I	preparation for use as a pattern, property enhancements using non-thermal and thermal techniques	
08	05.05.2021	11.30 AM – 12.30 PM/II	selection methods for a part, challenges of selection AM Applications: Functional models	
09	06.05.2021	11.30 AM – 12.30 PM/II	Pattern for investment and vacuum casting, Medical models, art models, Engineering analysis models	
10	08.05.2021	9.30 AM- 10.30 AM/I	Rapid tooling, new materials development, Bi-metallic parts, Re-manufacturing. Application examples	
11	10.05.2021	11.30 AM – 12.30 PM/II	Hydraulic and pneumatic motors and their features	
12	13.05.2021	11.30 AM – 12.30 PM/II	Electrical motors AC/DC and their features Actuators	
13	14.05.2021	9.30 AM- 10.30 AM/I	Electrical Actuators; Solenoids	
14	15.05.2021	9.30 AM- 10.30 AM/I	Relays, Diodes	
15	17.05.2021	11.30 AM – 12.30 PM/II	Thyristors, Triacs	
16	18.05.2021	9.30 AM- 10.30 AM/I	Hydraulic and Pneumatic actuators	
17	19.05.2021	11.30 AM – 12.30 PM/II	Design of Hydraulic circuits	
18	20.05.2021	11.30 AM – 12.30 PM/II	Design of Pneumatic circuits	
19	21.05.2021	9.30 AM- 10.30 AM/I	Piezoelectric actuators	
20	24.05.2021	11.30 AM – 12.30 PM/II	Shape memory alloys	
21	25.05.2021	9.30 AM- 10.30 AM/I	Polyamide, PF resin, polyesters etc. Classification of polymers, Concept of functionality	
22	26.05.2021	11.30 AM – 12.30 PM/II	Polydispersity and Molecular weight [MW], Molecular Weight Distribution [MWD] Polymer Processing	

23	31.05.2021	11.30 AM – 12.30 PM/II	Methods of spinning for additive manufacturing: Wet spinning	
24	01.06.2021	9.30 AM- 10.30 AM/I	Dry spinning. Biopolymers, Compatibility issues with polymers	
25	02.06.2021	11.30 AM – 12.30 PM/II	Moulding and casting of polymers, Polymer processing techniques General Concepts	
26	03.05.2021	11.30 AM – 12.30 PM/II	History of Powder Metallurgy (PM), Present and Future Trends of PM Powder Production Techniques	
27	05.06.2021	9.30 AM- 10.30 AM/I	Mechanical and Chemical methods, Atomisation of Powder, other emerging processes	
28	07.06.2021	11.30 AM – 12.30 PM/II	Particle Size & Shape Distribution, Electron Microscopy of Powder, Interparticle Friction, Compression ability, Powder	
29	08.06.2021	9.30 AM- 10.30 AM/I	Sintering: Theory of Sintering, Sintering of Single & Mixed Phase Powder, Liquid Phase Sintering Modern Sintering Techniques	
30	09.06.2021	11.30 AM – 12.30 PM/II	Defects Analysis of components Application of Powder Metallurgy	
31	10.06.2021	9.30 AM- 10.30 AM/I	Importance of Nano-technology, Emergence of Nanotechnology, Bottomup and Top-down approaches	
32	12.06.2021	9.30 AM- 10.30 AM/I	challenges in Nanotechnology Nano-materials Synthesis and Processing	
33	14.06.2021	11.30 AM – 12.30 PM/II	Processes for producing ultrafine powders- Mechanical grinding; Wet Chemical Synthesis of Nano-materials- sol-gel process	
34	15.06.2021	9.30 AM- 10.30 AM/I	Gas Phase synthesis of Nano-materials Furnace, Flame assisted ultrasonic spray pyrolysis	
35	16.06.2021	11.30 AM – 12.30 PM/II	Gas Condensation Processing (GPC), Chemical Vapour Condensation (CVC). Optical Microscopy	
36	17.06.2021	11.30 AM – 12.30 PM/II	Scanning Electron Microscopy (SEM), TEM and XRD	
37	18.06.2021	9.30 AM- 10.30 AM/I	SFM and AFM	
38	19.06.2021	9.30 AM- 10.30 AM/I	Electron Probe Micro Analyzer (EPMA) - Introduction, Sample preparation	
39	22.06.2021	9.30 AM- 10.30 AM/I	Applications and limitations of Characterization Techniques	
40	2306.2021	11.30 AM – 12.30 PM/II	Applications and limitations of Characterization Techniques	
41	24.06.2021	11.30 AM – 12.30 PM/II	Introduction to NC/CNC/DNC machine tools, Classification of NC /CNC machine tool	
42	25.06.2021	9.30 AM- 10.30 AM/I	Advantage, disadvantages of NC /CNC machine tools	
43	28.06.2021	9.30 AM- 10.30 AM/I	Application of NC/CNC Part programming: CNC programming	
44	29.06.2021	9.30 AM- 10.30 AM/I	Manual part programming Basic Drilling, milling, turning etc.	
45	30.06.2021	11.30 AM – 12.30 PM/II	Special part programming, Advanced part programming, Computer aided part programming (APT)	
46	01.07.2021	11.30 AM – 12.30 PM/II	Automation in production system principles and strategies of automation	
47	02.07.2021		Advanced Automation functions. Levels of Automations	
48	05.07.2021	11.30 AM – 12.30 PM/II	Control Technologies in Automation: Industrial control system	
49	06.07.2021	9.30 AM- 10.30 AM/I	Process industry vs discrete manufacturing industries.	

50	07.07.2021	9.30 AM-10.30 AM/I	Continuous process and its forms. Other control system components.	

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COURSE EVALUATION AND ASSESSMENT SCHEME-2017

	What		To Whom	When/ Where (Frequency in the course)	Max Marks	Evidence Collected
Direct Assessment Methods	CIE	Continuous Internal Evaluation	Students	Thrice(Average of the best two will be computed)	15	Blue Books
		Assignment		One(During Semester)	05	Assignment Books
		Practical Assessment		Once	20	Practical evaluation
	SEE	Semester Final Examination		End of Course (Answering One of two questions from five Modules)	80	Result sheet
		Practical Examination		One question from lot	80	Result sheet
Indirect Assessment Methods	Students Feedback		Students	End of the course	-	Questionnaire
	Course Exit Survey					

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy)

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Department of Mechanical Engineering

ASSIGNMENT – 01 (2020-21 EVEN Sem)

Staff Name: Dr. Kotresh Sardar	**Sec: B**
Course Name: Additive Manufacturing	**Total Contact Hours: 50**

Q No	QUESTIONS	BTL	CO
Q1	Explain stereo lithography process with a sketch. Write its merits, demerits and applications.	L6	1
Q2	With a neat sketch explain the working of hydraulic gear motor and unbalanced vane motor.	L2	2
Q3	Classify DC Motors and discuss DC compound motor	L2	2
Q4	Mention types of Air motors; explain vane type air motor, list advantages and applications of air motors.	L2	2
Q5	Sketch and explain the construction and working of solenoids and relays.	L2	2
Q6	Sketch and explain the construction and working of Diodes and Thyristors	L2	2
Q7	Design Regenerative circuit	L6	2
Q8	Write the applications of AM with respect to Automobile, Aerospace, Medical, Food and general.	L6	1
Q9	Explain the process chain of additive manufacturing	L2	1
Q10	Define Additive Manufacturing? Give classification of additive manufacturing process discuss the advantages of AM process.	L2	1

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Department of Mechanical Engineering

CONTINUOUS INTERNAL EVALUATION-I (2020-21 EVEN Sem)

Course: Additive Manufacturing	Course Code: 17ME82	Sem: 8th / B-sec
Date: 11/03/2021	Time: 10.30-12.00 AM	Max marks: 50
Course offered by : Dr. Kotresh Sardar		

NOTE: Answer any FIVE questions from the following

Q No	QUESTIONS	Marks	BTL	CO
Q1	Define Additive Manufacturing? Give classification of additive manufacturing process discuss the advantages of AM process.	10	L2	CO1
Q2	or Explain the process chain of additive manufacturing.		L2	CO1
Q3	Write the applications of AM with respect to Automobile, Aerospace, Medical, Food and general.	10	L6	CO1
Q4	or Explain stereo lithography process with a sketch. Write its merits, demerits and applications.		L6	CO1
Q5	With a neat sketch explain the working of hydraulic gear motor and unbalanced vane motor.	10	L2	CO2
Q6	Or Classify DC Motors and discuss DC compound motor		L2	CO2
Q7	Mention types of Air motors; explain vane type air motor, list advantages and applications of air motors.	10	L2	CO2
Q8	Or Sketch and explain the construction and working of solenoids and relays.		L2	CO2
Q9	Sketch and explain the construction and working of Diodes and Thyristors.	10	L2	CO2
Q10	or Design Regenerative circuit		L6	CO2

Note: BTL (Blooms Taxonomy Level) CO (Course Outcome)

Staff **QP Coordinator** **Course Coordinator** **HOD**

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Department of Mechanical Engineering

SCHEME OF EVALUATION FOR CIE-I (2020-21 EVEN Sem)

Course: Additive Manufacturing	Course Code: 17ME82	Sem: 8th / B-sec
Date: 11/036/2021	Time: 10.30-12.00 AM	Max marks: 50
Course offered by : Dr. Kotresh Sardar		

