Detailed Syllabus for Bachelor of Technology (Printing and Packaging)

(Four Years Full Time Undergraduate Degree Programme) Effective from July 2020



Department of New Media Technology MAKHANLAL CHATURVEDI NATIONAL UNIVERSITY OF JOURNALISM & COMMUNICATION, BHOPAL P 38 Press Complex Zono 1 M P Negar Phonel (M P) 462011

B-38, Press Complex, Zone -1, M.P. Nagar, Bhopal (M.P.)-462011 Bachelor of Technology (Printing and Packaging): **B.Tech.**(PP)

1. ABOUT THE PROGRAMME:

B.Tech.(PP) is a Four year (Eight Semesters) Undergraduate programme, that prepares a Student to work for the Printing Packaging industry. The space of digital media is widening day-by-day where Printing is overlapped by Packaging. An increased focus in digital packaging, has led to digitally printed packaging opportunities and commercial digital printers looking to establish packaging operations. But lack of trained manpower is one of the biggest issues to be addressed.

Keeping this in view, the University offers B. Tech. (Printing and Packaging) in response to a growing demand for trained Printing and Packaging professionals. The programme provides a comprehensive practical exposure in all aspects of printing and packaging processes. Focus on both existing and new technology skills and knowledge used throughout the production will prepare the learners for the exciting, diverse and technically advancing Printing and Packaging industry.

The programme content includes Printing and Packaging Technologies, Screen printing, Sheetfed offset printing, Flexography, Gravure, Weboffset, Multimedia Technology, Graphics design for Printing and Packaging, and more. State of art facilities are created in the department to provide complete practical exposure to the students along with working opportunity in University Press. This industry relevant programme is highly recommended for students who are creative and focused to upgrade their skill set for Printing and Packaging.

2. ELIGIBILITY:

First Year: Passed 10+2 exam with Physics, Chemistry/Computer, Mathematics or equivalent.

Lateral entry to Second Year: Passed 3 years Diploma in Engineering and Technology from a recognized institution.

Duration: 4 years (3 years for lateral entry)

3. CAREER AVENUES:

The programme empowers the students with ample job opportunities like Chief Production Officer, Assistant Director (Production), Technical Officer, Printing Officer, Manager Printing, Supervisor, Publication Officer in the field of printing and packaging industry. Also, they can work for Designing and Digital printing, Security printing, Software solution for print industry, Electronic publishing, Color management solution, Packaging, Print finishing and converting, and so on. The programme also trains young people to become entrepreneurs, to establish printing & packaging units and generate lot of employment.

4. PROGRAMME OBJECTIVES (PO):

The B.Tech.(PP) programme is designed with the following educational objectives:

i. To inculcate Art, Aesthetics and Technology of Printing and Packaging elements in Students.

- ii. To equip the Students with skills for Digital Electronic Circuits, Digital Prepress and Industrial Training. iii. To make the Students understand the theoretical aspects of Printing and Packaging Process and Techniques.
- iv. To develop the practical ability to work with Printing and Packaging machines and empower the Students to work as trained professional for Printing and Packaging industry.
- v. To prepare the Students to become, Entrepreneur creating Employability, Professional with Industry Ethics and Researcher questing for New Dimensions of Societal issues.

5. PROGRAMME EDUCATIONAL OUTCOMES (PEO):

On successful completion of B.Tech.(PP), Students shall be able to

- i. Understand and identify the requirements of various Printing and Packaging elements for a given task.
- ii. Demonstrate Skills in Designing, and Publishing Print Content. iii. Develop competence in understanding the theoretical aspects and choose appropriate process and technique for implementing any given task.
- iv. Analytically explore the relevant substrate and machine to be used for various job contexts.
- v. Demonstrate Skills to distinguish between work responsibility and accountability in Print Packaging, as an Entrepreneur and as an Individual.

Altended Online (Dr.Asmita Khajanchi) (Umesh Upadhyay) (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

Makhanlal Chaturvedi National University of Journalism & Communication (Department of New Media Technology) B. Tech. (Printing and Packaging)

	Course	Core Course (Compulsory) (CCC) (6Credits)	Core Course (Elective) (CCE) (6 Credits)	Ability Enhancement Compulsory Course (AECC) (3 Credits)	Skill Enhanceme nt Cours e (SEC) Elective (3 Credits)	Open Elective (3 Credits)	Total Credits
	1CCC-1 1CCC-2	Engineering Chemistry Engineering Mathematics-1		1AECC-1 Communicativ e English		(Any one in Each semeste r From	0
SEM I	1CCC-3	Basic Electricals & Electronics Engineering				Pool of OE)	
	1000 4	Engineering Campbios				\ \	
	1000-4	Engineering Graphics					
SEM II	2CCC-5	Engineering Physics		2AECC-2 Environment		(Any one in	30
	2CCC-6	Basic Mechanical Engineering		al Studies		Ea ch semester	
	2CCC-7	Basic Civil Engineering & Engineering Mechanics				From Pool of OE)	
	2CCC-8	Engineering Mathematics-2					
SEM	3CCC-9	Basics of Printing Processes	3CCE-1		3SEC-1	(Any one	30
III	3CCC-10	Elements of Packaging	Printer's Science		Graphic and Layout	in Ea	
	3CCC-11	Theory of Machines	OR 3CCE-2 Psychology of Printing and Packaging		Design	semester From Pool of OE)	
SEM IV	4CCC-12	Electrical Machines and Utilization	4CCE-3 Planning for Print		4SEC-2 Packaging Design	(Any one in Ea ch	30

	4CCC-13	Screen Printing	Production			semester	
		- C	OR			From	
	4CCC-14	Technology of Sheet fed offset	4 CCE-4			Pool of	
		Printing	Food and			OE)	
		C C	Agro Based				
			Packaging				
SEM	5CCC 15	Technology of Elevography	5CCF 5		ASEC 3	(Any one	30
V	3000-13	recimology of recography	Packaging		Digital Pre	in	50
	5000 16	Imaga Comion for Drinting	Material		Press	Ea	
	JUU-10	Process	Science		11055	ch	
		Tiocess	OR			semester From	
			5CCE-6			Pool of	
						OE)	
	Course	Care Course (Compulsory)	Core Course	Ability	Skill	Open	Total
	course	(CCC)	(Elective)	Enhancement	Enhanceme	Elective	Credits
		(6Credits)	(CCE)	Compulsory	nt	(3	
			(6 Credits)	Course	Cours	Credits)	
				(AECC)	e (SFC)		
				(3 Credits)	Elective		
					(3 Credits)		
			Paper Based				
			Packaging				
		Microprocessor and					
	5CCC-17	Microcontroller					
SEM	6CCC-18	Technology of Gravure	6CCE-7		6SEC-4	(Any one	30
VI			Metal and		Machine	in	
	6CCC-19	Multimedia for E-publishing	Glass Based		Design	Ea	
			Packaging			ch semester	
	6000-20	Technology of Color separation	OR			From	
	0000 20	recimionegy of color separation	6CCE-8			Pool of	
			Plastic &			OE)	
			Polymer				
			Based				
			Packaging				
SEM	7CCC-21	Technology of Web Offset	7CCE-9		7SEC-5	(Any	30
VII			Machine		Industrial	one in Fach	
	7000-22	Ink Technology	Maintenance		Training	semeste	
			Management			r From	
	7CCC-23	Specialized Packaging	7CCE-10			Pool of	
			Industrial			OE)	
			Plant and				
	00000		Layout Design				20
GE3 -	8CCC-24	Binding and Finishing	8CCE-11		8SEC-6	(Any one in	30
SEM		Iechnology	Dıgıtal &		Instrument	one m	

VIII	8CCC-25 8CCC-26	Estimating and Costing Major Project	Advanced Printing Processes OR 8CCE-12 Printed	ation and process control for Printing and Packaging	Each semeste r From Pool of OE)	
			Electronics			
						240

	Open Elective Papers Offered by Department of New Media Technology
OE-1	Basic Computer Engineering
OE-2	Manufacturing Technology
OE-3	Digital Electronics Circuit
OE-4	Industrial Safety Management
OE-5	Quality Control and Supply Chain Management
OE-6	Project Management and Entrepreneurship Development
OE-7	Recycling Technique & Waste Management
OE-8	Augmented Reality

- CCC Core Course Compulsory (CCC) (6 Credits Each)
- CCE Core Course Elective (CCE) (6 Credits Each, Any One)
- AECC Ability Enhancement Compulsory Course (AECC) (3 Credits Each)
- SEC Skill Enhancement Course (SEC) (3 Credits Each)
- OE Open Elective (3 Credits Each, Any One)

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(Dr.Babita Agrawal)

(Dr.P.Sasikala)

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Programme Structure

SEMESTER - 1

S.No	Course	Course ID	Course Name	Credit		Aarks			
					Th.	Р	I A	Tota 1	
1	1CCC-1	1B.Tech.(PP) 1	Engineering Chemistry	6	50	30	20	100	
2	1CCC-2	1B.Tech.(PP) 2	Engineering Mathematics-1	6	80	0	20	100	
3	1CCC-3	1B.Tech.(PP) 3	Basic Electricals & Electronics Engineering	6	50	30	20	100	
4	1CCC-4	1B.Tech.(PP) 4	Engineering Graphics	6	50	30	20	100	
5	1AECC-1	1B.Tech.(PP) 5	Communicative English	3	40	0	10	50	
6	OE-1	1B.Tech.(PP) 6	(OE)	3	40	0	10	50	

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S.No	Course	Course ID	Course Name	Credit		Aarks				
					Th.	Р	IA	Total		
1	2CCC-5	2B.Tech.(PP) 1	Engineering Physics	6	50	30	20	100		
2	2CCC-6	2B.Tech.(PP) 2	Basic Mechanical Engineering	6	50	30	20	100		
3	2CCC-7	2B.Tech.(PP) 3	Basic Civil Engineering & Engineering Mechanics	6	50	30	20	100		
4	2CCC-8	2B.Tech.(PP) 4	Engineering Mathematics-2	6	80	0	20	100		
5	2AECC-2	2B.Tech.(PP) 5	Environmental Studies	3	40	0	10	50		
6	OE-2	2B.Tech.(PP) 6	(OE)	3	40	0	10	50		

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S.No	Course	Course ID	Course Name	Credit		Μ	arks	
					Th.	P	IA	Total
1	3CCC-9	3B.Tech.(PP) 1	Basics of Printing Processes	6	50	30	20	100
2	3CCC-10	3B.Tech.(PP) 2	Elements of Packaging	6	80	0	20	100
3	3CCC-11	3B.Tech.(PP) 3	Theory of Machines	6	50	30	20	100
4	3CCE-1		A.Printer's Science	6	80	0	20	100
	3CCE-2	3B.Tech.(PP) 4	B.Psychology of Printing and Packaging	6	80	0	20	100
5	3SEC-1	3B.Tech.(PP) 5	Graphic and Layout Design	3	25	15	10	50
6	OE-3	3B.Tech.(PP) 6	(OE)	3	40	0	10	50

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S.No	Course	Course ID	Course Name	Credit		Marks			
					Th.	Р	IA	Total	
1	4CCC-12	4B.Tech.(PP) 1	Electrical Machines and	6	50	30	20	100	
			Utilization						
2	4CCC-13	4B.Tech.(PP) 2	Screen printing	6	50	30	20	100	
3	4CCC-14	4B.Tech.(PP) 3	Technology of Sheet fed offset Printing	6	50	30	20	100	
4	4CCE-3	4B.Tech.(PP) 4	A. Planning for Print Production	6	80	0	20	100	
	4CCE-4		B.Food and Agro Based Packaging	6	80	0	20	100	
5	4SEC-2	4B.Tech.(PP) 5	Packaging Design	3	40	0	10	50	
6	OE-4	4B.Tech.(PP) 6	(OE)	3	40	0	10	50	

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S.No	Course	Course ID	Course Name	Credi		Marks			
				t	Th.	Р	Ι	Total	
							Α		
1	5CCC-15	5B.Tech.(PP) 1	Technology of Flexography	6	50	30	20	100	
2	5CCC-16	5B.Tech.(PP) 2	Image Carrier for Printing Process	6	50	30	20	100	
3	5CCC-17	5B.Tech.(PP) 3	Microprocessor & Microcontroller	6	50	30	20	100	
4	5CCE-5	5B.Tech.(PP) 4	A.Packaging Material science	6	80	0	20	100	
	5CCE-6		B.Paper based Packaging	6	80	0	20	100	
5	5SEC-3	5B.Tech.(PP) 5	Digital Pre Press	3	40	0	10	50	
6	OE-5	5B.Tech.(PP)6	(OE)	3	40	0	10	50	

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S.No	Course	Course ID	Course Name	Credit		Marks			
					Th.	Р	IA	Total	
1	6CCC-18	6B.Tech.(PP) 1	Technology of Gravure	6	50	30	20	100	
2	6CCC-19	6B.Tech.(PP) 2	Multimedia for E-Publishing	6	50	30	20	100	
3	6CCC-20	6B.Tech.(PP) 3	Technology of Color separation	6	50	30	20	100	
4	6CCE-7	6B.Tech.(PP) 4	A.Metal and Glass Based Packaging	6	80	0	20	100	
	6CCE-8		B.Plastic & Polymer Based Packaging	6	80	0	20	100	
5	6SEC-4	6B.Tech.(PP) 5	Machine design	3	40	0	10	50	
6	OE-6	6B.Tech.(PP) 6	(OE)	3	40	0	10	50	

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S.No	Course	Course ID	Course Name	Credit		Marks		
					Th.	Р	IA	Total
1	7CCC-21	7B.Tech.(PP) 1	Technology of Web Offset	6	50	30	20	100
2	7CCC-22	7B.Tech.(PP) 2	Ink Technology	6	50	30	20	100
3	7CCC-23	7B.Tech.(PP) 3	Specialized Packaging	6	80	0	20	100
4	7CCE-9	7B.Tech.(PP) 4	A.Machine Maintenance Management	6	50	30	20	100
	7CCE-10		B.Industrial Plant and Layout Design	6	80	0	20	100
5	7SEC-5	7B.Tech.(PP) 5	Industrial Training	3	0	40	10	50
6	OE-7	7B.Tech.(PP) 6	(OE)	3	40	0	10	50

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S.No	Course	Course ID	Course Name	Credit		Marks		
					Th.	Р	IA	Total
1	8CCC-24	8B.Tech.(PP) 1	Binding and Finishing Technology	6	50	30	20	100
2	8CCC-25	8B.Tech.(PP) 2	Estimating and Costing	6	80	0	20	100
3	8CCC-26	8B.Tech.(PP) 3	Major Project	6	0	80	20	100
4	8CCE-11	8B.Tech.(PP) 4	A.Digital & Advanced Printing Processes	6	80	0	20	100
	8CCE-12		B.Printed Electronics	6	80	0	20	100
5	8SEC-6	8B.Tech.(PP) 5	Instrumentation and process control for printing and packaging Machines	3	40	0	10	50
6	OE-8	8B.Tech.(PP) 6	(OE)	3	40	0	10	50

Open Electives

S.No	Course	Course ID	Course Name	Credit	Marks			
					Th.	P.	IA	Total
1	OE-1	B.Tech.(PP)6	Basic Computer Engineering	3	40	0	10	50
2	OE-2	B.Tech.(PP)6	Manufacturing Technology	3	40	0	10	50
3	OE-3	B.Tech.(PP)6	Digital Electronic Circuits	3	40	0	10	50
4	OE-4	B.Tech.(PP)6	Industrial Safety Management	3	40	0	10	50
5	OE-5	B.Tech.(PP)6	Quality Control and Supply Chain Management	3	40	0	10	50
6	OE-6	B.Tech.(PP)6	Project Management and Entrepreneurship Development	3	40	0	10	50

7	OE-7	B.Tech.(PP)6	Recycling Technique & Waste Management	3	40	0	10	50
8	OE-8	B.Tech.(PP)6	Augmented Reality	3	40	0	10	50

B.Tecł	B.Tech.(PP) Programme Education Outcome(PEOs) / Programme Graduate Aptitude (PO)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14	PO15
PE01	2	3	3	3	3	2	2	2	2	2	2	2	2	2	2
PE02	3	2	2	3	2	2	2	3	2	2	2	2	2	3	3
PE03	3	2	3	2	3	2	2	3	3	3	2	2	3	2	3
PE04	3	2	3	3	3	3	3	2	2	2	3	2	2	3	3
PE05	3	2	3	2	3	3	3	3	3	3	2	2	3	3	3

Programme Graduate Aptitude (PO)

PO1 Disciplinary Knowledge PO4 Problem Solving PO7 Cooperation/Team Work PO10 Information /Digital Literacy PO11 Self-Directed Learning **PO13 Moral and Ethical** Lifelong Learning 110 0 7 114040 01

PO2- Communication Skills **PO5** Analytical Reasoning **PO8** Scientific Reasoning

PO3 Critical Thinking **PO6 Research Related Skills PO9 Reflective Thinking PO12 Multicultural Competence** PO14 Leadership Readiness/Qualities PO15

Attended Online

(Umesh Upadhyay)

(Dr.Asmita Khajanchi)

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(Ayan Tiwari)

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9/2020 (Dr.Pawan Singh Malik)

(Dr.Babita Agrawal)

Mapping Value 3-Strong 2- Moderate 1-Weak

- 1. **Disciplinary Knowledge:** Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.
- 2. **Communication Skills:** Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share one's views and express herself/himself; demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.
- 3. **Critical Thinking:** Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development.
- 4. **Problem Solving:** Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's learning to real life situations.
- 5. Analytical Reasoning: Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyse and synthesise data from a variety of sources; draw valid conclusions and support them with evidence and examples, and addressing opposing viewpoints.
- 6. **Research-related Skills:** A sense of inquiry and capability for asking relevant/appropriate questions, problematising, synthesising and articulating; Ability to recognise cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyse, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation.
- 7. **Cooperation/Team Work:** Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team.
- 8. Scientific Reasoning: Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences LOCF 4 from an open-minded and reasoned perspective.