Q No	SCHEME OF EVALUATION	Marks	BTL	CO
01	Definition of Additive Manufacturing Classification of AM Advantages of AM	02 04 04	L2	CO1
02	Explanation of each step (02*5)	10	L2	CO1
03	Application of AM in Automobile Application of AM in Aerospace Application of AM in Medical Application of AM in Food. Conclusion	02 02 02 02 02	L6	CO1
04	Sketch of stereo lithography process Explanation merits, demerits applications	02 04 02 02	L6	CO1
05	sketch of hydraulic gear motor sketch of unbalanced vane motor Explanation	02 02 06	L2	CO2
06	Classification of DC Motors Explanation of DC compound motor	04 06	L2	CO2
07	Types of Air motors Sketch Explanation of vane type air motor advantages and applications of air motors.	02 02 04 02	L2	CO2
08	Sketch of solenoids and relays 02*02 Explanation	04 06	L2	CO2
09	Sketch of Diodes and Thyristors. 02*02 Explanation	04 06	L2	CO2
10	Sketch of Regenerative circuit Explanation Advantages & Disadvantages	03 05 02	L2	CO2

Note: BTL (Blooms Taxonomy Level) CO (Course Outcome)

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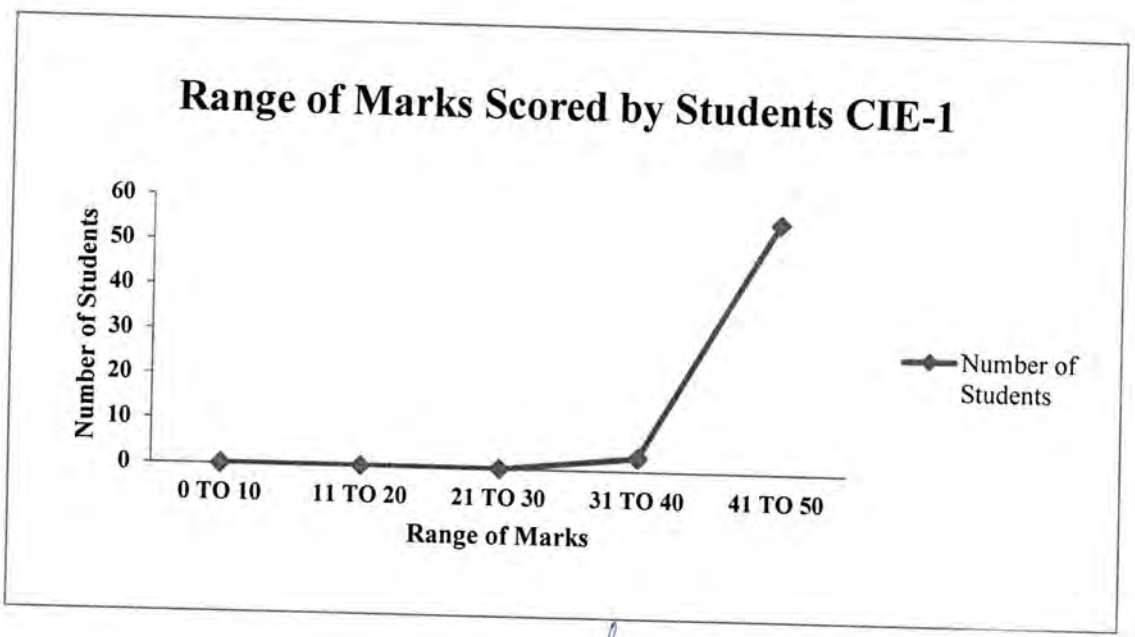
Department of Mechanical Engineering

CIE-I PERFORMANCE ANALYSIS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
CO mapping	17c410.1	17c410.1	17c410.1	17c410.1	17c410.2	17c410.2	17c410.2	17c410.2	17c410.2	17c410.2
Max Marks /Question	10	10	10	10	10	10	10	10	10	10
Total marks of class /question	253	287	531	20	0	474	518	18	19	525
No. of students attended	27	32	57	2	0	59	57	2	2	57
No of students scored > 60% of marks/Question	27	32	57	2	0	59	57	2	2	57
Percentage of students scored > 60% of marks/Question	100	100	100	100	0	100	100	100	100	100

Mark range	0 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50
No. Of Students	0	0	0	03	56



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ASSIGNMENT – 02 (2020-21 EVEN Sem)

Staff Name: Dr. Kotresh Sardar	**Sec: B**
Course Name: Additive Manufacturing	**Total Contact Hours: 50**

Q No	QUESTIONS	BTL	CO
Q1	Sketch and explain Gas Condensation Processing (GPC)	L2	4
Q2	What are the 5 grand challenges for Nano technology and Explain Ball Milling synthesis of nano materials.	L2	4
Q3	Explain Wet chemical synthesis of Nano-materials-sol-gel process. List advantages	L2	4
Q4	What is Nanotechnology? Explain the general methods followed in the synthesis of Nano-materials and fabrication of Nanostructures.	L2	4
Q5	Discuss characterization techniques in powder metallurgy.	L2	3
Q6	Explain with a neat sketch powder production by Ball milling and Attrition Milling.	L2	3
Q7	List Powder Production techniques and explain with a neat sketch powder production by Gas atomization & Water atomization technique.	L2	3
Q8	List processes of polymer moulding and explain with a neat sketch Roto moulding process.	L2	3
Q9	Explain the liquid phase sintering and solid state sintering.	L2	3
Q10	Explain with a neat sketch Dry spinning and wet spinning methods for additive manufacturing. List advantages and disadvantages.	L2	3

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Department of Mechanical Engineering

CONTINUOUS INTERNAL EVALUATION- II (2020-21 EVEN Sem)

Course: Additive Manufacturing	Course Code: 17ME82	Sem: 8th / B-sec
Date: 11/07/2021	Time: 10.00-11.30 AM	Max marks: 50
Course offered by : Dr. Kotresh Sardar		

NOTE: Answer any FIVE questions from the following

Q No	QUESTIONS	Marks	BTL	CO
Q1	Explain with a neat sketch Dry spinning and wet spinning methods for additive manufacturing. List advantages and disadvantages.	10	L2	CO3
Q2	or Explain the liquid phase sintering and solid state sintering.		L2	CO3
Q3	List processes of polymer moulding and explain with a neat sketch Roto moulding process.	10	L2	CO3
Q4	or List Powder Production techniques and explain with a neat sketch powder production by Gas atomization & Water atomization technique.		L2	CO3
Q5	Explain with a neat sketch powder production by Ball milling and Attrition Milling.	10	L2	CO3
Q6	or Discuss characterization techniques in powder metallurgy.		L2	CO3
Q7	What is Nanotechnology? Explain the general methods followed in the synthesis of Nano-materials and fabrication of Nanostructures.	10	L2	CO4
Q8	or Explain Wet chemical synthesis of Nano-materials-sol-gel process. List advantages and applications of Sol-Gel process.		L2	CO4
Q9	What are the 5 grand challenges for Nano technology and Explain Ball Milling synthesis of nano materials.	10	L2	CO4
Q10	or Sketch and explain Gas Condensation Processing (GPC)		L2	CO4

Note: BTL (Blooms Taxonomy Level) CO (Course Outcome)

Staff | QP Coordinator | Course Coordinator | HOD

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SCHEME OF EVALUATION FOR CIE-II (2020-21 EVEN Sem)

Staff Name: Dr. Kotresh Sardar	Sem: VIII	Sec: B
Subject Name: Additive Manufacturing	Subject Code: 15ME82	
Date: 15-04-2019, Time : 11.15-12.45 AM	Max Marks: 5*6=30	

NOTE: Answer any FIVE questions from the following

Q No	SCHEME OF EVALUATION	Marks	BTL	CO
01	Sketch of Wet and Dry spinning Explanation	04 06	L2	**CO3**
02	Definition of Sintering Solid state sintering Liquid state sintering	02 04 04	L2	**CO3**
03	List of processes of polymer moulding Sketch of ROTO moulding Explanation	02 03 05	L2	**CO3**
04	List of Powder Production techniques Sketch of powder production by Gas atomization Sketch of Water atomization technique. Explanation	02 02 02 04	L2	**CO3**
05	sketch of Ball milling Sketch of Attrition Milling. Explanation	02 02 06	L2	**CO3**
06	List of characterization techniques Explanation of any two	02 08	L2	**CO3**
07	Definition of Nanotechnology Explanation of general methods in synthesis	02 08	L2	**CO4**
08	sol-gel process Advantages of sol-gel process Applications of sol-gel process	02 04 04	L2	**CO4**
09	5 grand challenges for Nano technology Ball Milling synthesis of nano materials	04 06	L2	**CO4**
10	Sketch of GPC Explanation Advantages & Disadvantages	02 05 03	L2	**CO4**

Note: BTL (Blooms Taxonomy Level) CO (Course Outcome)

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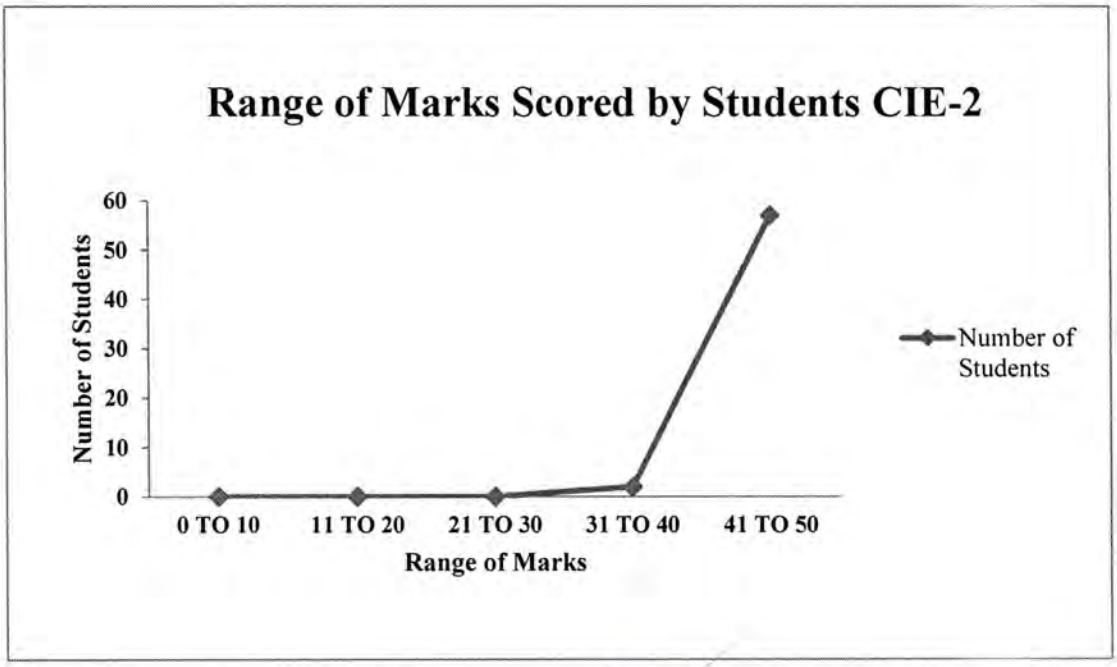
CIE-II PERFORMANCE ANALYSIS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
CO mapping	17c410.3	17c410.3	17c410.3	17c410.3	17c410.3	17c410.3	17c410.4	17c410.4	17c410.4	17c410.4
Max Marks /Question	10	10	10	10	10	10	10	10	10	10
Total marks of class /question	**502**	**70**	**28**	**542**	**525**	**0**	**8**	**492**	**0**	**502**
No. of students attended	**51**	**8**	**3**	**56**	**58**	**0**	**1**	**58**	**0**	**59**
No of students scored > 60% of marks/Question	**51**	**8**	**3**	**56**	**58**	**0**	**1**	**58**	**0**	**58**
Percentage of students scored > 60% of marks/Question	**100**	**100**	**100**	**100**	**100**	**0**	**100**	**100**	**0**	**98**

Mark range	0 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50
No. Of Students	0	0	0	02	57



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ASSIGNMENT – 03 (2020-21 EVEN Sem)

Staff Name: Dr. Kotresh Sardar	**Sec: B**
Course Name: Additive Manufacturing	**Total Contact Hours: 50**

Q No	QUESTIONS	BTL	CO
Q1	What are the capabilities of computer control	L2	5
Q2	What is control system? Explain open-loop and closed-loop control system with the help of a neat block diagram.	L2	5
Q3	Sketch and explain Spray Pyrolysis	L2	4
Q4	Sketch and explain chemical vapor condensation (CVC)	L2	4
Q5	Discuss briefly different components of CNC machine tools.	L2	5
Q6	List advantages, disadvantages and applications of CNC machine tools.	L2	5
Q7	Sketch and explain X Ray Diffraction (XRD), list its advantages and disadvantages.	L2	4
Q8	Explain levels of Industrial Process Control	L2	5
Q9	Sketch and explain Scanning Electron Microscope (SEM), list its advantages and disadvantages.	L2	4
Q10	Explain different process control requirements	L2	5

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CONTINUOUS INTERNAL EVALUATION-III (2020-21 EVEN Sem)

Course: Additive Manufacturing	Course Code: 17ME82	Sem: 8th / B-sec
Date: 16/07/2021	Time: 03.00-04.30 PM	Max marks: 50
Course offered by : Dr. Kotresh Sardar		

NOTE: Answer any FIVE questions from the following

Q No	QUESTIONS	Marks	BTL	CO
Q1	Sketch and explain Spray Pyrolysis or	10	L2	CO4
Q2	Sketch and explain chemical vapor condensation (CVC)		L2	CO4
Q3	Sketch and explain Scanning Electron Microscope (SEM), list its advantages and disadvantages. or	10	L2	CO4
Q4	Sketch and explain X Ray Diffraction (XRD), list its advantages and disadvantages.		L2	CO4
Q5	What are the capabilities of computer control or	10	L2	CO5
Q6	What is control system? Explain open-loop and closed-loop control system with the help of a neat block diagram.		L2	CO5
Q7	Discuss briefly different components of CNC machine tools. or	10	L2	CO5
Q8	List advantages, disadvantages and applications of CNC machine tools.		L2	CO5
Q9	Explain levels of Industrial Process Control or	10	L2	CO5
Q10	Explain different process control requirements.		L2	CO5

Note: BTL (Blooms Taxonomy Level) CO (Course Outcome)

Staff | QP Coordinator | Course Coordinator | HOD

IQAC MECH RYMEC

COURSE COMMITTEE CC MECH RYMEC

Head of Department,
Mechanical Engineering Department
R.Y.M. Engineering College,
Cantonment, BELLARY-583 104

RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI
Department of Mechanical Engineering

SCHEME OF EVALUATION FOR CIE-III (2020-21 EVEN Sem)

Course: Additive Manufacturing	Course Code: 17ME82	Sem: 8th / B-sec
Date: 16/07/2021	Time: 03.00-04.30 PM	Max marks: 50
Course offered by : Dr. Kotresh Sardar		

NOTE: Answer any FIVE questions from the following

Q No	SCHEME OF EVALUATION	Marks	BTL	CO
01	Sketch of Spray Pyrolysis Explanation Advantages & disadvantages	02 05 03	L2	**CO4**
02	Sketch of CVC Explanation	03 07	L2	**CO4**
03	Sketch of SEM Explanation Advantages & disadvantages	02 05 03	L2	**CO4**
04	Sketch of XRD Explanation Advantages & disadvantages	02 05 03	L2	**CO4**
05	List of capabilities of computer control Explanation	03 07	L2	**CO5**
06	Open loop control system Closed oop control system	05 05	L2	**CO5**
07	Sketch of CNC Explanation Advantages of CNC	03 05 02	L2	**CO5**
08	Advantages of CNC Disadvantages of CNC Applcations of CNC	03 03 04	L2	**CO5**
09	List of levels of industrial process control Explanation	04 06	L2	**CO5**
10	Explanation of 2 process control equipments (5M each)	10	L2	**CO5**

Note: BTL (Blooms Taxonomy Level) CO (Course Outcome)

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Mechanical Engineering Department
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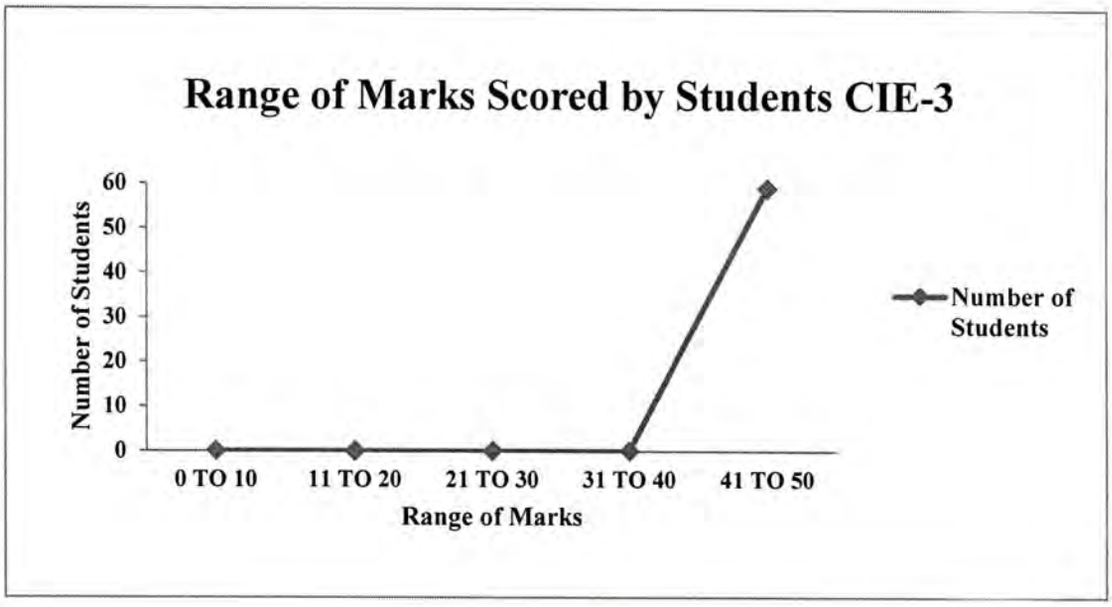
Cantonment, BELLARY-583 104

RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI
Department of Mechanical Engineering

CIE-III PERFORMANCE ANALYSIS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
CO mapping	17C410.4	17C410.4	17C410.4	17C410.4	17C410.5	17C410.5	17C410.5	17C410.5	17C410.5	17C410.5
Max Marks /Question	10	10	10	10	10	10	10	10	10	10
Total marks of class /question	514	49	202	372	216	322	115	401	0	536
No. of students attended	54	5	21	38	25	34	13	46	0	59
No of students scored > 60% of marks/Question	54	5	21	38	25	34	13	46	0	59
Percentage of students scored > 60% of marks/Question	100	100	100	100	100	100	100	100	0	100

Mark range	0 TO 10	11 TO 20	21 TO 30	31 TO 40	41 TO 50
No. Of Students	0	0	0	0	59



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Department of Mechanical Engineering