- 9. **Reflective Thinking:** Critical sensibility to lived experiences, with selfawareness and reflexivity of both self and society.
- 10.**Information/Digital Literacy:** Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information sources; and use appropriate software for analysis of data.
- 11.**Self-directed Learning:** Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.
- 12.**Multicultural Competence:** Possess knowledge of the values and beliefs of multiple cultures and a global perspective; and capability to effectively engage in a multicultural society and interact respectfully with diverse groups.
- 13.**Moral and Ethical Awareness/Reasoning:** Ability to embrace moral/ethical values in conducting one's life, formulates a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work.

Capable of demonstrating the ability to identify ethical issues related to one's work, avoid unethical behavior such as fabrication, falsification or misrepresentation of data or committing plagiarism, not adhering to intellectual property rights; appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work.

- 14.Leadership Readiness/Qualities: Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating and inspiring team members to engage with that vision, and using management skills to guide people to the right destination, in a smooth and efficient way.
- 15.Lifelong Learning: Ability to acquire knowledge and skills, including "learning how to learn", that are necessary for participating in learning activities throughout life, through self-paced and self-directed learning aimed at personal development, meeting economic, social and cultural objectives, and adapting to changing trades and demands of work place through knowledge/skill development/reskilling.

Altended Online (Dr.Asmita Khajanchi) (Umesh Upadhyay) (Dr.P.Sasika (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

1B.Tech.(PP) 1 1CCC-1: Engineering Chemistry

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Theory 50 Practical 30 Internal 20 Credits

COURSE OBJECTIVES

- 1. To understand the basic concept of water sources and Its Industrial application
- 2. To Understand the corrosion and Its related functions
- 3. Utilization of lubricants and classification of photochemistry
- 4. Categorize the polymer and Its properties
- 5. Interpret and analysis and various techniques

COURSE OUTCOMES (CO)

- 1. Demonstrate water in industrial application and effect.
- 2. To Analyze the corrosion and Its characterization
- 3. To differentiate lubricants and categories of Photochemistry 4. Assess the polymer classification, properties and types of resin.

Unit-1	Water And its Industrial Applications	\mathbf{L}	Т	Р
1.1	Sources, Impurities, Hardness & Its Units,	2	2	2
	Disadvantage Of Hard Water – Scale And Sludge In			
	Boiler			
	(Lecture, Discussion, Presentation)			
1.2	Preventive Methods, Caustic Embrittlement (Lecture,	2		2
	Discussion, Presentation)			
1.3	Boiler Corrosion, Priming And Foaming. Water	2		
	Softening Methods – Soda-Lime			
	(Lecture, Discussion, Presentation)		2	
1.4	Zeolite And Demineralization, Chemical Analysis	2	2	2
	Of Water- Alkalinity			
	(Lecture, Discussion, Presentation)			
1.5	Complex Metric Titration For Hardness. Numerical	2		
	Problems Based On Softening Methods.			
	(Lecture, Discussion, Presentation)			

5. Formulate Techniques for spectroscopy, thermogravimetric and colorimetry

Unit-2	Corrosion	L	Т	Р

2.1	Dry and wet corrosion – oxidation, electrochemical corrosion, Galvanic corrosion, pitting corrosion, water-line corrosion, differential aeration corrosion, stress corrosion	2	1	4
2.2	Factors influencing corrosion, Protection against corrosion. Protective coatings – Electroplating (Lecture, Discussion, Presentation)	2		2
2.3	cleaning articles, Electroplating methods, Electroless plating (Lecture, Discussion, Presentation)	2		2
2.4	Other metallic coatings, Organic coatings – Paints,	2		4
2.5	pigments (Lecture, Discussion, Presentation) vehicles, thinner, driers, extenders, varnish and lacquers.(Lecture, Discussion, Presentation)	2		2
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Unit -3	Lubricants	L	Т	Р
3.1	Introduction, mechanism, classification, (Lecture,	2	2	2
	Discussion, Presentation)			
3.2	Properties and Testing of lubricating oils-Viscosity	2		2
	(Lecture, Discussion, Presentation)			
3.3	Flash and fire point, Cloud and pour point etc			
	(Lecture, Discussion, Presentation)	2		2
3.4	Selection of Lubricants. Basics of Photochemistry			
	(Lecture, Discussion, Presentation)	2	2	2
3.5	Classification, characteristics, Laws of			
	Photochemistry, Photosensitization 2application in	2		
	photography			
	(Lecture, Discussion, Presentation)			

Unit-4	High- Polymer	L	Т	Р
4.1	Nomenclature, types and classification of polymers,			
	Polymerization reaction mechanism, Preparation,	2	2	2
	(Lecture, Discussion, Presentation)			
4.2	Properties & uses of – Thermoplastic			
	resinsPolyethylene	2	2	
	(Lecture, Discussion, Presentation)			
4.3	Properties & uses of , PVC, PVA, Polystyrene,			2
	PMA, PMMA, Teflon	2	2	
	(Lecture, Discussion, Presentation)			

4.4	Properties & uses of acrylonitrile, Polyamides-		
	Nylon 6, Nylon 6:6. Terylene. Thermo set resins-	2	
	Phenol formaldehyde		
	(Lecture, Discussion, Presentation)		
4.5	Properties & uses of Urea - Formaldehyde Resin,		
	Glyptal. Silicone Resin, Polyurethanes.	2	
	(Lecture, Discussion, Presentation)		

Unit-5	Analysis & Techniques	L	Т	Р
5.1	Instrumental Techniques In Chemical Analysis:	2		4
	Spectroscopy- Introduction, Principle			
	(Lecture, Discussion, Presentation)			
5.2	Instrumentation and applications of IR, UV, Visible,	2	2	2
	Atomic emission spectroscopy Flame Photometry and			
	Gas Chromatography.			
	(Lecture, Discussion, Presentation)			
5.3	Thermal Analysis Techniques: Thermogravimetric	2	2	2
	(T.G)			
	(Lecture, Discussion, Presentation)			
5.4	Differential Thermal Analysis (DTA) (Lecture,	2		
	Discussion, Presentation)			
5.5	Differential scanning Colorimetry (Lecture,	2		
	Discussion, Presentation)			

Practical/Projects/Assignments:-

NOTE: At least 10 of the following core experiments must be performed during the session.

1. Water Testing

- (i) Determination of Total hardness by Complexometric titration method.
- (ii) Determination of mixed alkalinity
 - (a) OH & C0₃
 - (b) CO₃& HCO₃
- 2. Lubricant testing:
- (i) Flash & fire points determination by a) Pensky Martin Apparatus,
- b) Abel's Apparatus,
- c) Cleveland's open cup Apparatus.
- (ii) Viscosity and Viscosity index determination by a) Redwood viscometer No.1
- b) Redwood viscometer No.2
- (iii) Steam emulsification No & Anline point determination
- (iv) Cloud and Pour point determination of lubricating oil

Suggested Readings:-

- 1. Engineering Chemistry by Wiley India (Author) ISBN-10 8126519886 Year 2011
- 2. Engineering Chemistry by Jain and Jain, Published by Dhanpat Rai Publishing Company. ISBN-10: 9352161319 Year 2016

- 3. A Text Book of Engineering Chemistry S. S. Dara & S. S. Umare, S. Chand Publication. ISBN-10: 8121903599 Year 2004
- 4. Applied Chemistry Theory and Practice, O.P. Viramani, A.K. Narula, New Age Pub.ISBN-10 8122408141 Year 1995
- 5. Polymer Science & Technology Ghosh, Tata McGraw Hill.III Edition ISBN-10: 0070707049 Year 2010
- 6. Engineering Chemistry- Sivasankar, Tata McGraw-Hill Education I Edition ISBN-10 0070669325 Year 2008
- 7. Technology of Synthetic Resins and Emulsion Polymers Dr. Himadri Panda, Engineers India Research Institute ISBN-10 8189765965 Edition 2011
- 8. Spectroscopy- Dr. B.K.Sharma, Krishna Prakashan Media. ISBN-10: 8182836719 Year 2015

(Dr.Asmita Khajanchi)

(Umesh Upadhyay)

(Dr.Babita Agrawal)

(Dr.P.Sasikala

(Dr.Pawan Singh Malik)

1B.Tech.(PP) 2 1CCC-2: Engineering Mathematics-1

Theory	80	Practical	00	Internal	20	Credits	6
2					-		-

COURSE OBJECTIVES

- 1. To Understand Concept Of Differential Calculus
- 2. To Give Adequate Integral Calculus 3. To Describe The Differential Equation.
- 4. To Differentiate The Matrices Theorem And Its Application
- 5. To Explain The Logic Of Algebra And Study Of Graph Theory

COURSE OUTCOMES (CO)

- 1. Formulate the Differential Calculus
- 2. Generate The Integral Calculus And Improper Integral.
- 3. Derive the derivation and Solve The Differential Equations
- 4. Rank matrices Elementary Transformation Of Solving Matrices
- 5. Algebra Logic And Essential Tools Of Solving Algebraic Equation

Unit-1	Differential Calculus	L	Т	Р
1.1	Expansion of functions by Maclaurin's and Taylor's	2	2	
	theorem.			
	(Lecture, Discussion, Presentation)			
1.2	differentiation, Euler's theorem and its application in	2	2	
	approximation and errors			
	(Lecture, Discussion, Presentation)			
1.3	Maxima and Minima of function of two variables	2	1	
	(Lecture, Discussion, Presentation)		1	
1.4	Curvature: Radius of curvature	2	1	
	(Lecture, Discussion, Presentation)		2	
1.5	Centre of curvature.	2		
	(Lecture, Discussion, Presentation)			

Unit-2	Integral Calculus	L	Τ	Р
2.1	Definite Integrals: Definite Integrals as a limit of a	2	2	
	sum			
	(Lecture, Discussion, Presentation)	2	2	
2.2	its application in Summation of series, Beta			
	and Gamma Functions			
	(Lecture, Discussion, Presentation)	2	1	
2.3	Double and Triple Integrals			
	(Lecture, Discussion, Presentation)	2	1	
2.4	Change of Order of Integration, Area, Volume and			
	Surfaces using double and triple Integral (Lecture,		2	
	Discussion, Presentation)	2	2	

2.5	Curve tracing		
	(Lecture, Discussion, Presentation)		

Unit -3	Differential Equations	L	Т	Р
3.1	Solution of Ordinary Differential Equation of first	2	2	
	order and first degree for Exact differential			
	Equations			
	(Lecture, Discussion, Presentation)			
3.2	Solution of Ordinary Differential Equation of first	2	-	
	order and higher degree (solvable for p, x and y,		2	
	Clairauts Equation)			
	(Lecture, Discussion, Presentation)			
3.3	Linear Differential Equations with Constant	2	1	
	Coefficients			
	(Lecture, Discussion, Presentation)			
3.4	Cauchy's Homogeneous differential Equation	2	1	
	(Lecture, Discussion, Presentation)			
3.5	Simultaneous differential Equations, Method of		2	
	Variation of Parameters	2		
	(Lecture, Discussion, Presentation)			

Unit-4	Matrices	L	Т	Р
4.1	Rank, Solution of Simultaneous equation by			
	elementary transformation.	2	2	
	(Lecture, Discussion, Presentation)			
4.2	Consistency of System of Simultaneous Linear	2	1	
	Equation			
	(Lecture, Discussion, Presentation)	2		
4.3	Eigenvalues and Eigenvectors,		1	
	(Lecture, Discussion, Presentation)	2		
4.4	Cayley-Hamilton Theorem		2	
	(Lecture, Discussion, Presentation)	2		
4.5	Application to find the inverse		2	
	(Lecture, Discussion, Presentation)			

Unit-5	Algebra of Logic	L	Т	Р
5.1	Boolean Algebra, Principle of Duality (Lecture,	2	1	
	Discussion, Presentation)			
5.2	Basic Theorems, Boolean Expressions and	2	2	
	Functions.			
	(Lecture, Discussion, Presentation)	2	2	
5.3	Elementary Concept of Fuzzy Logic Graph Theory			
	(Lecture, Discussion, Presentation)	2	1	

5.4	Graphs, Sub graphs, Degree and Distance (Lecture, Discussion, Presentation)	2	2	
5.5	Tree, cycles and Network, (Lecture, Discussion, Presentation)			

Practical/Projects/Assignments:-

- 1. Study of application of Differential Calculus in practice.
- 2. Study of application of Integral Calculus in practice.
- 3. Study of application of Differential Equations in practice.
- 4. Study of application of Matrices in practice.
- 5. Study of application of Algebra of logic in practice. Suggested Readings:-
- 1. Higher Engg. Mathematics by Ramana, Tata McGraw Hill. ISBN-10 007063419X Year 2006
- 2. Higher Engineering Mathematics by BS Grewal, Khanna Publication XLIII Edition ISBN-10 8174091955 Year 2014
- 3. Advance Engineering Mathematics with MATLAB by D.G.Duffy CRC Press; III Edition ISBN-10 1439816247 Year 2010
- 4. Engineering Mathematics by S S Sastri. P.H.I. ISBN-10 8120308042 Year 2004
- 5. Mathematics for Engineers by S. Arumugham, Scitech Publication ISBN-10: 8183711359 Year 2011

(Dr.Asmita Khajanchi)

(Umesh Upadhyay)

(Dr.Pawan Singh Malik)

(Dr.Babita Agrawal)

(Dr.P.Sasika

1B.Tech.(PP) 3 1CCC-3: Basic Electrical & Electronics Engineering

Theory	50	Practical	30	Internal	20	Credits	6	I
								1

COURSE OBJECTIVES

- 1. To Know And Understand The Basic Concept of Electrical Circuit And analyse its Function
- 2. To Demonstrate the Transformer function.
- 3. To Compare And Differentiate Rotating Electrical Machine.
- 4. To Evaluate The Digital Electronics With Operation And its Conversion.
- 5. To Demonstrate Electronic Component And Circuit With Semiconductor And Transistors

COURSE OUTCOMES (CO)

- 1. To construct DC And AC Circuits With Power Transmission
- 2. The Student demonstrates Function of Transformer.
- 3. To Analyze 3 Phase Induction motor and DC Machine.
- 4. To Obtain the Elementary Knowledge of Digital Electronic and Described DE morgen's law.
- 5. The Students Categorize Electronic Component And Circuits Of Different Transistor.

Unit-1	Electrical circuit analysis	L	Т	Р
1.1	Voltage and current sources, dependent and	2	2	2
	independent sources, source conversion (Lecture,			
	Discussion, Presentation)			
1.2	DC circuits analysis using mesh & nodal method,	2	1	2
	Thevenin's & superposition theorem			
	(Lecture, Discussion, Presentation)			
1.3	star-delta transformation.1-phase AC circuits under	2	1	2
	sinusoidal steady state, active, reactive and apparent			
	power			
	(Lecture, Discussion, Presentation)	2	1	
1.4	physical meaning of reactive power, power factor			
	(Lecture, Discussion, Presentation)	2		

1.5	3-phase balanced and unbalanced supply, star and delta connections.		
	(Lecture, Discussion, Presentation)		

Unit-2	Transformers	L	Т	Р
2.1	Review of laws of electromagnetism, emf, flux, and	2	1	
	their relation			
	(Lecture, Discussion, Presentation)			
2.2	Analysis of magnetic circuits	2	1	2
	(Lecture, Discussion, Presentation)			
2.3	Single-phase transformer, basic concepts (Lecture,	2		
	Discussion, Presentation)			2
2.4	Construction features, voltage, current (Lecture,	2		
	Discussion, Presentation)			
2.5	Impedance transformation, equivalent circuits, phasor	2	2	4
	diagram, voltage regulation, losses and efficiency, OC			
	and SC test.			
	(Lecture, Discussion, Presentation)			

Unit -3	Rotating Electric machines	L	Т	Р
3.1	Constructional details of DC machine, induction	2	2	2
	machine and synchronous machine. (Lecture,			
	Discussion, Presentation)			
3.2	Working principle of 3-Phase induction motor	2	2	2
	(Lecture, Discussion, Presentation)			
3.3	emf equation of 3-Phase induction motor, Concept of			
	slip in 3- Phase induction motor (Lecture,	2		2
	Discussion, Presentation)			
3.4	Explanation of Torque-slip characteristics of 3-Phase	2		2
	induction motor			
	(Lecture, Discussion, Presentation)	2		
3.5	Classification of self excited DC motor and			
	generator.			
	(Lecture, Discussion, Presentation)			

Unit-4	Digital Electronics	L	Т	Р
4.1	Number systems used in digital electronics, decimal, binary, octal, hexadecimal, their complements. (Lecture, Discussion, Presentation)	2	2	2
4.2	operation and conversion (Lecture, Discussion, Presentation)	2	2	
4.3	floating point and signed numbers, Demorgan's theorem (Lecture, Discussion, Presentation)	2		

4.4	AND, OR, NOT, NOR, NAND, EX-NOR, EX-OR gates and their representation (Lecture, Discussion,	2	1	
	Presentation)			2
4.5	Truth table, half and full adder circuits, R-S flip flop,	2	1	
	J-K flip flop.			
	(Lecture, Discussion, Presentation)			

Unit-5	Electronic Components and Circuits	L	Т	Р
5.1	Introduction to Semiconductors, Diodes,	2	1	2
	V-I characteristics.			
	(Lecture, Discussion, Presentation)			
5.2	Bipolar junction transistors (BJT) and their working,	2	1	2
	introduction to CC		I	
	(Lecture, Discussion, Presentation)			
5.3	CB & CE transistor configurations	2		2
	(Lecture, Discussion, Presentation)			
5.4	Different configurations and modes of operation of	2	2	2
	BJT			
	(Lecture, Discussion, Presentation)			
5.5	DC biasing of BJT.	2		
	(Lecture, Discussion, Presentation)			

Practical/Projects/Assignments:-

- 1. Verifications of Thevenin's Superposition theorem.
- 2. Study of Transformer, name plate rating, determination of ratio and polarity.
- 3. Determination of equivalent circuit parameters of a single phase transformer by O.C. and S.C. tests and estimation of voltage regulation and efficiency at various loading conditions and verification by load test.
- 4. Separation of resistance and inductance of choke coil.
- 5. Measurement of various line & phase quantities for a 3-phase circuit.
- 6. Identification of different Electronics components.
- 7. Observing input and output waveforms of rectifiers.