REMEDIAL AND TUTORIAL CLASSES INFORMATION

Sl. No	Topic Covered
01	Assess the level of Effectiveness in Identifying the different Additive manufacturing based on type of the materials
02	Rate of potency in usage of Additive manufacturing applications for the Medical and engineering models.
03	Are you able to recognize type of the drive to be used based on the applications
04	Are you able to analyze different drives and actuators based on the power transmissions.
05	Are you able to analyze the method of powder production technique.
06	Are you able to decide Physical & Mechanical Properties Evaluation of polymers.
07	Are you able to recognize different approaches for the emergence of the nano technology
08	Are you able to analyze different characterization technique and microstructure of the nano materials
09	Are you able to write manual part program for the different manufacturing process
10	Rate yourself about the overall benefit of this subject for your futuristic career

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Head of the Department,
Mechanical Engineering Department,
R.Y.M. Engineering College,
Cantonment, BELLARY-583 104

RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI
Department of Mechanical Engineering

FINAL CIE AND SEE MARKS

Roll No	USN	Name of the Student	CIE	SEE	Roll No	USN	Name of the Student	CIE	SEE
B - 1	3VC16ME001	A M SHASHANK	35	43	B - 31	3VC17ME076	TARUN KUMAR P	38	44
B - 2	3VC16ME020	BHAVANARI BHARGAV	37	40	B - 32	3VC17ME077	V D S S UDAYAKUMAR	37	47
B - 3	3VC16ME045	MANJUNATH GOUDA Y	37	35	B - 33	3VC17ME079	VIJAY PATIL	37	38
B - 4	3VC16ME047	MANOHARA G	38	39	B - 34	3VC17ME080	VIKAS GOUDA G	37	45
B - 5	3VC16ME079	S AFZAL HUSSAIN	38	43	B - 35	3VC17ME082	VINAYAKA V M	40	47
B - 6	3VC16ME095	SHIVARAJ M P	37	39	B - 36	3VC17ME083	VIVEK R	37	36
B - 7	3VC16ME123	RAHUL R	38	45	B - 37	3VC17ME084	V JETHA NAIK	37	36
B - 8	3VC16ME124	B AKHIL CHOWDARY	38	28	B - 38	3VC17ME087	YASHWANTH RAJ	37	36
B - 9	3VC16ME126	J VAMSHI	37	41	B - 39	3VC18ME400	AJAY KUMAR H	36	32
B - 10	3VC17ME034	M K GURURAJA	37	41	B - 40	3VC18ME403	AZHAR B	37	35
B - 11	3VC17ME036	MANIL KUMAR	37	48	B - 41	3VC18ME404	BALAJI D	40	48
B - 12	3VC17ME038	MD AJMAL S	38	35	B - 42	3VC18ME407	GOVARDHAN C R	38	39
B - 13	3VC17ME042	MOHAMMED TANVEER	38	35	B - 43	3VC18ME409	DEVARAJA	39	42
B - 14	3VC17ME044	MUNDALAMANE SHAMSHUDDIN	35	40	B - 44	3VC18ME412	HARISH K	37	40
B - 15	3VC17ME045	NAGARAJ B M	38	47	B - 45	3VC18ME416	KARTHIK KUMAR S	38	47
B - 16	3VC17ME050	PAVAN KUMAR M	37	48	B - 46	3VC18ME417	KARTHIK VD	37	47
B - 17	3VC17ME051	PINJARA MAHAMMAD SHAREEF	35	37	B - 47	3VC18ME419	KOTRESH K	38	48
B - 18	3VC17ME052	PRAJWAL ABBIGERI	36	36	B - 48	3VC18ME422	LOKESH P H	37	38
B - 19	3VC17ME053	PRAVEEN KUMAR	39	37	B - 49	3VC18ME428	MD ARSHAD	36	47
B - 20	3VC17ME056	RAHUL BEDDADI	37	36	B - 50	3VC18ME438	RAJA T	38	29
B - 21	3VC17ME057	D RAVI SHANKAR	38	34	B - 51	3VC18ME439	RAMZAN SAB	35	26
B - 22	3VC17ME059	S SHIVAKUMARA	37	38	B - 52	3VC18ME440	S P VISHAL	38	29
B - 23	3VC17ME060	SACHIN YALABURGI	39	44	B - 53	3VC18ME445	SHARUKANTHA P	38	42
B - 24	3VC17ME062	SAI SHASHANK	38	42	B - 54	3VC18ME448	SHIVARAJU M	36	31
B - 25	3VC17ME063	SAMEER BASHA	38	51	B - 55	3VC18ME450	SHUJAHATH ALI S	36	41
B - 26	3VC17ME070	SHARANABASAVA H M	38	37	B - 56	3VC18ME452	SOMANAIK K	37	39
B - 27	3VC17ME071	SOMASHEKAR R H	38	41	B - 57	3VC18ME453	SURESH G M	36	48
B - 28	3VC17ME072	SREEKANTH NAIK	38	36	B - 58	3VC18ME456	UNCHE NAVEEN	36	44
B - 29	3VC17ME074	SUMIT S KORLAHALLI	37	47	B - 59	3VC18ME463	YALIPI SHAIK MD HASHEEM PEER	35	38
B - 30	3VC17ME075	SURYA BABA G	38	40					

Staff

Head of the Department,
Mechanical Engineering Department
R.Y.M. Engineering Collage,
Cantonment, BELLARY-583 104

HOD

RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI
Department of Mechanical Engineering

COURSE EXIT SURVEY

Staff Name: Dr. Kotresh Sardar	**Semester: VIII**	**Sec: B**
Course Name: Additive Manufacturing	**Course Code: 17C410**	**Total contact hours: 50**
Max marks:60	**Prerequisites: CAD/CAM,CIM, Automation & Robotics**	
Academic year: 2020-21		

Course Code: 17C410	**Course Title: Additive Manufacturing**
Student Name: Nagaraj. B.M.	**USN:** 3VC17ME045
Mobile No.: 7090585839	**Email ID:**

Dear Student

In your opinion, how will you grade yourself in the attainment of the following Course Outcomes after undergoing **Industrial Safety** course (Please tick (√) in the appropriate column).

Excellent - 5, Very Good - 4, Good - 3, Average - 2, Below Average - 1

Course Outcome		5	4	3	2	1
At the end of the course, students will be able to ….						
17C410.1	Discuss various Additive manufacturing process and its applications.	✓				
17C410.2	Illustrate various motors, Actuators used in the system and design of hydraulic & pneumatic circuits.	✓				
17C410.3	Analyze basic concepts, its importance and applications of polymers and powder metallurgy in additive manufacturing.		✓			
17C410.4	Examine nanomaterials with various characterization techniques and its applications.			✓		
17C410.5	Develop NC, CNC machine programming automated industrial applications.	✓				

PROGRAMME COMMITTEE
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Nagaraj.

Signature of Student

RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI
Department of Mechanical Engineering

Consolidated Course Exit Survey 2020-21 EVEN

Rl.No.	USN	Name of the Student	C410.1	C410.2	C410.3	C410.4	C410.5
B - 1	3VC16ME001	A M SHASHANK	3	4	4	5	5
B - 2	3VC16ME020	BHAVANARI BHARGAV	5	5	5	5	5
B - 3	3VC16ME045	MANJUNATH GOUDA Y	5	5	5	5	5
B - 4	3VC16ME047	MANOHARA G	5	5	5	5	5
B - 5	3VC16ME079	S AFZAL HUSSAIN	5	5	5	5	5
B - 6	3VC16ME095	SHIVARAJ M P	4	5	5	5	5
B - 7	3VC16ME123	RAHUL R	5	5	5	4	5
B - 8	3VC16ME124	B AKHIL CHOWDARY	5	5	5	5	5
B - 9	3VC16ME126	J VAMSHI	5	4	5	4	5
B - 10	3VC17ME034	M K GURURAJA	5	4	5	5	4
B - 11	3VC17ME036	MANIL KUMAR	5	5	5	5	5
B - 12	3VC17ME038	MD AJMAL S	5	5	5	4	5
B - 13	3VC17ME042	MOHAMMED TANVEER	5	5	5	5	5
B - 14	3VC17ME044	MUNDALAMANE SHAMSHUDDIN	5	5	5	5	5
B - 15	3VC17ME045	NAGARAJ B M	5	5	4	3	5
B - 16	3VC17ME050	PAVAN KUMAR M	5	5	5	5	5
B - 17	3VC17ME051	PINJARA MAHAMMAD SHAREEF	5	5	5	5	5
B - 18	3VC17ME052	PRAJWAL ABBIGERI	5	5	5	5	5
B - 19	3VC17ME053	PRAVEEN KUMAR	5	5	5	5	5
B - 20	3VC17ME056	RAHUL BEDDADI	5	5	5	5	5
B - 21	3VC17ME057	D RAVI SHANKAR	5	5	5	5	5
B - 22	3VC17ME059	S SHIVAKUMARA	5	5	5	5	5
B - 23	3VC17ME060	SACHIN YALABURGI	5	5	5	5	5
B - 24	3VC17ME062	SAI SHASHANK	5	5	5	5	5
B - 25	3VC17ME063	SAMEER BASHA	4	4	4	4	5
B - 26	3VC17ME070	SHARANABASAVA H M	5	5	4	5	5
B - 27	3VC17ME071	SOMASHEKAR R H	5	5	5	5	5
B - 28	3VC17ME072	SREEKANTH NAIK	5	5	5	4	4
B - 29	3VC17ME074	SUMIT S KORLAHALLI	5	5	5	5	3
B - 30	3VC17ME075	SURYA BABA G	5	5	5	5	4
B - 31	3VC17ME076	TARUN KUMAR P	5	5	5	5	5
B - 32	3VC17ME077	V D S S UDAYAKUMAR	5	5	4	5	5
B - 33	3VC17ME079	VIJAY PATIL	5	5	5	5	3
B - 34	3VC17ME080	VIKAS GOUDA G	5	5	5	4	4
B - 35	3VC17ME082	VINAYAKA V M	5	5	5	5	5
B - 36	3VC17ME083	VIVEK R	5	5	4	5	5
B - 37	3VC17ME084	V JETHA NAIK	5	5	4	5	5
B - 38	3VC17ME087	YASHWANTH RAJ	5	5	5	5	5
B - 39	3VC18ME400	AJAY KUMAR H	5	5	5	5	5
B - 40	3VC18ME403	AZHAR B	5	5	5	5	5
B - 41	3VC18ME404	BALAJI D	5	5	5	5	5
B - 42	3VC18ME407	GOVARDHAN C R	5	5	5	5	5
B - 43	3VC18ME409	DEVARAJA	5	5	5	5	5
B - 44	3VC18ME412	HARISH K	4	4	4	4	5
B - 45	3VC18ME416	KARTHIK KUMAR S	5	5	4	5	4
B - 46	3VC18ME417	KARTHIK VD	5	5	5	5	5
B - 47	3VC18ME419	KOTRESH K	5	5	5	5	5
B - 48	3VC18ME422	LOKESH P H	4	4	4	4	5
B - 49	3VC18ME428	MD ARSHAD	5	5	4	5	5
B - 50	3VC18ME438	RAJA T	5	5	5	5	5
B - 51	3VC18ME439	RAMZAN SAB	5	5	5	4	4
B - 52	3VC18ME440	S P VISHAL	5	5	5	5	3
B - 53	3VC18ME445	SHARUKANTHA P	5	5	5	5	4
B - 54	3VC18ME448	SHIVARAJU M	5	5	5	5	5
B - 55	3VC18ME450	SHUJAHATH ALI S	5	5	4	5	5
B - 56	3VC18ME452	SOMANAIK K	5	5	5	5	3
B - 57	3VC18ME453	SURESH G M	5	5	5	4	4
B - 58	3VC18ME456	UNCHE NAVEEN	5	5	5	5	5
B - 59	3VC18ME463	YALIPI S MD HASHEEM PEER	5	5	4	5	5