Transistor application as amplifier and switch

Suggested Readings:-

- 1. Vincent Del Toro, Electrical Engineering Fundamentals, PHI Learning, II Edition ISBN-10 812030599X Year 1989
- 2. S. Ghosh, Fundamentals of Electrical and Electronics Engineering, PHI, II Edition. ISBN-10 8120332997 Year 2007
- 3. Millman, Halkias & Parikh, Integrated Electronics, Mc Graw Hill, II Edition ISBN-10 0070151420 Year 2009
- 4. Nagrath & Kothari, Basic Electrical Engineering, III Edition TMH. ISBN-10 007014611X Year 2009
- 5. J.S. Katre, Basic Electronics Engg, Max Pub. Pune.ISBN-10 9350779644 Year 2016

6. Hughes, Electrical and Electronic Technology, Pearson Education India X Edition ISBN-10 8131733661 Year 2010

110 0 114040 01 -12020 fended Oul 20 A (M.M.Isaad (Ayan Tiwari) (Dr.Asmita Khajanchi) (Umesh Upadhyay) (Dr.P.Sasikala) ٩ (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

1B.Tech(PP)4 1CCC-4: Engineering Graphics

	Theory	50	Practical	30	Internal	20	Credits	6
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COURSE OBJECTIVES

- 1. To Know And Understand Basic Concept Of Engineering Drawing
- 2. To Understand The Concept Of Orthographic Projection.
- 3. To Interpret The Projection Of Regular And Its Projections
- 4. To Prepare A Students For Section Of Solid And Development Of Surface 5. To Creating Isometric Projection And Computer Aided Design

COURSE OUTCOMES (CO)

- 1. PerformVisual Aspects Of Engineering Design
- 2. Construct Orthographic Projection Of Various Design
- 3. Design The Various Surfaces of Regular Solids
- 4. Evalute Section Of Solid And Development Of Surfaces
- 5. Demonstrate Design of Isometric Projection and also Make Design Layout on Computer (CAD).

Unit-1	Fundamentals of Engineering Drawing, Scales and	L	Т	Р
	Curves			
1.1	Introduction to engineering drawing: Drawing	2		
	instruments and accessories,(Lecture, Discussion,			
	Presentation)		2	2
1.2	Types of line, lettering, practice and rules of	2	2	Z
	dimensioning, geometrical constructions, basic	2		
	geometrical shapes;(Lecture, Discussion,			
	Presentation)			
1.3	Scales: Types of scales, units of length and their		2	2
	conversion, construction of scales, plain scale,	2		
	diagonal scale, vernier scale (Lecture, Discussion,	-		
	Presentation)			
1.4	Curves used in engineering practice and their			
	constructions; Conic sections, construction of ellipse	2	2	
	parabola and hyperbola (Lecture, Discussion,			
	Presentation)			
1.5	Special curves, construction of cycloid, epicycloids,	2		
	hypocycloid and involutes (Lecture, Discussion,			
	Presentation)			

Unit-2	Orthographic Projections, Projection of Points,	L	Т	Р
	Lines and Planes			

2.1	Orthographic projection: Principles of orthographic projections, conventions, first and third angle	2	1	2
	projections, (Lecture, Discussion, Presentation)			
2.2	Projection of points, projection of lines, lines inclined to single plane (Lecture, Discussion, Presentation)	2	2	2
2.3	Lines inclined to both the planes, true lengths and traces; (Lecture, Discussion, Presentation)	2	1	
2.4	Projection of planes: Projection of regular planes, planes inclined to one plane, (Lecture, Discussion, Presentation)	2		
2.5	Planes inclined to both planes, projection of planes by auxiliary plane projection method. (Lecture, Discussion, Presentation)	2	2	

Unit -3	Projections of Solids	L	Т	Р
3.1	Projection of solids: Projections of regular solid,	2	1	
	(Lecture, Discussion, Presentation)			
3.2	Prisms, cylinders, pyramids, cones.(Lecture,	2		2
	Discussion, Presentation)			
3.3	Solids inclined to one plane, (Lecture, Discussion,	2	1	2
	Presentation)			
3.4	Solids inclined to both planes (Lecture, Discussion,	2		
	Presentation)		2	
3.5	Projection of solid by auxiliary plane projection	2		2
	method (Lecture, Discussion, Presentation)		1	

Unit-4	Sections of Solids & Development of Surface	L	Т	Р
4.1	Surfaces Sectional Views of Right Regular Solids	2	1	2
	,(Lecture, Discussion, Presentation)			
4.2	Prisms, cylinders, pyramids and cones;	2	2	2
	(Lecture, Discussion, Presentation)	2	2	2
4.3	Solids inclined to one plane, solids inclined to both	2	1	
	planes, projection of solid by auxiliary plane	-	-	
	projection method(Lecture, Discussion)			2
4.4	Development of surfaces: Development of lateral	2		-
	surface of right regular solids, (Lecture, Discussion)	2	1	
4.5	Prisms, cylinders, pyramids and cones; (Lecture,	-		
	Discussion)			

Unit-5	Isometric Projections & CAD	L	Т	Р
5.1	Isometric projections: Principle of isometric	2	2	
	isometric views,(Lecture, Discussion, Presentation)			
5.2	Isometric projections of planes, prisms, cylinders,			
	pyramids, and cones. (Lecture, Discussion, Presentation)	2	1	2
5.3	Computer Aided Drafting (CAD): Introduction,			
	benefit,	2		2
	(Lecture, Discussion, Presentation)			
5.4	Software's basic commands of drafting entities like			
	line, circle, polygon, polyhedron, cylinders	1	2	
	(Lecture, Discussion, Presentation)			
5.5	Transformations and editing commands like move,			2
	rotate, mirror, array; solution of projection problems on CAD.	2	1	
	(Lecture, Discussion, Presentation)			

Practical/Projects/Assignments:-

- 1. Sketching and drawing of geometries and projections based on above syllabus
- 2. A min. of 30 hand drawn sketches (on size A4 graphic sketch Book) plus 5 CAD-printouts on size A4 sheets plus 10 sheets of size A2 or 6 sheets of size A1

Suggested Readings:-

- 1. Computer Aided Engg drawing, VTU, I K International Publishing House III Edition ISBN10: 8188237949 Year 2007
- 2. Bhatt N.D.; Engineering Drawing, Charotar Publishing House LIII Edition ISBN-10: 9380358962 Year 2014
- 3. Venugopal K.; Engineering Graphics; New Age International Publishers ISBN-10: 8122438016 Year 2015
- 4. John KC; Engg. Graphics for Degree; PHI. I Edition Year 2009
- 5. Gill P.S.; Engineering Drawing; S.K. Kataria & Sons; ISBN-10: 9350143151 Year 2013
- 6. Jeyapoovan T.; Engineering drawing & Graphics Using AutoCAD; Vikas Publishing House; III edition ISBN-10: 8125940006 Year 2010
- Agrawal and Agrawal; Engineering Drawing; TMH II Edition ISBN-10: 1259062880 Year 2013
- 8. Shah MB and Rana BC; Engg.drawing; Pearson Education II Edition ISBN-10: 8131710564 Year 2009

- 9. Luzadder WJ and Duff JM; Fundamental of Engg Drawing; PHI
- 10. Jolhe Dhananjay; Engg. Drawing with an Introduction to AutoCAD; TMH, ISBN-10: 0070648379 Year 2007
- 11. Narayana K.L.; Engineering Drawing; Scitech Publications (India) ISBN-10: 8183714226 Year 2013

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1B.Tech.(PP) 5 1AECC1: Communicative English

Theory 40 Practical 00 Internal 10 Credits 3

COURSE OBJECTIVES

- 1. To improve basic Grammar and essential of language skill.
- 2. To train to identify the nuances of Phonetics, intonation and enhance pronunciation skills.
- 3. To enable students to practice modern usage of English as it is spoken and written today with speech practice, reading passages and comprehension.
- 4. To enhance with English vocabulary and Language Proficiency.
- 5. To enable students to acquire a basic knowledge of phonetics required for effective communication.

COURSE OUTCOMES (CO)

- 1. Use Grammatical English and essentials of language skills and identify the numbers of phonetic s, intonation and flawless pronunciation.
- 2. Implement English Vocabulary at command and Language Proficiency.
- 3. Identify common error in Spoken and Written Communication
- 4. Understand and Improve the Nonverbal Communication and Kinesics.
- 5. Perform well in campus recruitment, engineering and all other general competitive examination.

UNIT-1	Introduction To Sentence and Grammar	L	Т	Р
1.1	Sentences: Simple, Compound, Complex, Assertive, Interrogative, Imperative, And Exclamatory.	2		
	(Lecture, Practical),	1	2	
1.2	Clauses: Co-ordinate, Sub-ordinate, Relative, Adverb, Comparative Adjective) Articles: Usage of 'A', 'AN', 'THE' Preposition:	Adverb	+	
	(Lecture, Practical)	1		
1.3	Position of Prepositions, Place Relations Time Relations and other	relatio	ons.	
	(Lecture, Practical)	1		
1.4	Basic English Grammar and Part of Speech- Noun, Pronoun (Lecture, Practical),	2		

1.5 Adjective, Verbs, Adverbs, Preposition, Articles, Conjuctions. (Lecture, Practical),

UNIT-2	Tenses	L	Т	Р
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2.1	The Sequence of Tenses, Tenses: Simple Present (Lecture, Practical)	1	
.2	Progressive Perfect	2	
	(Lecture, Practical)	1	
2.3	Present Perfect Progressive along-with Past Tense (Lecture, Practical)	1	
2.4	indications of futurity, Reported speech Modals (Will, Shall, Would and Other) (Lecture, Practical)	2	
2.5	Voice: Active and Passive (Lecture, Practical)		

UNIT-3	Introduction to listening Skills and Phonetics	L	Т	Р
3.1	Introduction to Phonetics, Sound Mispronounced, Silent and non- silent letter (Lecture, Practical)	2		
3.2	Homonyms, Aspiration, Pronunciation of The, word ending age, some Plural forms. (Lecture, Practical)	1	1	
3.3	Articles: Use of articles-Indefinite an Definite Articles	2		
3.4	Speech Sound: Vowels and Consonants: Exercises on it, Propositions Kind of Proposition and Prepositions often Confused. (Lecture, Practical)	2		
3.5	Word Accent - Rules for Word Accent, Stress Shift, Question Tags, and Question Tags for Assertive Sentences and One word Substitutes and Exercises. (Lecture, Practical)	1		

UNIT-4	Comprehension of unseen passage, Vocabulary and Speaking Skills	L	Т	Р
4.1	Short answer type questions to test understanding of the passage. (Lecture, Practical)	2		

4.2	Usage of Dictionary and Thesaurus, Diction - Words meaning and Usage (Lecture, Practical)	2		
4.3	Spelling rules, Verb patterns, Idioms and Phrases , Common error in Spellings and Sentences (Lecture, Practical)	2	1	
4.4	Words formation, Strong and Weak forms of words, Extempore and	1		
	Public Speaking (Lecture, Practical)			
4.5	Information Transfer, Listening Comprehension, Common Errors in Pronunciation (Lecture, Practical)	1		

UNIT-5	Paragraph writing	L	Т	Р
5.1	Paragraph writing based on expansion of given ideas Note taking /Note making (Lecture, Practical)	2		
5.2	Introducing one self and others, Letter Formats & writing (Lecture, Practical)	1		
5.3	Dialogue speaking and Writing in different situations (Lecture, Practical)	2	1	
5.4	Developing ability of questioning and answering in a discourse (Lecture, Practical)	1	1	
5.5	Practice of Introducing to an Interview board, Emergence of new English's (Lecture, Practical)	2		

Practical/Project/Assignment:

- 1. Basic Grammar & Vocabulary (Synonyms /Antonyms, Analogies, sentence completion, correctly spelt words, idioms, proverbs, common errors).
- 2. Phonetic symbols and pronunciation.
- 3. Listening skills (Including Listening Comprehension) 3
- 4. Reading Skills (Including Reading Comprehension)
- 5. Writing Skills (Including structuring resume and cover letter)
- 6. Speaking Skills
- 7. Body Language
- 8. Oral Presentation: Preparation and delivery using audio visual aids with stress n body

language and voice modulation (Topic to be selected by the teacher.) Final Assessment Should be based on Assignment, presentation and interview.

Suggested Readings:-

- 1. Business Correspondence and Report Writing By Sharma; TMH.
- 2. Living English Structure By W.S. Allen; Longmans.
- 3. English Grammar Ehrlich, Schaum Series; TMH.
- 4. Spoken English for India By R.K. Bansal and IB Harrison Orient Longman.
- 5. New International Business English by Joans and Alexander; OUP.
- 6. Effective Technical Communication Rizvi; TMH.

yan Tiwari (M.M.Isaad (Dr.Asmita Khajanchi) (Umesh Upadhyay) (Dr.P.Sasikala (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)
1B.Tech.(PP) 6 OE-1: Basic Computer Engineering

Theory 40 Practical 00 Internal 10 Credits 3	Theory	40 P	Practical 00	Internal	10	Credits	3
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COURSE OBJECTIVES

1. To Understand About the architecture of computer 2.

To Study about operating system.

- 3. To Understand The Basics Knowledge of MS Office MS Word.
- 4. To Understand Concepts of Workbook & Worksheets
- 5. To Study about Computer Networking

- 1. To describe About the architecture of computer
- 2. To define about operating system.
- 3. To perform The Basics Knowledge of MS Office MS Word.
- 4. To explain Concepts of Workbook & Worksheets
- 5. To explain about Computer Networking

Unit-1	Computer	L	Т	Р
1.1	Classification, Organization i.e. CPU, Motherboard, register, Bus architecture, Instruction set, Memory & Storage Systems, Input Devices- Scanners, Output Devices- Printers, System & Application Software. (Lecture, Discussion, Presentation)	2		

1.2	Computer Application in e-Business, BioInformatics,		1	
	health Care	2		
	(Lecture, Discussion, Presentation)			
1.3	Remote Sensing & GIS			
	(Lecture, Discussion, Presentation)	1		
1.4	Meteorology and Climatology			
	(Lecture, Discussion, Presentation)	1		
1.5	Computer Gaming, Multimedia and Animation etc			
	(Lecture, Discussion, Presentation)	2		

Unit-2	Operating System	L	Т	Р
2.1	Definition, Function, Types, Management of File,	1		
	Process & Memory.			
	(Lecture, Discussion, Presentation)			
2.2	Programming Languages: Generations,			
	Characteristics & Categorization	2		
	(Lecture, Discussion, Presentation)			
2.3	Introduction to Programming: Procedure Oriented			
	Programming VS object oriented programming	1	1	
	(Lecture, Discussion, Presentation)			
2.4	Introduction to Windows	2		
	(Lecture, Discussion, Presentation)			
2.5	Introduction Mac Operating Systems.	2		
	(Lecture, Discussion, Presentation)			

Unit -3	Introduction to MS Office MS Word	L	Т	Р
3.1	Features & area of use, Menus, Toolbars &	1	1	
	Buttons,			
	(Lecture, Discussion, Presentation)	r		
3.2	Creating a New Document, Different Page Views and	Z		
	layouts			
	(Lecture, Discussion, Presentation)			
3.3	Text Formatting, Paragraph and Page Formatting	2		
	(Lecture, Discussion, Presentation)	1		
3.4	Bullets, Numbering, Printing & various print options	1		
	(Lecture, Discussion, Presentation)			
3.5	Spell Check, Thesaurus, Find & Replace, Auto texts,	r		
	Working with Columns, Creation & Working with	Z		
	Tables, Mail Merge.			
	(Lecture, Discussion, Presentation)			

Unit-4	Concepts of Workbook & Worksheets	L	Т	Р
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4.1	Using different features with Data, Cell and Texts, Inserting, Removing & Resizing of Columns & Rows. (Lecture, Discussion, Presentation)	2	1	
4.2	Use of Formulas, Calculations & Functions,	2		
	Working with Different Chart Types			
	(Lecture, Discussion, Presentation)			
4.3	Introduction, Creating a New Presentation,	2		
	Working with Presentation, Using Wizards (Lecture,			
	Discussion, Presentation)			
4.4	Slides & its different views, Inserting, Deleting and	1		
	Copying of Slides, Working with Notes, Handouts			
	(Lecture, Discussion, Presentation)			
4.5	Columns & Lists, Adding Graphics, Sounds and	1		
	Movies to a Slide, print options.			
	(Lecture, Discussion, Presentation)			

Unit-5	Computer Networking	L	Т	Р
5.1	Types of Network, Topology.	1		
	(Lecture, Discussion, Presentation)	1		
5.2	Network Devices-, Bridges, HUB, Routers	2	1	
	(Lecture, Discussion, Presentation)	Z		
5.3	Repeater and Gateways, Internet, World Wide Web			
	(Lecture, Discussion, Presentation)	2		
5.4	Concept of Website and WebPages, Search Engines,	2		
	Portals	2		
	(Lecture, Discussion, Presentation)	-		
5.5	Browsers, Network Security & E-commerce.			
	(Lecture, Discussion, Presentation)			

- 1. Presentation of Comparison of different Computers, Memory & Devices.
- 2. Study and Practice of MS windows Folder related operations, My-Computer, window explorer, Control Panel.
- 3. Study and practice of Mac Operating System.
- 4. Creation and editing of Text files using MS- word.
- 5. Creation and operating of spreadsheet using MS-Excel.
- 6. Creation and editing power-point slides using MS- power point.
- 7. Comparison of different Browsers and Search Engines.
- 8. Comparison of different Websites and Portals. Suggested Readings:-
- 1. Fundamentals of Computers: E Balagurusamy, TMH, ISBN- 10: 0070141606, 2009
- 2. Fundamentals of Computers: V Rajaraman, PHI, ISBN-10: 8120350677, 6th Revised edition (2014)
- 3. Computer Fundamentals: Anita Goel, Pearson, ISBN-10: 8131733092 First edition (2010)

- 4. Operating Systems Silberschatz and Galvin Wiley India, ISBN-10: 8126554274, 2015
- 5. MS Office- S. S. Shrivastava, Laxmi Publication, ISBN-10: 8131802906, 2015
- 6. MS Office- S. Jain, BPB, ISBN-10: 8183334024, 2010
- 7. Windows 7 in simple steps- Dreamtech Press, ISBN-10: 9350040522, 2010
- 8. Mac OS- Jonathan Levin, Wiley, ISBN-10: 8126540427, 2013
- 9. Computer Networks: Andrew Tananbaum, ISBN-10: 9332518742 Pearson (2013)
- 10. Information Technology Principles and Application: Ajoy Kumar Ray & Tinku Acharya PHI, ISBN-10: 8120321847, 2004

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2 B.Tech.(PP) 1 2CCC-5: Engineering Physics

				0			
Theory	50	Practical	30	Internal	20	Credits	6

COURSE OBJECTIVES

- 1. To Understand The Basic Concept Of Quantum Physics
- 2. To Study Of Web Optics
- 3. To Study Of Nuclear Physics
- 4. To Know About The Solid State Physics
- 5. To Provide The Knowledge Of Laser And Fiber Optics

- 1. Students Demonstrate Quantum Physics Theory And Application
- 2. Students Assess Of Wave Optics Concept
- 3. To Demonstrate Nuclear Physics Working And Its Theory
- 4. To Analyze Of Superconductivity
- 5. To Differentite Of Laser And Fiber Optics

Unit-1	Quantum Physics	L	Т	Р
1.1	Group and particle velocities & their relationship.	2		2
	(Lecture, Discussion, Presentation)			

1.2	Uncertainty principle with elementary proof and applications, determination of position of a particle by a microscope, non existence of electron in nucleus, diffraction of an electron beam by a single	2	2	
	(Lecture, Discussion, Presentation)			
1.3	Compton scattering. Wave function and its properties, energy and momentum operators (Lecture, Discussion Presentation)	2	2	
1.4	time dependent and time independent Schrödinger			
	wave equation (Lecture, Discussion, Presentation)	2		2
1.5	Application of time independent Schrödinger wave equation to particle trapped in a one dimensional square potential well (derivation of energy eigenvalues and wave function)	2	2	
	(Lecture, Discussion, Presentation)			

Unit-2	Wave Optics	L	Т	Р
2.1	Interference: Fresnel's Biprism	2	2	2
	(Lecture, Discussion, Presentation)			
2.2	Interference from a wedge shaped thin film	2	1	
	(Lecture, Discussion, Presentation)			
2.3	Interference in thin films (due to reflected and	2	1	2
	transmitted light), Newton's rings and Michelson's			
	interferometer experiments and their applications.			
	Diffraction at single slit, double slit and n-slits			
	(diffraction grating)			
	(Lecture, Discussion, Presentation)			
2.4	Resolving power of grating and prism. Concept of	2	1	
	polarized light, Brewster's laws			
	(Lecture, Discussion, Presentation)			
2.5	Double refraction, Nicol prism, quarter & half wave	2	1	
	plate.			
	(Lecture, Discussion, Presentation)			

Unit -3	Nuclear Physics	L	Т	Р
3.1	Nuclear liquid drop model (semi empirical mass	2	2	
	formula), nuclear shell model. (Lecture, Discussion,			
	Presentation)			
3.2	Linear Particle accelerators: Cyclotron, general	2	2	
	description of Synchrotron			
	(Lecture, Discussion, Presentation)			

3.3	Synchrocyclotron and Betatron. Geiger- Muller			
	Counter	2	1	
	(Lecture, Discussion, Presentation)			
3.4	Motion of charged particles in crossed electric and			
	magnetic fields	2	1	
	(Lecture, Discussion, Presentation)			2
3.5	Uses of Bainbridge and Auston mass Spectrographs.			2
	(Lecture, Discussion, Presentation)	2		2

Unit-4	Solid State Physics	L	Т	Р
4.1	Qualitative discussion of Kronig-Penny model (no	2	2	
	derivation).			
	(Lecture, Discussion, Presentation)			
4.2	Effective mass, Fermi-Dirac statistical distribution	2	1	
	function			
	(Lecture, Discussion, Presentation)			
4.3	Fermi level for Intrinsic and Extrinsic	2	2	
	Semiconductors, Zener diode, tunnel diode (Lecture,	-	_	
	Discussion, Presentation)			4
4.4	Photodiode, solar-cells, Hall effect.	2		
	Superconductivity: Meissner effect, Type I and Type			
	II superconductors			
	(Lecture, Discussion, Presentation)			
4.5	Di-electric polarization, Complex	2		2
	permittivity, dielectric losses			
	(Lecture, Discussion, Presentation)			

Unit-5	Laser and Fibre Optics	L	Т	Р
5.1	Laser: Stimulated and processes,	2	2	
	& B Coefficients			
	probabilities, active medium.			
	(Lecture, Discussion, Presentation)			
5.2	population inversion, pumping, Optical resonators,	2	2	
	and characteristics of laser beam (Lecture,			
	Discussion, Presentation)			
5.3	Coherence, directionality and divergence. Principles and working of Ruby, Nd-YAG, He-Ne & Carbon dioxide Lasers with energy level diagram (Lecture,	2	2	
	Discussion, Presentation)			

5.4	Fundamental idea about optical fibre, types of fibres, acceptance angle & cone, numerical aperture, Vnumber, propagation of light through step index fibre (Ray theory) pulse dispersion	2	2
	(Lecture, Discussion, Presentation)		
5.5	Attenuation, losses & various uses. Applications of		
	lasers and optical fibers.	2	2
	(Lecture, Discussion, Presentation)	-	-

- 1. Biprism, Newton's Rings, Michelsons Interferometer.
- 2. Resolving Powers Telescope, Microscope, and Grating.
- 3. To study G.M. Counter
- 4. Spectrometers-R.I., Wavelength, using prism and grating
- 5. Optical polarization based experiments: Brewster's angle, polarimeter etc.
- 6. Measurements by LASER-Directionality, Numerical aperture, Distance etc.
- 7. Uses of Potentiometers and Bridges (Electrical).
- 8. Experiments connected with diodes and transistor.
- 9. Measurement of energy band gap of semiconductor.
- 10. To study Hall Effect.
- 11. To study Solar cell.
- 12. To find the width of s single slit by f He-Ne Laser.
- 13. To determine the numeral aperture (NA) of an Optical Fibre.
- 14. To determine plank's constant. Suggested Readings:-
- 1. Optics by Ghatak, TMH VI Edition ISBN-10: 9339220900 Year 2016
- 2. Engineering Physics- V Rajendran, TMH I Edition ISBN-10: 0071070141 Year 2010
- 3. A Text Book of Optics by Subrahmaniyam N & et al. S Chand Publication XXIII Edition ISBN-10: 8121926114 Year 2006
- 4. A Textbook of Engineering Physics by M.N. Avadhanulu S. Chand Publication Year 2010
- 5. Atomic and Nuclear Physics by N Subrahmaniyam & et al S Chand & Company Publication ISBN-10: 8121904145 Year 2007
- 6. Concepts of Modern Physics- A Besier & et al, TMH VII Edition ISBN-10: 9351341852 Year 2015
- Introduction to Solid State Physics by C Kittel, Wiley India VIII Edition ISBN-10: 8126535180 Year 2012
- 8. Fundamentals of Physics-Halliday & et al, Wiley India VI Edition ISBN-10: 047122863X Year 2002

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2B.Tech(PP)22CCC-6: Basic Mechanical EngineeringTheory50Practical30Internal20Credits

6

COURSE OBJECTIVES

- 1. To understand the classification of material use in various application. 2.
- To learn about measurement techniques and devices
- 3. To explain about fluid Properties and statics.
- 4. To understand the Law of Thermodynamics and its classification.
- 5. To learn about various engines use for different purpose

- 1. To define the Material classification and its comparison.
- 2. Describe the procedure and use various measuring techniques and devices
- 3. Demonstrate the Fluid properties and application.
- 4. Differentiate the law of thermodynamics and its classification for various applications.
- 5. Construct the different types of machine and engine.

Unit-1	Materials	L	Т	Р
1.1	Classification of engineering material,	2		2
	(Lecture, Discussion, Presentation)			
1.2	Composition of cast iron and carbon steels on			
	ironcarbon diagram and their mechanical properties	2	2	
	(Lecture, Discussion, Presentation)			
1.3	Alloy steel and their applications			
	(Lecture, Discussion, Presentation)	2	2	
1.4	Stress-strain diagram, hooks law and modulus of	-		
	elasticity	2		
	(Lecture, Discussion, Presentation)			
1.5	Tensile, shear, hardness and fatigue testing of	2		4
	materials			
	(Lecture, Discussion, Presentation)			

I	U nit-2	Measurement	L	Т	Р

2.1	Temperature, pressure, velocity, flow, strain, force and torque measurement. (Lecture, Discussion, Presentation)	2		
2.2	Concept of measurement error & uncertainly analysis (Lecture, Discussion, Presentation)	2		2
2.3	Measurement by Vernier caliper, micrometer, dial gauges, slip gauges, sine-bar and combination set (Lecture, Discussion, Presentation)	2	2	4
2.4	Introduction to lath, drilling, milling, and shaping machine	2	1	2
2.5	Introduction to NC/CNC/DNC, FMS, CAD/CAM, CIM and factory of future. (Lecture, Discussion, Presentation)	2	1	

Unit -3	Fluids	L	Т	Р
3.1	Fluid properties, density, specific weight, specific	2	1	2
	gravity, viscosity, vapor pressure, compressibility,			
	static and kinetic energy, (Lecture, Discussion,			
	Presentation)			
3.2	Pressure at a point, pascal's law, and pressure	2	2	
	variation with temperature, depth and altitude,			
	(Lecture, Discussion, Presentation)			
3.3	Classification of flows- steady and unsteady, uniform	2	1	2
	and non-uniform, laminar and turbulent, rotational			_
	and irrotational flows,(Lecture, Discussion,		1	
	Presentation)			
3.4	Euler's equation, Bernoulli's equation for	2	1	
	incompressible fluids, Working principle of fluid			
	coupling, pumps, compressors, turbines, positive			
	displacement machines and pneumatic machines			
	(Lecture, Discussion, Presentation)			
3.5	Hydraulic power & pumped storage plants for peak	2		
	load management as compared to base load plants.			
	(Lecture, Discussion, Presentation)			

Unit-4	Thermodynamics	L	Т	Р
4.1	Basic concepts, zeroth law of thermodynamics, First and second law of thermodynamics; (Lecture, Discussion, Presentation)	2	1	
4.2	Steam properties, steam processes at constant pressure, volume, (Lecture, Discussion, Presentation)	2	2	

4.3	Enthalpy & entropy, classification and working of boilers,	2		4
	(Lecture, Discussion, Presentation)			
4.4	Refrigeration, vapor absorption & compression cycles,	2	2	
	(Lecture, Discussion, Presentation)			
4.5	Coefficient of performance (COP), refrigerant	2		
	properties & eco friendly refrigerants (Lecture,	2		2
	Discussion, Presentation)			

Unit-5	Reciprocating Machines	L	Т	Р
5.1	Steam engines, hypothetical and actual indicator	2	1	2
	diagram.			
	(Lecture, Discussion, Presentation)			
5.2	Carnot cycle and ideal efficiency (Lecture,	2	2	
	Discussion, Presentation)			
5.3	Otto and diesel cycles	2		
	(Lecture, Discussion, Presentation)			
5.4	Working of two stroke & four stroke petrol & diesel	2		4
	IC engines			
	(Lecture, Discussion, Presentation)			
5.5	Air pollution due to I C Engines.	4		
	(Lecture, Discussion, Presentation)			

- 1. To perform tensile testing of standard mild steel specimen.
- 2. To perform experiments on Bernoulli's theorem.
- 3. To perform experiment of flow measurements by venturi and orifice meters.
- 4. To practice linear and angular measurement using, vernier, micrometer, slip gauge, dial gauge and sine- bar.
- 5. To study of different types of boilers and mountings. 6. To perform experiment on miniboiler (50 Kg/Hour)
- 7. To find COP of a refrigeration unit.
- 8. To study of different IC engines & measurement of B.H.P. using rope/belt dynamometer.
- 9. To study the analysis of exhaust gases on petrol, diesel & bio-diesel engines.

Suggested Readings:-

- 1. G Narula, K Narula, V Gupta; Material Science; TMH I Edition ISBN-10: 0074517961 Year 2001
- 2. Agrawal B & CM; Basic Mechanical Engg. Wiley India ISBN-10: 8126518782 Year 2008
- 3. Nag PK, Tripathi et al; Basic Mechanical Engg; TMH ISBN-10: 0070085633 Year 2016
- 4. Rajput; Basic Mechanical Engg; Laxmi Publications; IV Edition ISBN-10: 8131803597 Year 2007
- Sawhney GS; Fundamentals of Mechanical Engg; PHI III Edition ISBN-10: 8120351339 Year 2015

- 6. Nakra and Chaudhry; Instrumentation, Measurement & Analysis; TMH IV Edition ISBN10: 9385880624 Year 2016
- 7. Nag PK; Engineering Thermodynamics; TMH V Edition ISBN-10: 1259062562 Year 2013
- 8. V Ganesan; Internal Combustion Engines; TMH IV Edition ISBN-10: 1259006190 Year 2012
- 9. Rao PN; Manufacturing Technology- Vol.1& 2, TMH III Edition ISBN-10: 1259062570 & ISBN-10: 1259029565 Year 2013
- 10. John KC; Mechanical workshop practice; PHI II Edition ISBN-10: 812034166X Year 2013
- 11. Hazara Choudhary; Workshop Practices Volume I & II.

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2B.Tech(PP)7 2CCC-7: Basic Civil Engineering & Engineering Mechanics

Theory	50	Practical	30	Internal	20	Credits	6
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COURSE OBJECTIVES

- 1. To Understand About The Building Material And Construction.
- 2. To Study about Surveying and Positioning.
- 3. To Understand The Basics Knowledge Of Mapping And Sensing.
- 4. To AnalyzeAbout Force and Equilibrium Application.
- 5. To Perform Centre Of Gravity And Moment Of Inertia.

- 1. To Demonstrate The Building Material And Construction.
- 2. To Perform Surveying And Positioning.
- 3. To Assess The Basics Knowledge Of Mapping And Sensing.
- 4. To Study about Force and Equilibrium Application.
- 5. To Understand Centre Of Gravity And Moment Of Inertia.

Unit-1	Building Materials & Construction	L	Т	Р
1.1	Building Materials & Construction - Stones, bricks, cement, lime, timber-types, properties, test & uses.	2		4
	(Lecture, Discussion, Presentation)			
1.2	laboratory tests concrete and mortar Materials:	2	1	
	Workability, Strength properties of Concrete			
	(Lecture, Discussion, Presentation)			
1.3	Nominal proportion of Concrete preparation of	2	1	2
	concrete, compaction, curing (Lecture, Discussion,			2
	Presentation)			
1.4	Elements of Building Construction, Foundations	2	1	
	conventional spread footings, RCC footings, brick			
	masonry walls			
	(Lecture, Discussion, Presentation)			
1.5	Plastering and pointing, floors, roofs, Doors,	2	2	
	windows, lintels, staircases – types and their			
	suitability.			
	(Lecture, Discussion, Presentation)			

Unit-2	Surveying & Positioning	L	Т	Р
2.1	Introduction to surveying Instruments – levels, thedolites, plane tables and related devices. Electronic surveying instruments etc. (Lecture, Discussion, Presentation)	2		2
2.2	Measurement of directions by different methods. (Lecture, Discussion, Presentation)		2	2

2.3	Measurement of distances – conventional and EDM			
	methods	2	1	4
	(Lecture, Discussion, Presentation)			
2.4	Measurement of elevations by different methods	2	1	
	(Lecture, Discussion, Presentation)			
		2		
2.5	Reciprocal leveling	_		
	(Lecture, Discussion, Presentation)			

Unit -3	Mapping & Sensing	L	Т	Р
3.1	Mapping details and contouring.	2	2	
	(Lecture, Discussion, Presentation)			
3.2	Profile Cross sectioning and measurement of areas,	2	2	
	volumes			
	(Lecture, Discussion, Presentation)			
3.3	Application of measurements in quantity	2	1	
	computations			
	(Lecture, Discussion, Presentation)			
3.4	Survey stations	2	1	
	(Lecture, Discussion, Presentation)			
3.5	Introduction of remote sensing and its applications.	2	2	
	(Lecture, Discussion, Presentation)			

Unit-4	Forces and Equilibrium	L	Т	Р
4.1	Graphical and Analytical Treatment of Concurrent		2	2
	and non concurrent Co- planner forces. (Lecture,			
	Discussion, Presentation)			
4.2	free Diagram, Force Diagram and Bow's notations	2	1	
	(Lecture, Discussion, Presentation)			_
4.3	Application of Equilibrium Concepts	2	1	2
4.4	Analysis of plane Trusses: Method of joints, Method			4
	of Sections.	2		
	(Lecture, Discussion, Presentation)			
4.5	Frictional force in equilibrium problems			
	(Lecture, Discussion, Presentation)	2		

Unit-5	Centre of Gravity and moment of Inertia	L	Т	Р
5.1	Centroid and Centre of Gravity, Moment Inertia of	2	2	2
	Area and Mass			
	(Lecture, Discussion, Presentation)			
5.2	Radius of Gyration	2	1	
	(Lecture, Discussion, Presentation)			

5.3	Introduction to product of Inertia and Principle Axes	2	1	
	(Lecture, Discussion, Presentation)			
5.4	Support Reactions, Shear force and bending moment			
	Diagram	2		2
	(Lecture, Discussion, Presentation)			
5.5	Cantilever & simply supported beam with	2		4
	concentrated, distributed load and Couple			
	(Lecture, Discussion, Presentation)			

Students are expected to perform minimum ten experiments from the list suggested below by preferably selecting experiments from each unit of syllabus.