PROGRAMME COMMITTEE PC MECH RYMEC

RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI
Department of Mechanical Engineering

COURSE SELF ASSESSMENT REPORT

Staff Name:Dr. Kotresh Sardar	**Semester: VIII**	**Sec: B**
Course Name: Additive Manufacturing	**Course Code: 17C410**	**Total contact hours: 50**
Max marks:60		
Academic year: 2020-21		

Sl. No.	Questionnaires	Ratings				
		Excellent (5)	Very Good (4)	Good (3)	Fair (2)	Poor (1)
01	Assess the level of Effectiveness in Identifying the different Additive manufacturing based on type of the materials	✓				
02	Rate of potency in usage of Additive manufacturing applications for the Medical and engineering models.	✓				
03	Are you able to recognize type of the drive to be used based on the applications	✓				
04	Are you able to analyze different drives and actuators based on the power transmissions.		✓			
05	Are you able to analyze the method of powder production technique.		✓			
06	Are you able to decide Physical & Mechanical Properties Evaluation of polymers.	✓				
07	Are you able to recognize different approachs for the emergence of the nano technology	✓				
08	Are you able to analyze different characterization technique and microstucture of the nano materials	✓	✓			
09	Are you able to write manual part programm for the different manufacturing process		✓			
10	Rate yourself about the overall benefit of this subject for your futuristic career		✓			

PROGRAMME COMMITTEE
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Signature of Student

(Nagaraj B.N.)
VIII - B.

RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI
Department of Mechanical Engineering

CBAR

Ro. No.	USN	Name of the Student	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
B - 1	3VC16ME001	A M SHASHANK	5	3	5	3	5	3	5	4	3	3
B - 2	3VC16ME020	BHAVANARI BHARGAV	5	3	5	3	5	3	5	4	3	3
B - 3	3VC16ME045	MANJUNATH GOUDA Y	5	5	5	5	5	5	5	5	5	5
B - 4	3VC16ME047	MANOHARA G	5	5	5	5	5	5	5	5	5	5
B - 5	3VC16ME079	S AFZAL HUSSAIN	5	5	5	5	5	5	5	5	5	5
B - 6	3VC16ME095	SHIVARAJ M P	4	4	4	4	5	4	4	4	4	5
B - 7	3VC16ME123	RAHUL R	5	5	4	5	5	5	5	4	5	5
B - 8	3VC16ME124	B AKHIL CHOWDARY	5	5	5	5	5	5	5	5	5	5
B - 9	3VC16ME126	J VAMSHI	5	5	5	4	4	5	5	5	4	4
B - 10	3VC17ME034	M K GURURAJA	5	5	5	5	3	5	5	5	5	3
B - 11	3VC17ME036	MANIL KUMAR	5	5	5	5	4	5	5	5	5	4
B - 12	3VC17ME038	MD AJMAL S	5	5	5	5	5	5	5	5	5	5
B - 13	3VC17ME042	MOHAMMED TANVEER	5	5	4	5	5	5	5	4	5	5
B - 14	3VC17ME044	MUNDALAMANE SHAMSHUDDIN	5	5	5	5	3	5	5	5	5	3
B - 15	3VC17ME045	NAGARAJ B M	5	5	5	4	4	5	5	5	4	4
B - 16	3VC17ME050	PAVAN KUMAR M	5	5	5	5	5	5	5	5	5	5
B - 17	3VC17ME051	PINJARA MAHAMMAD SHAREEF	5	5	5	5	5	5	5	5	5	5
B - 18	3VC17ME052	PRAJWAL ABBIGERI	5	5	5	5	5	5	5	5	5	5
B - 19	3VC17ME053	PRAVEEN KUMAR	5	5	5	5	5	5	5	5	5	5
B - 20	3VC17ME056	RAHUL BEDDADI	5	5	5	5	5	5	5	5	5	5
B - 21	3VC17ME057	D RAVI SHANKAR	4	4	4	4	5	4	4	4	4	5
B - 22	3VC17ME059	S SHIVAKUMARA	5	5	4	5	5	5	5	4	5	5
B - 23	3VC17ME060	SACHIN YALABURGI	5	5	5	5	5	5	5	5	5	5
B - 24	3VC17ME062	SAI SHASHANK	5	5	5	4	4	5	5	5	4	4
B - 25	3VC17ME063	SAMEER BASHA	5	5	5	5	3	5	5	5	5	3
B - 26	3VC17ME070	SHARANABASAVA H M	5	5	5	5	4	5	5	5	5	4
B - 27	3VC17ME071	SOMASHEKAR R H	5	5	5	5	5	5	5	5	5	5
B - 28	3VC17ME072	SREEKANTH NAIK	5	5	4	5	5	5	5	4	5	5
B - 29	3VC17ME074	SUMIT S KORLAHALLI	5	5	5	5	3	5	5	5	5	3
B - 30	3VC17ME075	SURYA BABA G	5	5	5	4	4	5	5	5	4	4
B - 31	3VC17ME076	TARUN KUMAR P	4	4	4	4	5	4	4	4	4	5
B - 32	3VC17ME077	V D S S UDAYAKUMAR	5	5	4	5	5	5	5	4	5	5
B - 33	3VC17ME079	VIJAY PATIL	5	5	5	5	5	5	5	5	5	5
B - 34	3VC17ME080	VIKAS GOUDA G	5	5	5	4	4	5	5	5	4	4
B - 35	3VC17ME082	VINAYAKA V M	5	5	5	5	3	5	5	5	5	3
B - 36	3VC17ME083	VIVEK R	5	5	5	5	4	5	5	5	5	4
B - 37	3VC17ME084	V JETHA NAIK	5	5	5	5	5	5	5	5	5	5
B - 38	3VC17ME087	YASHWANTH RAJ	5	5	4	5	5	5	5	4	5	5
B - 39	3VC18ME400	AJAY KUMAR H	5	5	5	5	3	5	5	5	5	3
B - 40	3VC18ME403	AZHAR B	5	5	5	4	4	5	5	5	4	4
B - 41	3VC18ME404	BALAJI D	5	5	4	5	5	5	4	5	5	5
B - 42	3VC18ME407	GOVARDHAN C R	5	5	5	5	5	5	4	5	4	5
B - 43	3VC18ME409	DEVARAJA	5	5	5	5	5	4	5	5	5	5
B - 44	3VC18ME412	HARISH K	5	5	5	5	3	5	5	5	5	3
B - 45	3VC18ME416	KARTHIK KUMAR S	5	5	5	4	4	5	5	5	4	4
B - 46	3VC18ME417	KARTHIK VD	4	4	4	4	5	4	4	4	4	5
B - 47	3VC18ME419	KOTRESH K	5	5	4	5	5	5	5	4	5	5
B - 48	3VC18ME422	LOKESH P H	5	5	5	5	3	5	5	5	5	3
B - 49	3VC18ME428	MD ARSHAD	5	5	5	4	4	5	5	5	4	4
B - 50	3VC18ME438	RAJA T	4	4	4	4	5	4	4	4	4	5
B - 51	3VC18ME439	RAMZAN SAB	5	5	4	5	5	5	5	4	5	5
B - 52	3VC18ME440	S P VISHAL	5	5	5	5	5	5	5	5	5	5
B - 53	3VC18ME445	SHARUKANTHA P	5	5	5	4	4	5	5	5	4	4
B - 54	3VC18ME448	SHIVARAJU M	5	5	5	5	3	5	5	5	5	3
B - 55	3VC18ME450	SHUJAHATH ALI S	5	5	5	5	4	5	5	5	5	4
B - 56	3VC18ME452	SOMANAIK K	5	5	5	5	5	5	5	5	5	5
B - 57	3VC18ME453	SURESH G M	5	5	4	5	5	5	5	4	5	5
B - 58	3VC18ME456	UNCHE NAVEEN	4	4	4	4	5	4	4	4	4	5
B - 59	3VC18ME463	YALIPI SHAIK MD HASHEEM PEER	5	5	5	5	5	5	5	5	5	5