- 1. To perform traverse surveying with prismatic compass, check for local attraction and determine corrected bearings and to balance the traverse by Bowditch's rule.
- 2. To perform leveling exercise by height of instrument of Rise and fall method.
- 3. To measure horizontal and vertical angles in the field by using Theodolite.
- 4. To determine (a) normal consistency (b) Initial and Final Setting time of a cement Sample.
- 5. To determine the workability of fresh concrete of given proportions by slump test orcompaction factor test.
- 6. To determine the Compressive Strength of brick.
- 7. To determine particle size distribution and fineness modulus of course and fine Aggregate.
- 8. To verify the law of Triangle of forces and Lami's theorem.
- 9. To verify the law of parallelogram of forces.
- 10. To verify law of polygon of forces
- 11. To find the support reactions of a given truss and verify analytically.
- 12. To determine support reaction and shear force at a given section of a simply Supported beam and verify in analytically using parallel beam apparatus.
- 13. To determine the moment of inertia of fly wheel by falling weight method.
- 14. To verify bending moment at a given section of a simply supported beam.

Suggested Readings:-

- 1. S. Ramamrutam & R.Narayanan; Basic Civil Engineering, Dhanpat Rai Pub. ISBN-10: 8187433930 Year 2009
- Prasad I.B., Applied Mechanics, Khanna Publication. ISBN-10: 8174090681 Year 2002 3. Punmia, B.C., Surveying, Standard book depot. Laxmi Publications; XVII edition ISBN-10: 8170088534 Year 2016
- 4. Shesha Prakash and Mogaveer; Elements of Civil Engg & Engg. Mechanics; PHI II Edition ISBN-10: 8120344391 Year 2012
- 5. S.P, Timoshenko, Mechanics of structure, East West press Pvt.Ltd.
- Surveying by Duggal Tata McGraw Hill IV Edition. ISBN-10: 1259028992 Year 2013 7. Building Construction by S.C. Rangwala- Charotar publications House, Anand. ISBN-10: 9385039040 Year 2015

- 8. Bhawan Nirman Samagari by Grucharan Singh- Standard Book House, New Delhi XIV Edition ISBN-10: 8180141608 Year 2012
- 9. Global Positioning System Gopi, TMH ISBN-10: 0070585997 Year 2005
- 10. A. P Boresi & R J Schmidt- Engineering Mechanics- statics and dynamics, Cengage Learning India Pvt Ltd; I Edition ISBN-10: 8131507955 Year 2008

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2B.Tech(PP)4 2CCC-8: Engineering Mathematics-2

Theory	80	Practical	00	Internal	20	Credits	6
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COURSE OBJECTIVES

- 1. To explain the Differential Equations and theorems.
- 2. To learn about second Lenoir equations and power series solution.
- 3. Students get knowledge of Partial differential equations.
- 4. To explain the line integration with effective mathematical tools.
- 5. Students are able to solved vector calculus.

- **1.** To introduce effective mathematical tools for the solutions of ordinary and partial differential equations that model physical processes.
- **2.** To introduce the tools of differentiation and integration of functions of complex variable that is used in various techniques dealing engineering problems.
- **3.** To acquaint the student with mathematical tools available in vector calculus needed various field of science and engineering.
- 4. Analyze the integration with use of mathematical tools.
- 5. Define the vector calculus and problem solving.

UNIT 1	Ordinary Differential Equations I	L	Т	Р
1.1	Differential Equations of First Order and First	2	2	
	Degree (Leibnitz linear, Bernoulli's, Exact)			
	(Lecture, Discussion, Presentation)			
1.2	Differential Equations of First Order and Higher	2	2	
	Degree(Lecture, Discussion, Presentation)			
1.3	Higher order differential equations with constants	2	2	
	coefficients(Lecture, Discussion, Presentation)			
1.4	Homogeneous Linear Differential equations (Lecture,	2	1	
	Discussion, Presentation)		1	
1.5	Simultaneous Differential Equations. (Lecture,	2	1	
	Discussion, Presentation)			

UNIT2	Ordinary differential Equations II	L	Т	Р
2.1	Second order linear differential equations with	2	2	
	variable coefficients, (Lecture, Discussion,			
	Presentation)			
2.2	Method of variation of parameters, (Lecture,	2	2	
	Discussion, Presentation)			
2.3	Power series solutions;	2	1	
	(Lecture, Discussion, Presentation)			
2.4	Legendre polynomials,		2	
	(Lecture, Discussion, Presentation)			

2.5	Bessel functions of the first kind and their properties		1	
	(Lecture, Discussion, Presentation)			

Unit 3	Partial Differential Equations	L	Т	Р
3.1	Formulation of Partial Differential equations,	2	2	
	(Lecture, Discussion, Presentation)			
3.2	Linear	2	1	
	(Lecture, Discussion, Presentation)			
3.3	Non-Linear Partial Differential Equations (Lecture,	2	2	
	Discussion, Presentation)			
3.4	Homogeneous Linear	2	1	
	(Lecture, Discussion, Presentation)			
3.5	Partial Differential Equations with Constants		2	
	Coefficients	2		
	(Lecture, Discussion, Presentation)			

Unit 4	Complex Variables	L	Т	Р
4.1	Functions of Complex Variables: Analytic Functions,	2	2	
	Harmonic Conjugate, (Lecture, Discussion, Presentation)	2	2	
4.2	Cauchy-Riemann Equations (without proof), Line	Z		
	Integral, (Lecture, Discussion, Presentation)	2	2	
4.3	Cauchy-Goursat theorem (without proof), Cauchy Integral			
	formula (without proof), (Lecture, Discussion,			
	Presentation)	2	1	
4.4	Singular Points, Poles & Residues, Residue Theorem,	2	1	
	(Lecture, Discussion, Presentation)			
4.5	Application of Residues theorem for Evaluation of Real	C	1	
	Integral (Unit Circle).	Δ		
	(Lecture, Discussion, Presentation)			

Unit 5	Vector Calculus	L	Т	Р
5.1	Differentiation of Vectors	2	2	
	(Lecture, Discussion, Presentation)	2		
5.2	Scalar and vector point function, (Lecture, Discussion,	2	2	
	Presentation)	2		
5.3	Gradient(Lecture, Discussion, Presentation)		2	
5.4	Geometrical meaning of gradient, (Lecture, Discussion,	2		
	Presentation)		2	
5.5	Directional Derivative, Divergence and Curl, Line Integral	2		
	,Surface Integral and Volume Integral, Gauss Divergence,			
	Stokes and Green theorems. (Lecture, Discussion,			
	Presentation)			

Practical/Projects/Assignments:- N/A Suggested Readings:-

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006. 3. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edn., Wiley India, 2009.

- 4. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
- 5. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
- 6. E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.
- 7. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., McGraw Hill,2004.
- 8. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
- B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
 2B.Tech(PP)5

I IIC OTINOUS (Ayan Tiwari) (Dr.Asmita Khajanchi) (Umesh Upadhyay) (Dr.P.Sasikala) (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

2AECC-2: Environmental Studies

Theory 40 Practical	00	Internal	10	Credits	3
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COURSE OBJECTIVES

- 1. To learn about environment study, natural& energy resources.
- 2. TO explain about eco system and bio-diversity system.
- 3. Student study about environmental pollution and waste management.
- **4.** To get a knowledge about environmental issues and laws.
- 5. To explain about human population and environmental and human health issue.

- 1. Define the environmental importance, various resources of nature.
- 2. Describe the Eco-System and Biodiversity Classification.
- 3. Demonstrate the Pollution effect and Process of Waste Management.
- 4. Analysis the environmental Issues and environmental Laws

5	To Analy	ucic the	Humon	Donulating	anvironmental	and Health issue
J.	10 Analy	y 515 the	IIuman	i opulating,	CITVITOIIIICIIICII	and meanin issue.

UNIT 1	Multidisciplinary nature of environmental studies	L	Т	Р
1.1	Definition; Scope and importance(Lecture,	2	1	
	Discussion, Presentation)			
1.2	Natural resources, Forest resources, Water resources,	1		
	Mineral resources, Food resources, (Lecture,	1		
	Discussion, Presentation)	1		
1.3	World food problems(Lecture, Discussion,			
	Presentation)	2		
1.4	Energy resources, renewable and non-renewable	2		
	energy sources(Lecture, Discussion, Presentation)			
1.5	use of alternate energy sources, Land resources,			
	Equitable use of resources for sustainable			
	lifestyles(Lecture, Discussion, Presentation)			

UNIT 2	Ecosystems, Biodiversity and its Conservation	L	Т	Р
2.1	Concept, structure and function of an ecosystem, food chains, Conservation of biodiversity: In-situ and Ex- situ conservation of biodiversity. (Lecture, Discussion, Presentation)	2		
2.2	Food webs and ecological pyramids. Types of ecosystem: - Forest ecosystem, Grassland ecosystem, Desert ecosystem (Lecture, Discussion, Presentation)	2	1	
2.3	Aquatic ecosystems Biodiversity: Definition, Biogeographical classification of India (Lecture, Discussion, Presentation)	1		

2.4	Value of biodiversity, biodiversity at global, national and local levels (Lecture, Discussion, Presentation)	2	
2.5	India as a mega-diversity nation, Hot-spots of biodiversity (Lecture, Discussion, Presentation)	1	

UNIT 3	Environmental Pollution	L	Т	Р
3.1	Definitions. Causes, effects and control measures of	2		
	Air, water (Lecture, Discussion, Presentation)	2		
3.2	Soil, Marine, Noise, Thermal, Nuclear pollution & hazards.	2		
	(Lecture, Discussion, Presentation)			
3.3	Solid waste management: Causes, effects and control measures of urban industrial wastes. (Lecture,	2		
	Discussion, Presentation)			
3.4	Disaster management: floods, earthquake (Lecture,	1	1	
	Discussion, Presentation)	1		
3.5	cyclone and landslides	1		
	(Lecture, Discussion, Presentation)			

UNIT 4	Social Issues and the Environment	L	Т	Р
4.1	Unsustainable to Sustainable development, Water conservation	2		
4.2	Environmental ethics: Issues and possible solutions, Environment Protection Act- Air (Prevention and Control of Pollution)	2	1	
	(Lecture, Discussion, Presentation)			
4.3	Act, Water (Prevention and Control of Pollution) (Lecture, Discussion, Presentation)	1		
4.4	Act, Wildlife Protection Act, Forest Conservation (Lecture, Discussion, Presentation)	1		
4.5	Act, Issues involved in enforcement of environmental legislation, Public awareness.	2		
	(Lecture, Discussion, Presentation)			

UNIT 5	Human Population and the Environment	L	Т	Р

5.1	Population growth, variation among nations.	2	1	
	(Lecture, Discussion, Presentation)	2		
5.2	Population explosion-Family welfare Program	2		
	(Lecture, Discussion, Presentation)	1		
5.3	Environment and human health			
	(Lecture, Discussion, Presentation)			
5.4	Human Rights	2		
	(Lecture, Discussion, Presentation)	1		
5.5	Value Education	1		
	(Lecture, Discussion, Presentation)			

- 1. Visit to a local area to document environmental assets-river/forest/grassland/hill/mountain.
- 2. Visit to a local polluted site- Urban/Rural/Industrial/Agricultural.
- 3. Study of common plants, insects, birds.
- 4. Study of simple ecosystems-pond, river, hill slopes, etc.
- 5. Case study on biodiversity.
- 6. Case study on population growth.
- 7. Case study on value education.
- 8. Case study on gender discrimination Suggested Readings:-
- 1. Harris, CE, Prichard MS, Rabin's MJ, Engineering Ethic, Cengage Publication. V Edition ISBN-10 1133934684 Year 2013
- 2. Rana SVS; Essentials of Ecology and Environmental Science, PHI Publication, V Edition ISBN-10 8120347862 Year 2013
- 3. Raynold, GW Ethics in information Technology; Cengage. IV Edition ISBN-10 8131518752 Year 2012
- 4. Svakumar; Energy Environment & Ethics in society; TMH
- 5. BK Sharma, Environmental Chemistry; Krishna Prakashan Media ISBN-10 8182836832 Year 2014
- 6. Bala Krishnamoorthy; "Environmental management" Text and Cases; PHI II Edition ISBN10 8120333292 Year 2008
- 7. Gerard Kiely, Environmental Engineering; TMH I Edition ISBN-10 0070634297 Year 2006 2B.Tech(PP)6

Altended Valia (Dr.Asmita Khajanchi (Umesh Upadhyay) (Dr.P.Sas (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

OE-2:	Manufacturin	g Technology
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COURSE OBJECTIVES

- 1. To understand the theory of metal forming personal.
- 2. To study forging and rolling processes.
- 3. To study extrusion and drawing processes.
- 4. To understand sheet metal forming processes.
- 5. To learn the basic concept of powder metallurgy.

COURSE OUTCOMES (CO)

- 1. Students will acquire a fundamental knowledge on metal forming technology which is necessary for an understanding of industrial processes.
- 2. Student can understand the classification, defects causes, remedies and application of forging and rolling processes.
- 3. Student can understand the classification, defects analysis, principle and processes of extrusion and drawing processes.
- 4. Student can understand the classification, processes and application of sheet metal forming processes.

UNIT 1	Theory of Metal Forming	L	Т	Р
1.1	Introduction to cold/hot forming processes. (Lecture,	2		
	Discussion, Presentation)			
1.2	Metallurgical aspects of metal forming –slip-twining,	2	1	
	(Lecture, Discussion, Presentation)	_		
1.3	Mechanics of plastic deformation- effects of	2		
	temperature, strain rate, microstructure and friction in			
	metal forming (Lecture, Discussion, Presentation)			
1.4	Yield criteria and their significance, (Lecture,	1		
	Discussion, Presentation)			
1.5	Classification of metal forming processes: slip line field	1		
	theory (Lecture, Discussion, Presentation)			

5. Student can understand the processes, application and advantage of powder metallurgy.

UNIT 2	Welding and rolling processes	L	Т	Р
2.1	Basic Joining Processes Types of welding, processes of	2	1	
	welding, Geometry of weld joints (Lecture, Discussion,			
	Presentation)			

2.2	Resistance welding (spot, seam, projection, percussion, flash types) (Lecture, Discussion, Presentation)	1	
		2	
2.3	Principles of rolling processes, Classification, types	-	
	of rolling mills, ring comparison tests calculation of forces and geometrical relationship in rolling (Lecture, Discussion, Presentation)		
2.4	Analysis of rolling load, torque and power, rolling mill control, effects of friction. (Lecture, Discussion, Presentation)	2	
2.5	Form rolling, rolling defects, causes and remedies. (Lecture, Discussion, Presentation)	1	

UNIT 3	Extrusion and Drawing Processes	L	Т	Р		
3.1	Classification of extrusion processes-tool,	2				
	equipment, and principle of these processes,					
	(Lecture, Discussion, Presentation)					
3.2	Influence on friction- Extrusion force	1				
	calculationdefects and (Lecture, Discussion,		1			
	Presentation)	2				
3.3	Analysis-rod/wire drawing -ool, equipment and					
	principle of processes defects (Lecture, Discussion,					
	Presentation)	1				
3.4	Tube drawing and sinking processes (Lecture,					
	Discussion, Presentation)					
3.5	Mannessmann processes of seamless pipe	2				
	manufacturing (Lecture, Discussion, Presentation)					

UNIT 4	Sheet metal forming processes	L	Τ	Р
4.1	Classification - conventional and HERF processespresses-types and selection of presses, formability of sheet metals- (Lecture, Discussion, Presentation)	1	1	
4.2	Principle, process parameters, equipment and application of the following processes: deep drawing, spinning, stretch forming. (Lecture, Discussion, Presentation)	2		

4.3	Plate bending, spring back, press brake forming, (Lecture, Discussion, Presentation)	1		
4.4	Introduction to forming, electro hydraulic forming, magnetic pulse forming. (Lecture Discussion	2		
	Presentation)			
4.5	Introduction to press work – coining, embossing etc, Design of sheet metal dies. (Lecture, Discussion,	2		
	Presentation)			
UNIT 5	Powder Metallurgy	L	Т	Р
5.1	Introduction to Powder Metallurgy	2		
	process, preparation of powders			
	(Lecture, Discussion, Presentation)			
5.2	Types & function of binders, green compaction	1		
	(Lecture, Discussion, Presentation)			
5.3	Sintering process and its effect on the product	2		
	(Lecture, Discussion, Presentation)	2		
5.4	Application of powder metallurgy products	2		
	(Lecture, Discussion, Presentation)	1	1	
5.5	Advantages of powder metallurgy products. Sintering equipment (Lecture, Discussion, Presentation)			

- 1. Study of basic principles of metal forming.
- 2. Study of welding and rolling processes.
- 3. Study of extrusion and drawing processes.
- 4. Study of sheet metal forming processes.
- 5. Study of basic principles of powder metallurgy. Suggested Readings:-
- 1. Manufacturing Technology by <u>P. N. Rao</u>- Vol. 1 & 2, McGraw Hill Education; Fifth edition, ISBN-10: 9353160502, 2018

2. Manufacturing Engineering and Technology (SI Edition) by <u>Serope Kalpakjian</u> & <u>Steven</u> R. Schmid, Pearson Education; Seventh edition, ISBN-10: 9789332587908, 2018

3. A Textbook of Manufacturing Technology by <u>R.K. Rajput</u>, Laxmi Publications; Second edition, ISBN-10: 8131802442, 2017

4. A Textbook of Workshop Technology: Manufacturing Processes by <u>R.S Khurmi</u> & J.K. Gupta, S. Chand & Company, ISBN-10: 812190868X, 2010

5. Elements of Workshop Technology Vol-1&2 by <u>Choudhury H S K</u>, Media Promoters and Publishers Pvt Ltd, ISBN-10: 8185099146, 2008

...... N (Dr.Asmita Khajanchi) (N 10,200 Altended Oul (M.M.Isaad) SA. (Ayan Tiwari) (Umesh Upadhyay) Inta in 20 2 9 2020 (Dr.P.Sasikala) (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

3B.Tech(PP)1 3CCC-9: Basics of Printing Processes

				0				
Theory	50	Practical	30	Internal	20	Credits	6	
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COURSE OBJECTIVES

- 1. Understand the brief introduction and history of printing.
- 2. Understand the printing process with its principle.
- 3. To understand flexography and gravure printing process.
- 4. To understand screen printing.
- 5. To understand digital printing

- 1. To Critique of different printing process.
- 2. To Assess printing process and describe its principle.
- 3. To Evaluate the letterpress and lithography process.
- 4. To Evaluate the Flexography and Gravure printing process.
- 5. To Evaluate the screen and digital printing process.