CC MECH RYMEC

PC MECH RYMEC

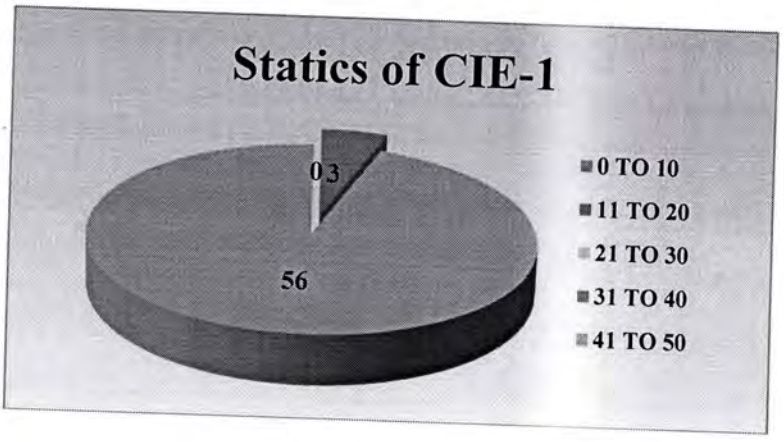
RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI
Department of Mechanical Engineering

FINAL RESULT ANALYSIS

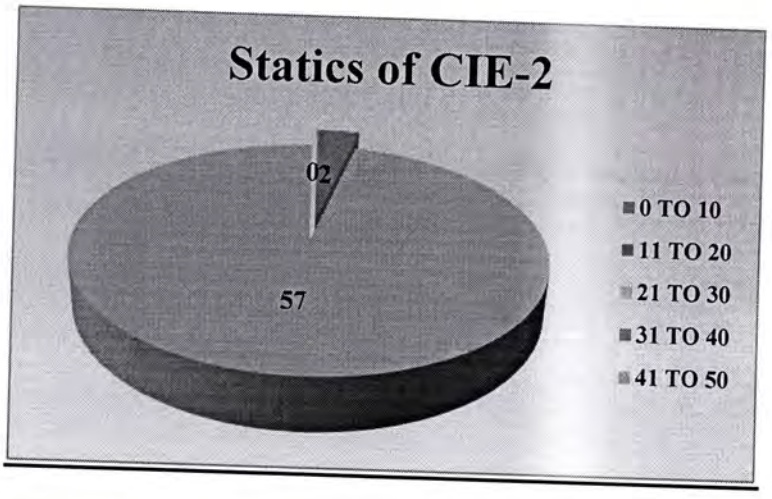
Result analysis has been done w.r.t **CIE** and **SEE** for the academic year 2020-2021.

STATISTICS OF CONTINUOUS INTERNAL EVALUATION

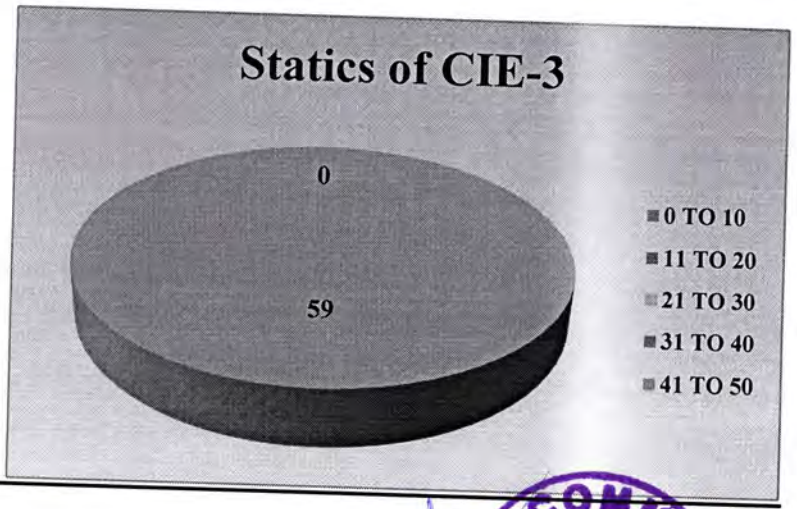
CIE - 1		No. of Students
Marks Range	0 TO 10	0
	11 TO 20	0
	21 TO 30	0
	31 TO 40	03
	41 TO 50	56
Total Number of Students		59



CIE - 2		No. of Students
Marks Range	0 TO 10	0
	11 TO 20	0
	21 TO 30	0
	31 TO 40	2
	41 TO 50	57
Total Number of Students		59



CIE - 3		No. of Students
Marks Range	0 TO 10	0
	11 TO 20	0
	21 TO 30	0
	31 TO 40	0
	41 TO 50	59
Total Number of Students		59



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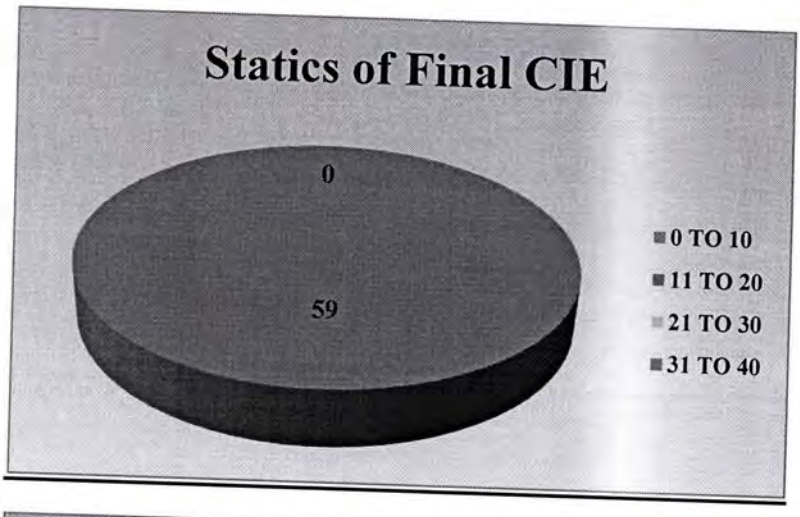
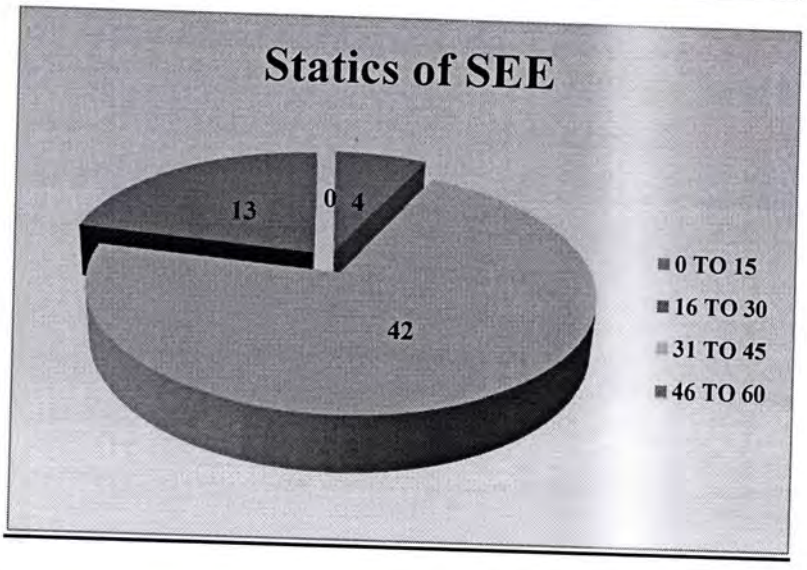
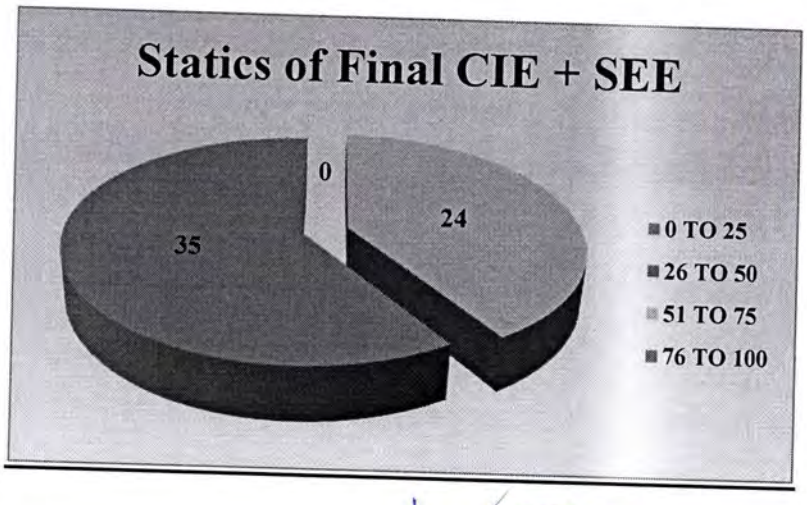
FINAL CIE		No. of Students
Marks Range	0 TO 10	0
	11 TO 20	0
	21 TO 30	0
	31 TO 40	59
Total Number of Students		59