Unit-1	Brief introduction on history of Printing	L	Т	Р
1.1	Sequential developments in Printing. (Lecture,	2	2	
	Discussion, Presentation)			
1.2	Printing in India	2	1	
	(Lecture, Discussion, Presentation)	2	2	
1.3	Recent trends in printing	2	2	
	(Lecture, Discussion, Presentation)	2	1	
1.4	Participation at international level.	Z	1	
	(Lecture, Discussion, Presentation)	2	2	
1.5	Earlier press system (Timeline)	2	2	
	(Lecture, Discussion, Presentation)			

Unit-2	Introduction to printing process with its principle	L	Т	Р
2.1	Letterpress and offset	2	1	2
	(Lecture, Discussion, Presentation)			
2.2	Flexography, gravure (Lecture, Discussion,			
	Presentation)	2	1	2
2.3	Screen and Digital printing ,Identification of image	•		
	area and non image area in all printing process	2	2	4
	(Lecture, Discussion, Presentation)			
2.4	Prepress, press and post press operations;	2		
	Identification of different printed products.	2		
	(Lecture, Discussion, Presentation)			
2.5	Advantages and disadvantages of various printing	2		
	processes and Job suitability of various printing	2		
	processes.(Lecture, Discussion, Presentation)			

Unit -3	Letterpress and Lithographic printing Process	L	Т	Р
3.1	Characteristics of letterpress printing. (Lecture, Discussion, Presentation)	2	1	2
3.2	Tools & equipments used in the Letterpress department. (Lecture, Discussion, Presentation)	2		2
3.3	Classification of letterpress printing machines, Inks & image carriers; Lithographic offset printing process. (Lecture, Discussion, Presentation)	4		2
3.4	Principle, characteristics of lithographic printing, classification of offset printing machines. (Lecture, Discussion, Presentation)	2		2
3.5	Different units of offset machine. (Lecture, Discussion, Presentation)			2

Unit-4	Flexography and Gravure printing process	L	Т	Р
4.1	Characteristics of flexography	2		2
	(Lecture, Discussion, Presentation)			
4.2	Components of flexo press, flexo plates,	2		
	(Lecture, Discussion, Presentation)	-	1	4

4.3	Introduction to flexo inks & substrates ;Gravure printing process-	2		
	(Lecture, Discussion, Presentation)			
4.4	Characteristics of gravure	2		
	(Lecture, Discussion, Presentation)	_		2
4.5	Basic components of gravure press, gravure inks &	2		2
	substrate.		2	
	(Lecture, Discussion, Presentation)			

Unit-5	Screen and Digital printing process	L	Т	Р
5.1	Stencils- Their kinds and method of preparation,	2	1	2
	(Lecture, Discussion, Presentation)			
5.2	Application of screen printing,	2		2
	(Lecture, Discussion, Presentation)			
5.3	Screen preparation	2	1	
	(Lecture, Discussion, Presentation)	2		
5.4	Printing process steps; Digital printing Process	2	1	
	(Lecture, Discussion, Presentation)	2		2
5.5	Introduction, various digital printing technologies.	2	2	2
	(Lecture, Discussion, Presentation)			

- 1. Identification of different tools & equipments used in various printing process.
- 2. Introduction of different printing presses.
- 3. Schematic diagram of different printing processes.
- 4. Study of running & printing faults on different printing process machine.
- 5. Study of various types of Image carriers for different printing process.
- 6. Screen Printing- Screen making materials & chemicals. Registration methods.

Suggested Readings:-

- Introduction to Printing-Herbert Simonn Publisher: Faber & Faber (March 17, 1980) ISBN10: 0571115284
- 2. Printing Technology Adams, Faux and Rieber Publisher: Delmar Thomson learning; 5th edition (June 12, 2001) ISBN-10: 076682232X
- 3. Screen Printing Review Babett Magee Publisher: Graphic Arts Technical Fndtn (June 1985) ISBN-10: 0883620774
- 4. Silk Screen Printing R.Krishnamoorthi
- 5. Screen Printing -B.D Mendhiratta, Arihant Publications
- 6. Handbook of Print media: Technologies and production methods -Helmnt Kippahan Publisher: Springer; 2001 edition (September 21, 2001) ISBN-10: 354067326

14045 01 2.0 er (Dr.Asmita Khajanchi) 101,2010 Altended Oul (M.M.Isaad) (Ayan Tiwari) (Umesh Upadhyay) Inta in 09.20 2 9 2020 (Dr.P.Sasikala) (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

3B.Tech(PP)2 3CCC-10: Elements of Packaging

COURSE OBJECTIVES

- 1. Students will develop skills from other package in Futures courses.
- 2. Students will gain a thorough grounding in packaging technology and procedures 3. Students will gain a thorough grounding of marking on package
- 4. Students will gain a thorough grounding in media used.
- 5. Students prepare a series of assignments suitable for inclusion in a portfolio.

- 1. To identify the primary packaging
- 2. To Classify and Compare the Types of material used in Packaging
- 3. To Classify and Compare the Types of cushioning material used in Packaging
- 4. To apply and Identify various media in packaging
- 5. To identify the packaging process types

Unit-1	History And Evolution Of Packaging	L	Т	Р
1.1	Basics of Packaging	2	2	
	(Lecture, Discussion)	2	2	
1.2	History of Packaging	Z	Z	
	(Lecture, Discussion, Presentation)	2	2	
1.3	Classification		1	
	(Lecture, Discussion, Demonstration)		1	
1.4	Functions & Roles	2	1	
	(Lecture, Discussion, Presentation)			
1.5	Factors Influencing Design of a Package	2		
	(Lecture, Discussion, Practice, Assignment)			

Unit-2	Shelf Life And Packaging Cycle	L	Т	Р
2.1	Product-Package Relationship	2	2	
	(Lecture, Discussion)	2	2	
2.2	Product Life Cycle Curve	2	Z	
	(Lecture, Discussion)			
2.3	Elements of Package Design			
	(Lecture, Discussion, Presentation)	2	1	
2.4	Types of Packaging- Flexible, Rigid &	2	1	
	SemiRigid (Lecture, Discussion, Presentation)			
2.5	Types of Packaging- Rigid & Semi-Rigid.	2	2	
	(Lecture, Discussion, Presentation)			

Unit -3	Markings On Package	L	Т	Р
3.1	Handling Marks	2	2	
	(Lecture, Discussion, Presentation)	2		
3.2	Routing Marks, Information Marks	2		
	(Lecture, Discussion, Presentation)	2	2	
3.3	Cushioning Materials – Functions and			
	Properties			
	(Lecture, Discussion, Demonstration)	2	2	
3.4	Classification- Space Fillers			
	(Lecture, Discussion, Demonstration)	2	2	
3.5	Resilient Cushioning and, Non-Resilient			
	Cushioning Materials			
	(Lecture, Discussion, Demonstration)			

Unit-4	Introduction To Packaging Media And Their	L	Т	Р
	Characteristics			
4.1	Paper and Board	2	1	
	(Lecture, Discussion, Assignment)	2	1	
4.2	Plastics	2	1	
	(Lecture, Discussion, Assignment)	2	2	
4.3	Glass	2	2	
	(Lecture, Discussion, Assignment)	2	2	
4.4	Wood	2	2	
	(Lecture, Discussion, Assignment)			
4.5	Metals and Foils			
	(Lecture, Discussion, Assignment)			

Unit-5	Introduction to Innovative Packaging	L	Т	Р
5.1	Map, Cap and Vacuum Packaging (Lecture,	2	2	
	Discussion, Presentation)		2	
5.2	Shrink Packaging, Stretch Wrapping (Lecture,	2	2	
	Discussion, Presentation)		1	
5.3	Blister Packaging	2	1	
	(Lecture, Discussion, Presentation)		1	
5.4	Skin Packaging	2		
	(Lecture, Discussion, Presentation)			
5.5	Aerosol Packaging Container	2		
	(Lecture, Discussion, Presentation)			

- 1. To Study the Historical Timeline of Packaging
- 2. To Study the Various Flexible & Rigid Packages
- 3. To Study calculation of Cushioning for Different Materials and Products
- 4. Detail Study of Various Packaging Media 5. Detail Study of Innovations in Packaging Suggested Readings:

1. Packaging Design and Performance – Frank Paine Publisher: Springer; 1991 Edition (October 31, 1990) Isbn-10: 075140151 xs

2. Advances in Plastic Packaging Technology – John Briston Publisher: Pira International (December 1992) Isbn-10: 0902799967

3. Packaging Technology: Fundamentals, Materials and Processes (Wood head publishing In Materials) Isbn-10: 1845696654

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3B.Tech(PP)3 3CCC-11: Theory of Machines

COURSE OBJECTIVES

- 1. To understand the basic concepts of theory of machines and mechanisms.
- 2. To learn about different cams and followers.
- 3. To understand basics and designing aspects of belts, ropes and chains.
- 4. To understand basics and designing aspects of gears and gear trains.
- 5. To learn the basics of vibration.

- 1. Students can understand the basics of kinematics and different mechanisms.
- 2. Students can understand different cams and followers and their relative motion.
- 3. Students can understand basic terminology and designing basics of belts, ropes and chains.
- 4. Students can understand basic terminology and designing basics of gear and gear trains.
- 5. Students can understand the vibration, its types and other drive systems.

UNIT 1	Basic concepts	L	Т	Р
1.1	Definition of statics, kinetics, kinematics and dynamics, types of constrained motion, Rigid and resistant body, Link or element, kinematic pair, type of joints degrees of freedom, (Lecture, Discussion, Presentation)	2	1	2
1.2	Classification of kinematic pairs, Kinematic chain, linkage, (Lecture, Discussion, Presentation)	2	1	2
1.3	Mechanism and structure, Mobility of Mechanisms,			
	equivalent mechanism. (Lecture, Discussion, Presentation)	2	1	
1.4	The four bar chain, mechanical advantage, transmission angle.			
	(Lecture, Discussion, Presentation)	2	1	
1.5	Single slider crank chain and double slider crank chain, ratchet and pawl mechanism, geneva mechanism and other miscellaneous mechanisms. (Lecture, Discussion, Presentation)	2		4

UNIT 2	Cams	L	Т	Р
2.1	Types of cams, Types of followers, Displacement, Velocity and Acceleration time curves for cam	3		4

2.2	Disc cam with reciprocating follower having knifeedge, roller and flat-faced follower, (Lecture, Discussion, Presentation)	2	2
2.3	Disc cam with oscillating roller follower (Lecture,	2	2
	Discussion, Presentation)		
2.4	Follower motions including SHM, Uniform velocity, (Lecture, Discussion, Presentation)	3	2
2.5	Uniform acceleration and retardation and Cycloidal motion. (Lecture, Discussion, Presentation)	2	2

UNIT 3	BELTS, ROPES AND CHAINS	L	Т	Р
3.1	Introduction, Belt and Rope drives, open belt and crossed belt drives, (Lecture, Discussion, Presentation)	4		2
3.2	Action of belt on pulleys, velocity ratio, slip, material for belts and ropes, (Lecture, Discussion, Presentation)	2		2
3.3	Law of belting, length of belt, Ratio of friction tensions, Power transmitted, Centrifugal effect on belts, (Lecture, Discussion, Presentation)	3		
3.4	Maximum power transmitted by belt Initial tension, creep, Chains, chain length, (Lecture, Discussion, Presentation)	3		2
3.5	Angular speed ratio, classification of chains. (Lecture, Discussion, Presentation)	2		2

UNIT 4	Gears and Gear Trains	L	Т	Р
4.1	Gear terminology, Functions of gear, Classification of	2		2
	gears, Gear nomenclature, (Lecture, Discussion,			
	Presentation)			
4.2	Forms of teeth, cycloid profile and involute profile	4		2
	teeth, Law of gearing, (Lecture, Discussion,	4		2
	Presentation)			
4.3	Path of contact, Arc of contact, Contact ratio,			
	minimum number of teeth,	3		2
	(Lecture, Discussion, Presentation)			
4.4	Terminology of helical, worm and bevel gear,	2		
	(Lecture, Discussion, Presentation)			

4.5	Simple gear trains, compound gear trains, reverted		
	gear train and epicyclical gear	3	2
	trains, (Lecture, Discussion, Presentation)		

UNIT 5	Vibration and Drive Systems	L	Т	Р
5.1	Introduction, Types of vibrations – free vibration, longitudinal vibration, transverse vibration and torsional vibration (Lecture, Discussion, Presentation)	3	1	2
5.2	Forced vibration, damped vibration, causes, remedial measures & harmful effects of vibrations (Lecture, Discussion, Presentation)	3		2
5.3	Basic features of vibrating systems, degree of freedom, (Lecture, Discussion, Presentation)	2		2
5.4	Vibration Isolation and transmissibility (Lecture, Discussion, Presentation)	2		2
5.5	Hydraulics, pneumatics (Lecture, Discussion, Presentation)	2		2

- 1. To study inversion of four bar mechanisms.
- 2. Study of different cams and followers. Draw the cam profile.
- 3. Study of different belts and chains.
- 4. Study of various types of gears.
- 5. Study of power drive systems hydraulics and pneumatics. Suggested Readings:-
- 1. Shigley, J.E. and Vicker, J.J., "Theory of Machines and mechanism" McGraw Hill, 1995
- 2. Ghosh, A. and Mallick, A.K. "Theory of Mechanisms and Machines", Affiliated East-West Press Pvt. Ltd. New Delhi.
- 3. Rattern, S.S., "Theory of Machines", Tata McGraw Hills Publishing Company Pvt. Ltd., New Delhi, 1994.
..... 1110 11 er 2/9/2020 51,200 Altended Oul (M.M.Isaad) (Ayan Tiwari) (Dr.Asmita Khajanchi) (Umesh Upadhyay) Inta in Q.20 2 9 2020 (Dr.P.Sasikala) (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

3 B.Tech(PP)4 3CCE-1: A.Printer's Science

COURSE OBJECTIVES

- 1. To understand the use of science in printing and its effect on material.
- 2. Explain of Photography material and color management techniques.
- 3. To Explain Surface Science for Printing surface and material.
- 4. Classify the Various types of colloids and polymers and use in printing technology
- 5. To understand the printing ink science and its ingredients.

COURSE OUTCOMES (CO)

- 1. Describe The Printing Science Use and Effect on Paper, Ink and on Process.
- 2. Explain The Light Sensitive Photography Material And Measurement Technique Colour.
- 3. Students are Able to Science of Surface Use in Printing Surface, Plate, Paper, Ink and Paper Etc.
- 4. Differentiate The Various Type of Polymer and Collides Use in Printing and Use in Printing Material.

Unit-1	Printing Science	L	Т	Р
1.1	Definition of pH, Method of Determining pH,	2	2	
	Importance of pH in Printing & Packaging			
	(Lecture, Discussion)			
1.2	pH Effect on Paper & ink, Lecture,	2	2	
	Discussion, Presentation			
1.3	Humidity – Definition, Relative Humidity			
	Measurement.	2	1	
	(Lecture, Discussion)			
1.4	Role and Effect of Relative Humidity in Printing			
	& Packaging	2	1	
	(Lecture, Discussion)			
1.5	Control of relative humidity by air conditioning	2		
	(Lecture, Discussion)	2	2	

5. Student Get Knowledge of Various Types of Ink and Chemical.

Unit-2	Basics of Photographic material and Metals for Platemaking	L	Т	Р
2.1	Light Sensitive Material: Chemistry of Sensitization and Desensitization of Photographic Emulsions and Photographic Processing. (Lecture, Discussion)	2	1	

2.2	Introduction to color Measurement and management ex. Densitometer, Spectrophotometer, Color control strips etc. (Lecture, Discussion)	2	2	
2.3	Use of Copper, Zinc and Aluminum as metals	2	2	
	for plate making (Lecture,			
	Discussion)	2	1	
2.4	Use of Magnesium, chromium as metals for plate	Z		
	(Lecture, Discussion, Presentation)			
2.5	Use of Nickel ,Lead as metals for plate making	2	2	
	(Lecture, Discussion, Presentation)			

Unit -3	Surface Chemistry	L	Т	Р
3.1	Molecular Phenomenon in Surface Tension,	2	2	
	Role of Surface Tension in Printing			
	(Lecture, Discussion, Presentation)			
3.2	Cohesive force and adhesive force, Capillary	2	1	
	action			
	(Lecture, Discussion)			
3.3	Contact Angles, Interfacial Tension and			
	Hydrophobic and Hydrophilic nature Offset	2	2	
	Plate			
	(Lecture, Discussion)			
3.4	Emulsification Role in Offset Printing (Lecture,	2	1	
	Discussion, Presentation)			
3.5	Light Fastness, Effect of Light and Temperature		2	
	in Printing and Packaging	2	2	
	(Lecture, Discussion, Presentation)			

Unit-4	Polymers and Colloids	L	Т	Р
4.1	Monomer and Polymer used in Printing	2	2	
	Material			
	(Lecture, Discussion)		1	
4.2	Types of Plastics- Thermo-sets &	2	1	
	Thermoplastics			
	(Lecture, Discussion)			
4.3	Natural Polymers, Cellulose Derivatives,			
	Synthetic Polymers,	2	2	
	(Lecture, Discussion)		_	
4.4	Polythene, Polypropylene, Polyvinyl	2	1	
	(Lecture, Discussion)			

4.5	Colloids:-Characteristic and Applications in		2	
	Printing Industry.	2		
	(Lecture, Discussion)			

Unit-5	Ink and Ingredients	L	Т	Р
5.1	Types of Ink for various printing Process and Its	2	2	
	properties Lecture, Discussion,			
5.2	Composition Of Ink :- Pigment, Vehicles, Resin	2	1	
	, Solvent , Additives Lecture, Discussion, Assignment			
5.3	Types of Plasticizer and Driers use in Ink	2	2	
	Lecture, Discussion, Assignment, Presentation	2	2	
5.4	Rheological Property of ink		1	
	Lecture, Discussion, Assignment,	2	1	
5.5	Viscosity, Yield Value, Thixotropy, Flow, Tack,			
	Body length, Ink Mileage			
	Lecture, Discussion, Assignment, Presentation	2	2	

- 1. To study and Measure pH of paper.
- 2. Measurement and management of color according to devices.
- 3. To identify metals used in platemaking.
- 4. To study and Calibrate Densitometer.
- 5. To study the techniques of color mixing and matching.
- 6. To study and compare various light sources used in printing for exposing.