SEE		No. of Students
Marks Range	0 TO 15	0
	16 TO 30	4
	31 TO 45	42
	46 TO 60	13
Total Number of Students		59



Final CIE + SEE		No. of Students
Marks Range	0 TO 25	0
	26 TO 50	0
	51 TO 75	24
	76 TO 100	35
Total Number of Students		59



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RYMEC

RAO BAHADUR Y MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARIDEPARTMENT OF MECHANICAL ENGNEERING

DIRECT ATTAINMENT 2018-19

Faculty: Dr. Kotresh Sardar
Subject: ADDITIVE MANUFACTURING - 17ME82
Code: 17C410
SEM: VIII
SEC: B

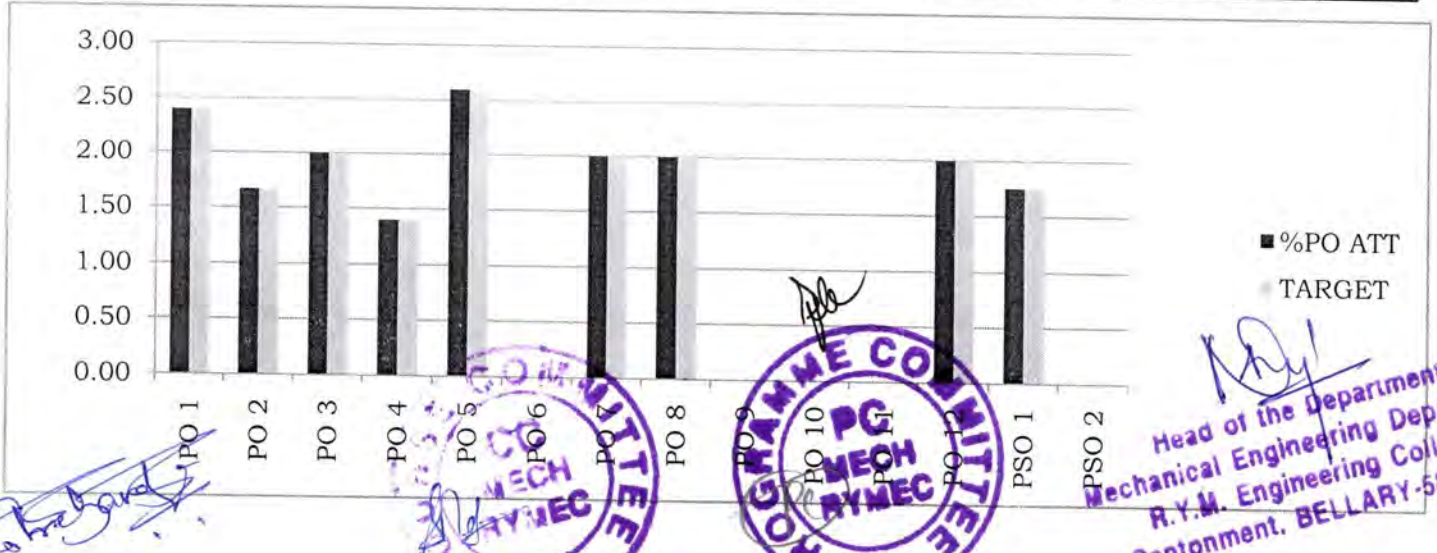
COURSE OUTCOME STATEMENT	
17C410.1	To discuss various Additive manufacturing process and its applications.
17C410.2	To illustrate various motors, Actuators used in the system and design of hydraulic & pneumatic circuits.
17C410.3	To analyze basic concepts, its importance and applications of polymers and powder metallurgy in additive manufacturing.
17C410.4	To Analyze nanomaterials with various characterization techniques and its applications.
C410.5	To develop NC, CNC machine programming automated industrial applications.

CO-PO/PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
17C410.1	2	0	0	1	3	0	2	2	0	0	0	2	0	0
17C410.2	2	0	2	1	2	0	0	2	0	0	0	2	1	0
17C410.3	2	1	2	1	2	0	0	2	0	0	0	2	2	0
17C410.4	3	2	2	2	3	0	0	2	0	0	0	2	2	0
17C410.5	3	2	2	2	3	0	0	2	0	0	0	2	2	0

	%CO	TARGET
17C410.1	66.67	60
17C410.2	57.14	60
17C410.3	58.33	60
17C410.4	74.97	60
C410.5	75	60

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
%PO ATT	2.40	1.67	2.00	1.40	2.60		2.00	2.00				2.00	1.75	
TARGET	2.4	1.67	2	1.4	2.6		2	2				2	1.75	



PROGRAMME COMMITTEE PG MECH RYMEC

Head of the Department,
Mechanical Engineering Department
R.Y.M. Engineering College,
Cantonment, BELLARY-583 104

RAO BAHADUR Y MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARIDEPARTMENT OF MECHANICAL ENGNEERING

DIRECT AND INDIRECT ATTAINMENT 2018-19

Faculty: Dr. Kotresh Sardar **Code:** 17C410

Subject: ADDITIVE MANUFACTURING - 17ME82

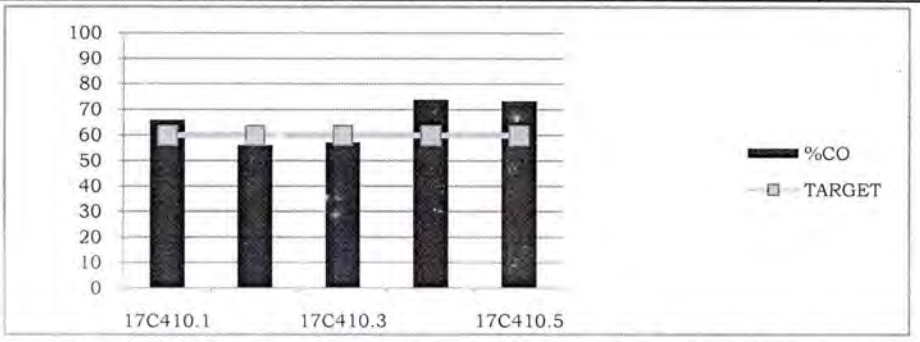
SEM: VIII **SEC:** B

COURSE OUTCOME STATEMENT	
17C410.1	To discuss various Additive manufacturing process and its applications.
17C410.2	To illustrate various motors, Actuators used in the system and design of hydraulic & pneumatic circuits.
17C410.3	To analyze basic concepts, its importance and applications of polymers and powder metallurgy in additive manufacturing.
17C410.4	To Analyze nanomaterials with various characterization techniques and its applications.
C410.5	To develop NC, CNC machine programming automated industrial applications.

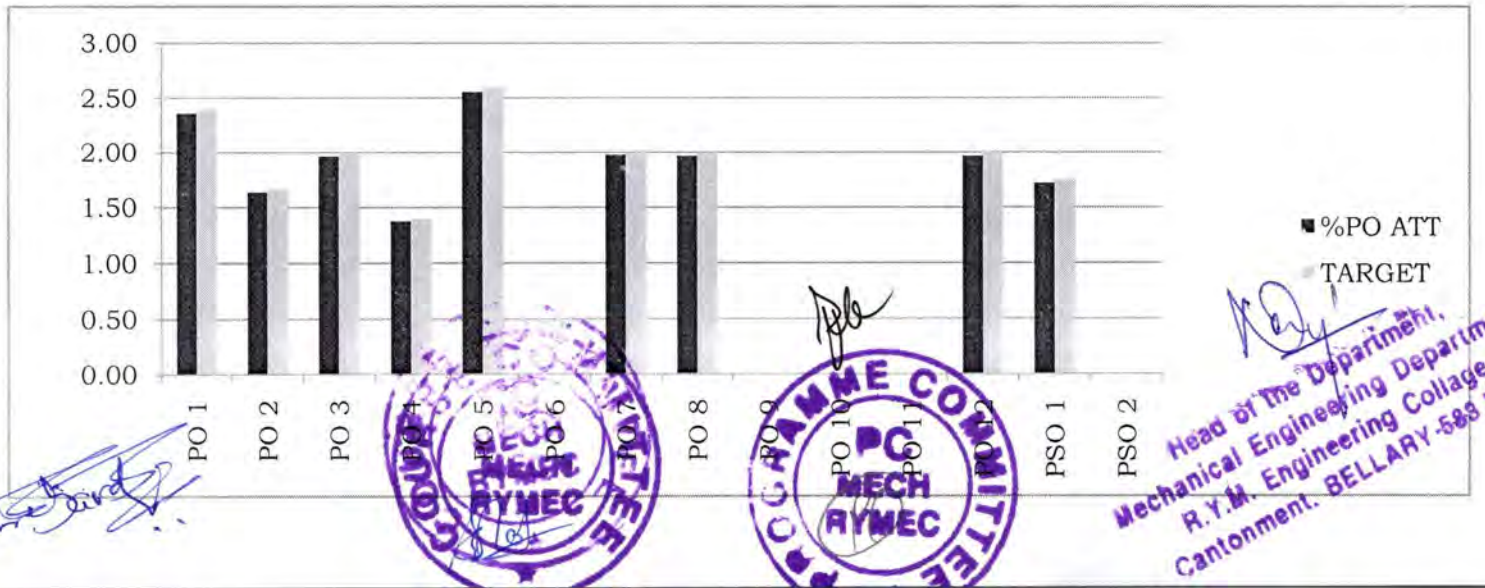
CO-PO/PSO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
17C410.1	2	0	0	1	3	0	2	2	0	0	0	2	0	0
17C410.2	2	0	2	1	2	0	0	2	0	0	0	2	1	0
17C410.3	2	1	2	1	2	0	0	2	0	0	0	2	2	0
17C410.4	3	2	2	2	3	0	0	2	0	0	0	2	2	0
17C410.5	3	2	2	2	3	0	0	2	0	0	0	2	2	0