Suggested Readings:

- 1. Printing Science: By L C Young, F.Pateman Year 1963, Published by Pitman Publishing
- 2. Engineering Chemistry by Jain and Jain Year 2004, ISBN-10: 9352161319
- Covington, A. K.; Bates, R. G.; Durst, R. A. (1985). "Definitions of pH scales, standard reference values, measurement of pH, and related terminology". Pure Appl. Chem. 57 (3): 531–542. doi:10.1351/pac198557030531
- 4. Perry, R.H. and Green, D.W, Perry's Chemical Engineers' Handbook (7th Edition), McGraw-Hill, ISBN 0-07-049841-5 , Eqn 12-7
- 5. Hunt, R. W. (1998). Measuring Color (3rd edition). England: Fountain Press. ISBN 086343-387-1.
- Hand Book of Polymer & Plastic Technology- Engineers India Research In, 2007.
 3B.Tech(PP)4

Allope 59.2020 (Dr.Asmita Khajanchi) (N Altended Outine (M.M.Isaad) (Ayan Tiwari) (Umesh Upadhyay) lata 200 (Dr.P.Sasikala) 2020 2 (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

3CCE-2: B.Psychology of Printing & Packaging

Theory	80	Practical	00	Internal	20	Credits	6
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COURSE OBJECTIVES

- 1. To Understand Psychology and design
- 2. To Study Working of eye and Brain
- 3. To understand the physiopathology of everyday things and geometrical shapes
- 4. To explain the design basics and elements.
- 5. Understanding design theory.

- 1. Define the physiology and design.
- 2. Analysis the working human Eye and Brain and its combination of working.
- 3. Differentiate the various geometrical shapes and analysis of physiological of everyday.
- 4. Assess the basics of design and its elements.
- 5. Demonstrate the theory of design and analysis idea and approaches.

Unit 1	Psychology and design	L	Т	Р
1.1	An Introduction Psychology and design	2	1	
	(Lecture, Discussion, Presentation)			
1.2	How business world organizations that grow	2	2	
	(Lecture, Discussion, Presentation)			
1.3	study of mindset and management decisions	2	1	
	(Lecture, Discussion, Presentation)			
1.4	leadership, organizational mindset (Lecture,	2		
	Discussion, Presentation)	2	2	
1.5	Learning Backgrounds, goals, process, strategy and	2		
	Brand Identity		2	
	(Lecture, Discussion, Presentation)			

Unit 2	Working of eye and Brain	L	Т	Р
2.1	Understanding vision, Light, eye ,brain, seeing	2	2	
	brightness			
	(Lecture, Discussion, Presentation)			
2.2	Design Process :Introduction, Procedures, Thinking,	2	1	
	Looking, Doing and Critique (Lecture, Discussion,			
	Presentation)			
2.3	How to Inspire audience to own through design	2	1	
	(Lecture, Discussion, Presentation)			
2.4	Learning Backgrounds(Lecture, Discussion,	2	2	
	Presentation)			

2.5	Opportunities, strategy, Design system (Lecture,			
	Discussion, Presentation)	2	2	

Unit 3	Psychopathology of everyday things	L	Т	Р
3.1	Understanding colors, Human response	2	2	
	(Lecture, Discussion, Presentation)		1	
3.2	Biological, Visual, Emotional, Aesthetic and Psychic	2	1	
	response			
	(Lecture, Discussion, Presentation)		2	
3.3	How to understand human response through color	2	2	
	channels			
	(Lecture, Discussion, Presentation)		1	
3.4	Color that buys, color that heals etc	2	-	
	(Lecture, Discussion, Presentation)		2	
3.5	Psychology of geometrical shape such as Square,			
	rectangle, circle etc	2		
	(Lecture, Discussion, Presentation)			

Unit 4	Design Basics	L	Т	Р
4.1	Understanding Design principles and way to achieve	2	1	
	(Lecture, Discussion, Presentation)			
4.2	Unity, Emphasis and focal point, etc (Lecture,	2	2	
	Discussion, Presentation)	2		
4.3	Understanding Design Elements	2	1	
	(Lecture, Discussion, Presentation)	2		
4.4	Line, Shape/Volume, Pattern and Texture, Illusion of	2	1	
	Space			
	(Lecture, Discussion, Presentation)		2	
4.5	Illusion of Motion, Value.	2		
	(Lecture, Discussion, Presentation)		1	

Unit 5	Understanding psychological Design Theory	L	Т	Р
5.1	The Von Restorff Effect, Gestalt Principles, Visceral	2	1	
	Reactions,			
	(Lecture, Discussion, Presentation)			
5.2	Dual-Coding Theory, Cost-Benefit Analysis (Lecture,	2	2	
	Discussion, Presentation)			
5.3	Ideas and approaches-introduction, process,			
	tools, transformation, simplicity etc (Lecture,	2	1	
	Discussion, Presentation)			
5.4	Materials and their effects (Lecture, Discussion,	2	2	
	Presentation)			

5.5	Introduction, workability, material,	2	2	
	sustainability(Lecture, Discussion, Presentation)			

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Assignments/Practical Work

- 1. Study to Use Color as a psychological tool for Brand Identity ex. Face book, yahoo etc logo color.
- 2. Comparative study of advertising material in the business world.
- 3. Logo Design Case study for GOOGLE.
- 4. Understanding the various geometrical shapes and their use in today world ex. Use of paper in office as A4 with Rectangular shape rather than any other size and shape etc.
- 5. Understanding the use of Typography and their effect in Brand Building.
- 6. Design your own Logo and create a layout ex. Paper board box, magazine cover etc and obtain critique from the audience to improve the product identity.
- 7. To study and examine the relationship between packaging and consumer buying behavior.

Suggested Readings:-

- 1. Colour & Human Response: Aspects of Light and Colour Bearing on the Reactions of Living Things and the Welfare of Human Beings by Faber Birren Publisher: Wiley; 1 edition (February 1, 1984) ISBN-10: 0471288640
- 2. Eye and Brain: The psychology of seeing by R.L. Gregory Publisher: Princeton University Press; Fifth edition (September 15, 2015) ISBN-10: 0691165165
- 3. Design Basics 2D and 3D by Stephen Pentak (Author), David Lauer (Author) Publisher: Wadsworth Publishing; 8 edition (January 1, 2012) ISBN-10: 0495909971
- 4. Mindset: The New Psychology of Success Publisher: Ballantine Books; Rep Upd edition (December 26, 2007) ISBN-10: 0345472322
- 5. Visual Thinking –by Rudolf Arnheim Publisher: University of California Press; 2 edition (April 16, 2004) ISBN-10: 0520242262

(Dr.Asmita Khajanchi) (Umesh Upadhyay) (Dr.P.Sasi (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

3B.Tech.(PP) 53SEC-1: Graphic and Layout DesignTheory 25 Practical 15 Internal 10 Credits

3

OBJECTIVES

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COURSE

1. Define and interpret visual communication through Design. 2. Achieve design solutions in a given context and problem

- 3. Use CorelDraw environment for Graphics Design.
- 4. Use various Menu Bars and Graphic Tools of CorelDraw.
- 5. To understand Styles and Templates, Clipart and Special Characters.

COURSE OUTCOMES (CO)

- 1. Students can identify Design issues in Visual Communication.
- 2. Create dynamic Graphics using Advanced Drawing and Editing tools.
- 3. Demonstrate Good Skills in Creating Professional and Multi-page Brochures.
- 4. Apply some effects to the Design Created, using Interactive Blend Tools.
- 5. Conceptualize and create Logos and banner advertisement.

UNIT-1 Graphics Design

			-	1
1.1	Introduction to Graphic Design - Visual communication process,	1	1	2
	Relation between the Society and the Graphic Design (Demonstration, Discussion, Practice)			
	Principles, Elements of Design (Discussion, Practice)	1	-	
1.3 Gra	aphic Design- Different stages of simplification of design, Different - 1 2 Letter form (Demonstration, Discussion, Practice)	aspe	cts o	f
	02			

1.4 G	raphic Design- Different stages of simplification of design, Different 2 Letter form	2 aspec	ets of	
	(Discussion, Practice)			
1.5	Typography and its power for expressive qualities, Experiments in			
	typography use, Serif, San Serif Fonts	-	1	2
	(Demonstration, Discussion, Practice, Assignment)			
UNIT-2	Coral Draw Interface	L	ТР	
2.1	Interduction to Concl Draw, Hass and Advantages, Introduction to year	Ľ	2	2
2.1	interface	-	Z	Z
	(Demonstration,, Practice, Assignment)			
2.2	Introduction to tool panel and workplace	-	- 4	
	(Discussion, Practice, Assignment)			

2.3	Introduction to various Size and Formats of Panels and Layouts (Discussion, Practice)	-	-	2
2.4	File layouts and layout properties (Discussion, Practice)	-	-	2
2.5	Objects and using color profile (Demonstration, Discussion, Practice)	-	1	2

UNIT-3	Text	L	Т	Р
3.1	Text tools and text properties creating vector Graphics by using editing tools (Demonstration, Discussion, Practice)	-	1	2
3.2	Importing images and graphics in CorelDraw layout (Demonstration, Practice, Assignment)	-	-	4
3.3	Creating shapes and Inserts, drawing curves and editing curves (Demonstration, Practice, Assignment)	-	1	2
3.4	Wedding special text effects, creating special object effects (Demonstration, Discussion, Practice)	-	1	2
3.5	Using colors effects (Practice, Assignment)	-	-	2

UNIT-4	Effect	L	Τ	Р
4.1	Using grid and rulers, tracking images and graphics (Demonstration, Discussion, Practice)	-	1	2
4.2	Working with borders and page arrangements (Discussion, Practice)	-	-	4
4.3	Using making effects with text (Demonstration, Discussion, Practice)	-	1	4
4.4	Using making effects with objects (Discussion, Practice, Assignment)	-	-	2
4.5	Bitmap Image, Vector Image (Discussion, Practice)	-	-	2

UNIT-5	Project using Coral Draw	L	Т	Р
5.1	Visiting Card, Sticker, Wedding Card (Discussion, Practice)	-	-	4
5.2	Flex Banner, Brochure, Product Box Package (Demonstration, Discussion, Practice)	-	1	2
5.3	Book Cover, Newspaper advertising (Discussion, Practice)	-	-	4
5.4	Magazine Inner Page (Discussion, Practice)	-	-	2
5.5	Letterhead with Logo (Demonstration, Discussion, Practice)	-	1	2

- 1. To find out solutions to the typical design problems. Ex; Book Cover
- 2. To design a symbol or a logo with specific objective.
- 3. To take up design problems in designing Visiting cards, Letter Heads, Envelop Design, and Greetings Designs Invitation Cards etc.
- 4. To Prepare Pamphlets, Posters, Invitation cards, Greeting cards, and wrappers frame.
- 5. Design Advertisements, Banners and Package as assigned by subject teacher.
- 6. Create magazine page layout

Suggested Reading:

- 1. Graphic Design as Communication by Malcolm Barnard / Routledge
- 2. Design for Communication: Conceptual Graphic Design Basics by Elizabeth Resnick / John Wiley & Son
- CorelDraw X7: The Official Guide, Gary David Bouton, Corel press. ISBN-10: 0071833145

E- Resources:

- 1. Li, Z., & Drew, S. (2004). Fundamentals of Multimedia [Ebook]. Pearson Education International.
- 2. How to Use Corel Draw 12: https://www.youtube.com/playlist?list=PLlGhKy3_uBImdPZlQnqv50VytJ1J1nUui
- 3. The Designer's Handbook -Alistair Campbell.
- 4. Art and Print Production N.N Sarkar.

Claf 2/9/2020 61,2020 Altended Online 2 (M.M.Isaad) (Ayan Tiwari) (Dr.Asmita Khajanchi) (Umesh Upadhyay) Inta in (Dr.P.Sasikala) 2020 ٩ 2 (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

3B.Tech.(PP) 6 **OE-3: Digital Electronics Circuit**

Theory 40 Practical	00	Internal	10	Credits	3	
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COURSE OBJECTIVES

- 1. To study Digital Electronic Circuits.
- 2. To understand the Fundamental of Digital Electronic Circuits.
- 3. To Study Instruction Set of Digital Electronic Circuits.
- 4. To Learn The Skill of GATE.
- 5. To understand the interfacing of different Converters.

COURSE OUTCOMES (CO)

- 1. Have a thorough understanding of the fundamental concepts and techniques used in digital electronics.
- 2. To understand and examine the structure of various number systems and its application in digital design.
- 3. The ability to understand, analyze and design various combinational and sequential circuits.
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I. Ability solutio	to identify basic requirements for a design application a n.	nd prop	ose a c	0
5. To dev	elop skill to build, and troubleshoot digital circuits.			
Unit 1	Fundamentals of Digital Techniques	L	Т	
		L		
1.1	Logic Gates and Boolean algebra: Digital signals,	2	1	
	Review of logic gates. Karnaugh map & variable.	l		
	(Lecture, Discussion, Presentation)	l		
1.2	Binary codes: BCD, Excess-3, Gray, EBCDIC,	2		
	ASCH, Error detection and correction codes	l		
	(Lecture, Discussion, Presentation)			
1.3	Combinational Logic Circuits: Simplification of	2		
	Boolean expression and realization using logic gates,	l		
	sum of products and product of sums	1		
	(Lecture, Discussion, Presentation)	1		
1.4	minimization of Boolean expressions using Karnaugh	l		
	map, don't care conditions (Lecture, Discussion,	1		
	Presentation)	1		
1.5	variable entered mapping, and minimization using	1		1

variable entered maps

(Lecture, Discussion, Presentation)

Unit 2	Numbering Systems & Binary Arithmetic	L	Т	Р

2.1	Introduction. Symbolic number systems, Positional number system, Integer Binary number- Binary digital computers, Binary number system. Number System Notation. Lecture, Discussion, Presentation)	2	1	
2.2	Conversion between decimal and binary numbers, Hexadecimal numbers, Conversion between Hexadecimal, Binary & Decimal numbers (Lecture, Discussion, Presentation)	1		
2.3	Fractional binary numbers- Converting binary fractions to decimal, Converting Hexadecimal fractions to decimal, Converting decimal fractions to Binary and Hexadecimal. (Lecture, Discussion, Presentation)	1		
2.4	Binary Addition and Subtraction- Signed binary numbers, Complementary numbers, Two's complement mathematics. Binary multiplication & division. (Lecture, Discussion, Presentation)	2		
2.5	Binary codes- Character codes, Numeric codes, other binary codes, and Error correction & detection codes.(Lecture, Discussion, Presentation)	2		

Unit3	Arithmetic Circuits	L	Т	Р
3.1	EXOR and EXNOR gates.	2		
	(Lecture, Discussion, Presentation)			
3.2	Half adder, full adder, full subtractor, addersubtractor,	2		
	look ahead and carry. (Lecture, Discussion,	Z		
	Presentation)			
3.3	Data Processing Circuits: Multiplexers,	1	1	
	demultiplexers, decoders,	1		
	(Lecture, Discussion, Presentation)			
3.4	BCD to decimal decoder, seven segment decoder,	1		
	encoders, decimal to BCD encoder (Lecture,	1		
	Discussion, Presentation)			
3.5	Parity generators and checkers.	2		
	(Lecture, Discussion, Presentation)			

Unit4	Flip-Flops	L	Т	Р
4.1	AND gate latch, NOR gate latch. (Lecture, Discussion, Presentation)	2	1	

4.2	Review of flip-flops and their conversions.		
	(Lecture, Discussion, Presentation)	2	
4.3	Sequential Logic Circuits: Comparison between		
	combinational and sequential logic circuits	2	
	(Lecture, Discussion, Presentation)		
4.4	Shift registers, SISO,SIPO, PISO and PIPO shift		
	registers	1	
	(Lecture, Discussion, Presentation)		
		1	
4.5	D/A & A/D Converters	1	
	(Lecture, Discussion, Presentation)		

Unit5	D/A and A/D Converters	L	Т	Р
5.1	Variable-Resistor network, binary ladder. (Lecture,	2	1	
	Discussion, Presentation)			
5.2	D/A counter. D/A accuracy and resolution, (Lecture,			
	Discussion, Presentation)	2		
5.3	A/D counters- simultaneous conversion, counter method, continuous conversion, successive approximation method, single slope and dual slope A/D counters. (Lecture, Discussion, Presentation)	2		
5.4	Programmable logic devices: ROM, PLA, PAL, FPGA AND CPLDs. (Lecture, Discussion, Presentation)	1		
5.5	Application of digital electronic in printing & packaging. (Lecture, Discussion, Presentation)	1		

Suggested Reading:

- 1. Digital Electronics- Melvin.
- 2. Digital Electronics- Goth man.
- 3. Digital Principles and Applications Donald P Leach, Albert Paul Melvin.
- 4. Digital Systems-Principles and Applications- Ronald J.Tocci.
- 5. Digital Fundamentals- Floyd.
- 6. An Engineering approach to digital design- Fletcher.

Allope (Dr.Asmita Khajanchi) (M Jan 2010 Altended Online (M.M.Isaad) (Ayan Tiwari) (Umesh Upadhyay) anta sure (Dr.P.Sasikala) 2020 (Dr.Babita Agrawal) 2 (Dr.Pawan Singh Malik)

4B.Tech. (PP)1 4CCC-12: Electrical Machines and Utilization

COURSE OBJECTIVES

1. To understand the use of D.C Generator

To understand about Single Phase motor.

- 3. To understand about Three Phase motor.
- 4. To understand about electrolysis process.
- 5. To understand consideration and selection of electric motor for different industrial drives

COURSE OUTCOMES (CO)

1. To describe the use of D.C Generator

To demonstrate about Single Phase motor.