	%CO	TARGET
17C410.1	65.97	60
17C410.2	56.2	60
17C410.3	57.24	60
17C410.4	73.87	60
C410.5	73.39	60



	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
%PO ATT	2.36	1.64	1.96	1.38	2.56		1.98	1.97				1.97	1.72	
TARGET	2.4	1.67	2	1.4	2.6		2	2				2	1.75	



Head of the Department, Mechanical Engineering Department, R.Y.M. Engineering Collage, Cantonment, BELLARY-583 104

RAO BAHADUR Y. MAHABALESWARAPPA ENGINEERING COLLEGE, BALLARI
Department of Mechanical Engineering

DIRECT CO ATTAINMENT GAP ANALYSIS 2020-21

Course Outcomes	CO Direct Attainment ={0.70(SEE)+0.30(CIE)}*100	CO Target	CO Attainment Gap
17C410.1	66.67	60	Nil
17C410.2	57.14	60	2.86
17C410.3	58.33	60	1.67
17C410.4	74.97	60	Nil
17C410.5	75	60	Nil

DIRECT & INDIRECT CO ATTAINMENT GAP ANALYSIS 2020-21

Course Outcomes	CO Direct & Indirect Attainment {0.20(Indirect Attainment)+ 0.8(Direct Attainment)}*100	CO Target	CO Attainment Gap
17C410.1	65.97	60	Nil
17C410.2	56.2	60	3.8
17C410.3	57.24	60	2.76
17C410.4	73.87	60	Nil
17C410.5	73.39	60	Nil

ACTION REPORT ON GAP ANALYSIS

Course Outcomes	Action proposed to bridge the gap	Modification of target if achieved
17c410.1	Target achieved	Higher target will be set for next academic batch
17c410.2	3.8	Suitable action to be initiated to fill the gap at the course coordinator level by having more elaborated discussions on topics, remedial classes to improve academic performance, Additional classes/tutorial, real engg applications.
17c410.3	2.76	
17C410.4	Target achieved	Higher target will be set for next academic batch
17C410.5	Target achieved	Higher target will be set for next academic batch

COURSE COMMITTEE CC MECH RYMEC

INSTRUCTOR REPORT Academic Year – 2020-21 Sec: 'B'

Impact of Delivery Methods (state the delivery methods used and its effectiveness):

- Delivery methods followed are chalk, marker, board & PPT.
- Chalk & Board is better mode of teaching to make the students to understand the concepts in a sequence and quote the real time examples by writing sketches and related points on the board instantly and comfortably as and when required.
- PPT is used to improve the effectiveness of teaching theory portion by presenting colorful images, videos and content beyond syllabus can also be covered. More exposure can be given to the student community at par with the current industry scenario, more detailed explanation is possible, time saving.
- Use of Videos, Models and specimens also help the student to learn the concepts very effectively and quickly. It enhances self-learning and better understanding ability. It is very much useful to understand the working principals of different processes.

Course Outcome Attainment Remarks :

Suitable action will be initiated to achieve the set targets and higher targets will be set for the next immediate batch after achieving the set targets.

Course Owner Feedback:

a) Instructor Feedback :

This particular subject is one of the trendy subjects in Mechanical engineering program. This is very much suitable for present time modern and advanced manufacturing system. The knowledge of this subject will open new avenues and channels for the student community to pursue their career in the field the manufacturing and Research areas. There is a ample scope for the students to contribute.

This subject demands detailed explanation about the history, origin, evolution, working principle of various processes, present status of this technology in the market and applications.

This subject also requires the knowledge of other engineering subjects like materials, Computer Aided Design, Computer aided Manufacturing and networking etc. This subject is trying to replace the conventional manufacturing with many potential advantages like: it is suitable to manufacture complex shapes with no tool requirement, Environment friendly, Mass customization, negligible scrap and waste etc.

- **b) Scope for improvement:**

- Scope to increase number of contact hours, sharing more information about the current trends in manufacturing, importance and progress of this technology in recent days in the manufacturing sector and research areas.

- Providing hands on experience to the students on this technology and providing an opportunity to design and build the parts on their own by using this concept.
- Motivating the students to carry out research projects on this technology and inspiring them to think out of box to design and develop their own components for certain useful applications.

Signature of Staff Member

PROGRAMME COMMITTEE
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15ME82

Eighth Semester B.E. Degree Examination, Aug./Sept.2020
Additive Manufacturing

Time: 3 hrs. Max. Marks: 80

Note: i) For Regular Students: Answer any FIVE full questions irrespective of modules.
ii) For Arrear Students : Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Explain Additive Manufacturing Process Chain with a neat block diagram. **(06 Marks)**
b. Explain stereolithography process with a neat sketch. Write its merits, demerits and applications. **(10 Marks)**

2 a. Distinguish between stereolithography and selective laser sintering processes. **(06 Marks)**
b. Explain with a neat sketch, Fused Deposition Modeling Process. What are its advantages, disadvantages and applications? **(10 Marks)**

Module-2

3 a. Explain the types of D.C. motors with field coils with neat sketches. **(08 Marks)**
b. Explain briefly with neat diagrams the following: **(08 Marks)**
(i) Thyristors (ii) Triacs

4 a. Compare hydraulic and pneumatic systems. **(06 Marks)**
b. Write a note on shape memory alloys. **(10 Marks)**

Module-3

5 a. Explain with a neat sketch polymer processing by wet spinning. **(08 Marks)**
b. Explain in detail the liquid phase sintering. **(08 Marks)**

6 a. Explain with a neat sketch Dry Spinning Method for additive manufacturing. **(08 Marks)**
b. Explain with a neat sketch powder production by vacuum atomization technique. **(08 Marks)**

Module-4

7 a. Explain with a neat sketch the sol-gel process. **(06 Marks)**
b. Explain the principle of Scanning Electron Microscopy (SEM) with a neat sketch. What are its applications? **(10 Marks)**

8 a. Explain with a neat sketch, flame assisted ultrasonic spray pyrolysis. **(08 Marks)**
b. Explain with a neat sketch the salient features of Atomic Force Microscopy (AFM). **(08 Marks)**

Module-5

9 a. Write a note on NC, CNC and DNC machine tools. **(06 Marks)**
b. Explain briefly the various strategies for automation and process improvement. **(10 Marks)**

10 a. Explain with a block diagram the levels of automation. **(10 Marks)**
b. Distinguish between continuous control in process industries and discrete control in manufacturing industries. **(06 Marks)**

CBCS SCHEME

USN | | | | | | | | | | |

17ME82

Eighth Semester B.E. Degree Examination, July/August 2021
Additive Manufacturing

Time: 3 hrs. Max. Marks: 100

Note: *Answer any FIVE full questions.*

1 a. Define additive manufacturing. Justify why additive manufacturing is so important in modern days. **(07 Marks)**

b. Explain the additive manufacturing process chain. **(06 Marks)**

c. Give the detailed classification of AM processes. **(07 Marks)**

2 a. With a neat sketch, explain the working principle of Stereolithography process. **(08 Marks)**

b. Discuss the post processing of AM parts. **(07 Marks)**

c. Write the applications of AM parts. **(05 Marks)**

3 a. Explain the importance of system drives and devices in AM machines. **(06 Marks)**

b. With a neat sketch, explain the working of DC electric motor. **(07 Marks)**

c. Give the detailed classification of hydraulic and pneumatic motors. **(07 Marks)**

4 Write short notes on :

i) Solenoids
ii) Diodes and Thyristors
iii) Triacs
iv) Piezoelectric actuators
v) Application of shape memory. **(20 Marks)**

5 a. Give the detailed classification of polymers. **(04 Marks)**

b. Explain the concept of

i) Functionality
ii) Polydispersity and molecular weight
iii) Molecular weight distribution **(06 Marks)**

c. Explain with neat sketch.

i) Wet Spinning
ii) Dry Spinning. **(10 Marks)**

6 a. Define Powder Metallurgy. Explain the different powder production techniques. **(07 Marks)**

b. Explain the importance particle size, and shape distribution, interparticle friction and compression ability on the quality of PM parts. **(08 Marks)**

c. Give the detailed applications of powder metallurgy. **(05 Marks)**

7 a. Explain with relevant sketches
i) Bottom – up ii) Top down Approaches of nanotechnology. **(06 Marks)**

b. Explain the synthesis of nanomaterials

i) Solgel process
ii) Chemical Vapour Condensation (CVC) **(08 Marks)**

c. Give the applications of Nanotechnology. **(06 Marks)**

8 a. With a neat sketch, explain Transmission Electron Microscopy (TEM). List the application. **(10 Marks)**

b. With a neat sketch, explain Atomic Force Microscopy (AFM) – List the application. **(10 Marks)**

9 a. Give the detailed classification of CNC machine tools. **(10 Marks)**

b. Explain the NC words used in manual part programming. **(10 Marks)**

10 a. Define Automation. Explain the basic elements of an automated system. **(10 Marks)**

b. Explain the need of Automation in productivity. **(04 Marks)**

c. Write short notes on :

i) Continuous and Discrete control

ii) Control System components. **(06 Marks)**

* * * * *