- 3. To characterize about Three Phase motor.
- 4. To explain about electrolysis process.
- 5. To implement Consideration and selection of electric motor for different industrial drives

UNIT 1	D.C. Generator	L	Т	Р
1.1	Construction; types, series, shunt, compound E.M.F. equation (Lecture, Discussion, Presentation)	2		2
1.2	Building up of E.M.F. in shunt generator, Significance of residual magnetism (Lecture, Discussion, Presentation)	4		2
1.3	Generation characteristics. D.C. Motor: types, Principles of operation, Significance of back e.m.f. (Lecture, Discussion, Presentation)	2		4
1.4	Torque equation. Torque-speed characteristics of series, Shunt and compound motors (Lecture, Discussion, Presentation)	3		2
1.5	Speed control of d.c. motors by armature resistance, Flux control and thyristor control method Applications. (Lecture, Discussion, Presentation)	2		

UNIT 2	Single Phase Motors	L	Т	Р
2.1	Types, single phase induction motor (Lecture, Discussion, Presentation)	2		4
2.2	Principle of operation of induction-motor (Lecture, Discussion, Presentation)	2		2

2.

2.

2.3	Repulsion motor(Lecture, Discussion, Presentation)	2	1	
2.4	A.C. series Motor (Lecture, Discussion, Presentation)	4		2
2.5	Application of single phase motor(Lecture, Discussion, Presentation)	2		2

UNIT 3	Three Phase Induction Motor	L	Т	Р
3.1	Basic principle of operation, cause of rotating rotor	2		2
	(Lecture, Discussion, Presentation)			
3.2	Slip frequency of rotor current(Lecture, Discussion, Presentation)	2		2
3.3	Relation Between torque and rotor power factor(Lecture, Discussion, Presentation)	2		2
3.4	Starting Torque for squirrel cage induction motor, Starting torque for slip ring (Lecture, Discussion, Presentation)	3		
3.5	Induction Motor, Condition for maximum torque, Effect of rotor resistance on torque, torque-slip characteristic, Different type of starters. (Lecture, Discussion, Presentation)	4		4

UNIT 4	Electrolytic Processes	L	Т	Р
4.1	Introduction of Electrolyte(Lecture, Discussion, Presentation)	2		2
4.2	Ionization, Definition of various terms used in electrolysis(Lecture, Discussion, Presentation)	3		
4.3	Faraday's laws Of electrolysis, Extraction of metals (Lecture, Discussion, Presentation)	4		2
4.4	Refining of metals (Lecture, Discussion, Presentation)	2		4
4.5	Electrodeposition, power supply for electrolytic	2		
	processes. (Lecture, Discussion, Presentation)	3		

UNIT 5	Consideration and selection of electric motor for	L	Т	Р
	different industrial drives			

5.1	Electric Welding Principle, Resistance welding	2	4
	(Lecture, Discussion, Presentation)		2
5.2	Arc welding, Atomic hydrogen, A.C. & D.C. welding		2
	(Lecture, Discussion, Presentation)	2	
5.3	welding transformer, Electric-heating (Lecture,	4	2
	Discussion, Presentation)	r	2
5.4	Introduction, Resistance heating, Direct resistance.	2	Z
	(Lecture, Discussion, Presentation)	2	2
5.5	Industrial Electrical Installations(Lecture,		
	Discussion, Presentation)		

- 1. To perform Load Test on DC Shunt Motor
- 2. To perform Swinburne's Test
- 3. To perform Load Test on DC Series Motor
- 4. To perform Load Test on Three Phase Alternator
- 5. To perform Load test on Single Phase Transformer.
- 6. To perform Load Test on Single Phase Induction Motor.

Suggested Readings:-

- 1. Elements of Electrical Engg. L. Theraja, Vol. 1, 2 publisher: S Chand; 23rd Revised edition (1 June 2006) ISBN-10: 8121924375
- 2. Elements of Electrical Engineering 30 Dec 2013 by Maria LM Publisher: Prentice Hall India Learning Private Limited; Fifth edition ISBN-10: 8120348524
- 3. Electric Motor Drives: Modeling, Analysis, and Control Paperback Import, 15 Feb 2001 By R. Krishnan (Author), ISBN-10: 0130910147.
- 4. Electrical Machines, Devices and Power Systems Hardcover Import, 14 Nov 1996 by Theodore Wildi (Author), ISBN-10: 01336788

Ablended Ouline

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(Dr.P.Sasikala)

(Dr.Babita Agrawal)

4B.Tech(PP)2 4CCC-13: Screen Printing

COURSE OBJECTIVES

- 1. To Impart Knowledge of screen Printing and Screen stencil Preparation.
- 2. Explain the Types of Screen Printing Machine Its Process.
- 3. Describe the Properties and Use of Ink and solvents for Screen Printing and its drying method.
- 4. Interpret the Textile Printing Technique.
- 5. Practical work will enhance his Practical Knowledge of various types screen printing.

- 1. Define the Screen printing Technology and Stencil Making Process.
- 2. Demonstrate the Working of Screen printing Semiautomatic machine
- 3. To Get the Knowledge of Screen Ink and Solvent Properties and Drying Method of Ink.
- 4. To get a Knowledge of Textile Printing with the Help of Screen Printing.
- 5. Students get Knowledge of Print Various Subtract manually and by Machine. This Practical Session will enhance the Knowledge of Screen Printing Technique.

Unit-1	Screen Preparation and Stencil Making	L	Т	Р
1.1	Characteristics and Selection of Screen Mesh	3	1	2
	(Lecture, Discussion, Presentation, Practical)	4		2
1.2	Types of Frames, Screen Tensioning Devices,	4		2
	Screen Pre-Treatment.			
	(Lecture, Discussion, Assignment)			
1.3	Degreasing of a Screen, Hand Cut Stencils.	3		2
	(Lecture, Discussion, Presentation, Assignment)	2		
1.4	Photomechanical Stencil Making, Exposing	2		
	Lecture, Discussion, Assignment	2		
1.5	Direct & Indirect Process, Equipment Used.			
	Lecture, Discussion, Presentation, Practical			

Unit-2	Machine Printing	L	Т	Р
2.1	Flatbed Hinged Frames, Vertical Lift, Cylinder	3	1	2
	(Lecture, Discussion,, Presentation)			
2.2	Container(Cylindrical objects) Printing & Rotary	3		2
	Machines			
	(Lecture, Discussion, Presentation)			
2.3	Advanced Technique of Screen Printing	2		2
	(Lecture, Discussion, Presentation,, Practical)	2		2
2.4	Automatic and Semi-Automatic Machine	2	1	
	(Lecture, Discussion, , Practical)			

2.5	Squeegee Types and Machine Maintenance.	2	2
	(Lecture, Discussion)		

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Unit -3	Ink and Solvents - Drying Methods	L	Т	Р
3.1	General Properties, Basic Constituents Of	2		
	Screen Ink			
	(Lecture, Discussion, Presentation)			
3.2	Major Classes Of Solvents And Ingredients Of			
	Ink.	2	1	
	(Lecture, Discussion, Presentation, Assignment)			
3.3	Safety In The Handling And Storage Of Ink &	4		2
	Solvents,			
	(Lecture, Discussion, Presentation)			
3.4	Drying Method Of Screen Printing Oxidation	3		4
	Drying, Solvent Evaporation,			
	(Lecture, Discussion, Practical , Presentation)			
3.5	Infra- Red & Ultraviolet Curing,	2		2
	(Lecture, Discussion, Practical, Assignment)			

Unit-4	Textile Printing	L	Т	Р
4.1	Design: Gouache, Bottled water colors, Painting	4		
	and Blotches,			
	(Lecture, Discussion, Presentation)			2
4.2	Resist Techniques, Surfaces, Transfer	2		
	Techniques			
	(Lecture, Discussion, Assignment, Presentation)			2
4.3	Materials, Dyeing, Single stage dyeing and	3		
	polychromatic dyeing			
	(Lecture, Discussion, Practical)			
4.4	Types of Fabric:-Synthetic fabrics, blended fiber	3		2
	fabric, natural fabrics.			
	(Lecture, Discussion, Assignment, Presentation)			2
4.5	Trouble shooting the Textile printing.	2		2
	(Lecture, Discussion, Assignment, Practical)			

Unit-5	Direct And Indirect Stencil Making	L	Т	Р
5.1	Direct And Indirect Stencil Making (Lecture, Discussion Practical)	3		2
5.2	Screen Producing, Producing Single Color on different substrate (Discussion, Practical)	4		2

5.3	Multi-Color Images/ Printing		
	(Discussion, Practical, Presentation)	2	4
5.4	Producing Half Tone Images, Study Of		
	Automatic machines.	2	
	(Lecture, Discussion)		2
5.5	Semi-Automatic Screen Printing Machines,		
	Industrial Visit.	2	
	(Practical, Discussion)		

- 1. To Perform Printing Visiting Card, Letter Head, Greeting Card Etc.
- 2. To Make Metallic Effect, Flocking.
- 3. To Perform Printing On Irregular Shaped Object.
- 4. To Perform Printing On Non-Absorbent Surface Such As Ceramic, Glass Etc. (Special Ink Curing).
- 5. To Perform Screen Printing On PCB, Keyboard Etc.

Suggested Readings:-

- 1. John Stephens (1994), Screen Process Printing; Blueprint Publishing Ltd.
- 2. Albert Koslof (1900), Screen Printing Techniques; The Signs Of The Times Publishing Co.
- 3. Chawan, R.B(1981), "Advances In Textile Chemical Processing Ed.", Iit, Delhi,
- 4. Joyce Storey, the Thanes & Hudson Manual of Textile Printing, Thames & Hudson Ltd., London, 1984.
- 5. Mary Paul Yates (1996), Textile, a Handbook for Designers, W.W. Norton & Company, London.
- 6. Susan Bosence (1985), Handbook Printing & Resist Dyers, David & Charies, London.

Hended Ouli (Dr.Asmita Khajanchi) (Umesh Upadhyay) (Dr.P.Sasikal (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

4B.Tech.(PP) 3 4CCC-14: Technology of Sheet fed offset Printing

COURSE OBJECTIVES

- 1. To understand and execute the offset press technology.
- 2. To describe the feeding unit of offset printing technique.
- 3. To describe the dampening unit of offset printing technique.
- 4. To describe the printing unit of offset printing technique.
- 5. To describe the Delivery section unit of offset printing technique.

- 1. To define knowledge of offset printing.
- 2. To explain complete Feeding unit of offset and its related part.
- 3. To explain complete process of Dampening unit and its different type.
- 4. To explain complete process of printing unit and its function.
- 5. To explain complete process of delivery unit and its accessory part.

Unit-1	History of offset printing	L	Т	Р
1.1	Recent trends in offset press technology. (Lecture,	2		
	Discussion, Presentation)			
1.2	Basic principles of sheet fed offset printing (Lecture,	2		4
	Discussion, Presentation)			
1.3	Construction and categories of sheet fed offset press.	4		2
	(Lecture, Discussion, Presentation)	2		2
1.4	Safe handling of tools, equipment and materials in	3		2
	offset press.			
	(Lecture, Discussion, Presentation)			
1.5	Equipment and materials in offset press. (Lecture,	2		2
	Discussion, Presentation)	2		2

Unit-2	Feeding unit	L	Т	Р
2.1	Functions of the feeding section, sheet feeding types,	4		2
	feeding cycle			
	(Lecture, Discussion, Presentation)			
2.2	Components of feeder, sheet conveying mechanisms, sheet detectors, sheet register, front lay and side lay. (Lecture, Discussion, Presentation)	3		4
2.3	Sheet insertion systems, grippers. Inking unit: role and function of inking system, different parts of inking system (Lecture, Discussion, Presentation)	2		2
2.4	Split duct techniques, types of rollers in the inking system, setting of the rollers (Lecture, Discussion, Presentation)	2		2

2.5	Care and maintenance of rollers, different inking		
	systems.	2	
	(Lecture, Discussion, Presentation)		

ning system	L	Т	Р
l function of the dampening system, fountain	3		
, Discussion, Presentation)	2		2
conductivity of the fountain solutions, role of fountain solution	2		2
, Discussion, Presentation)			
alcohol or alcohol substitutes in fountain	4		
different rollers in the dampening system			
overings, and doctor dwell, desensitizing the	2		2
, Discussion, Presentation)			
t dampening systems, care and maintenance	3		4
mpening system.			
, Discussion, Presentation)			
	I function of the dampening system, fountain <u>(a, Discussion, Presentation)</u> conductivity of the fountain solutions, role of fountain solution <u>(a, Discussion, Presentation)</u> alcohol or alcohol substitutes in fountain <u>(a) different rollers in the dampening system</u> <u>(a) Discussion, Presentation)</u> overings, and doctor dwell, desensitizing the llers <u>(b) Discussion, Presentation)</u> t dampening systems, care and maintenance impening system. <u>(c) Discussion, Presentation)</u>	Ining systemLI function of the dampening system, fountain3I function of the dampening system, fountain3I function of the dampening system, fountain3I function2I fountain solution2I fountain solution2I fountain solution2I fountain solution2I fountain solution3I fountain solution4I fountain solution4I fountain solution4I fountain solution4I foundation4I foundation4<	LTI function of the dampening system, fountain3a. Discussion, Presentation) conductivity of the fountain solutions, role of fountain solution b. Discussion, Presentation) alcohol or alcohol substitutes in fountain different rollers in the dampening system b. Discussion, Presentation) overings, and doctor dwell, desensitizing the llers b. Discussion, Presentation)2b. Discussion, Presentation) overings, and doctor dwell, desensitizing the llers b. Discussion, Presentation)2c. Discussion, Presentation) overings, and doctor dwell, desensitizing the llers b. Discussion, Presentation)3c. Discussion, Presentation) t dampening systems, care and maintenance umpening system. b. Discussion, Presentation)3

Unit-4	Printing unit	L	Т	Р
4.1	Different cylinders and their construction (Lecture,	4		2
	Discussion, Presentation)			
4.2	cylinder gears, cylinder gap, bearers,	3		4
	(Lecture, Discussion, Presentation)			
4.3	undercut, cylinder packing,	2		2
	patching, printing pressures			
	(Lecture, Discussion, Presentation)			
4.4	Cylinder setting theories, cylinder balancing.	2		
4.5	Pre-make ready and make ready operations.			
	(Lecture, Discussion, Presentation)	2		2
1				

Unit-5	Delivery section	L	Т	Р
5.1	Role and function of delivery section, transfer cylinder. (Lecture, Discussion, Presentation)	1		
5.2	sheet transfer, sheet delivery, short and extended delivery systems (Lecture, Discussion, Presentation)	4		2

5.3	sheet control devices, anti-set off spray powder unit		
	(Lecture, Discussion, Presentation)	3	2
5.4	Delivery board setting.		
	(Lecture, Discussion, Presentation)	3	2
5.5	Printing machine maintenance and trouble shooting.		
		3	2
	(Lecture, Discussion, Presentation)		

- 1. Study of various controls and operations.
- 2. Study of various mechanisms.
- 3. Study of the lubrication system.
- 4. To perform pre make ready operations like setting the feeder, feed board, lays and delivery.
- 5. Study of setting the water and ink rollers and fixing the plate.
- 6. To prepare and print a job for Single color printing.
- 7. To prepare and print a job for Two color printing 8. To prepare and print a job for four color printing.

Suggested Readings:-

- Printing Technology 3rd Edition- Adams, Fax & Rieder- Publisher: Delmar Cengage Learning; 5th Revised edition (12 July 2001)- ISBN-10: 076682232X
- Sheet fed offset Press Operating- Lloyd P.Dejidas. 3. Stripping- Harold L.Peck- ISBN-10: 0883621177
- 4. Selecting the Right Litho Plate- BPIF.
- 5. Manual of advanced lithography Hardcover 14 Dec 2016- ISBN-10: 0684149370

(Dr.Asmita Khajanchi)

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(Umesh Upadhyay)

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4B.Tech(PP)4 4CCE-3: A.Planning For Print Production

Theory	80	Practical	00	Internal	20	Credits	6
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COURSE OBJECTIVES

- 1. This course deals with an overview of various print products obtained.
- 2. It will cater the pre-press sections of industrial sectors for in-depth assignments
- 3. It will also cater in Printing process and selection
- 4. Valuable inputs from industry would be incorporated from time to time
- 5. Students will gain a thorough grounding on selection of Binding, Finishing &

Converting Products

- 1. To characterized and list out print products
- 2. To Demonstrate the print and packaged products
- 3. To Describe Printing Processes For Different Products
- 4. To Describe Selection criteria of Substrates and Other Materials
- 5. To Describe Selection of Binding, Finishing & Converting Process

Unit-1	Classification Of Print Products	L	Т	Р
	ForCommercial Printing			
1.1	Books, Magazines, Stationary, Newspaper, Bills	2	2	
	(Lecture, Discussion, Presentation)	2	1	
1.2	Variable Data Printing	Z	1	
	(Lecture, Discussion, Presentation)		2	
1.3	Customized Printing			
	(Lecture, Discussion, Presentation)	4		
1.4	Advertising Materials Like Pamphlates, Posters,	2	1	
	Calendar, Etc.			
	(Lecture, Discussion, Assignment)	2		
1.5	Package Printing: - Folding Boxes, Cartons,			
	Label, Flexible Packing, Tin, Wood, and Glass			
	(Lecture, Discussion, Presentation)			

Unit-2	Designing Of Print Products For Commercial Printing And Package	L	Т	Р
2.1	Design Considerations & Principle For Books &	2	4	
	Magazines, Newspapers Stationary &			
	Advertising Products			
	(Lecture, Discussion, Practice, Assignment)	3	1	
2.2	Design Considerations & Principle For			
	Stationary Products			
	(Lecture, Discussion, Assignment)	2	1	
2.3	Design Considerations & Principle For	-	-	
	Advertising Products			
	(Lecture, Discussion, Assignment)			

2.4	Design Considerations Including Legal Aspects (Lecture, Discussion, Assignment)	2	2	
2.5	Design Considerations For Packaging Products (Lecture, Discussion, Assignment)	1		

Unit -3	Selection Of Printing Processes For Different	L	Т	Р
	Products			
3.1	Selecting Process of Printing For Books &	2	1	
	Magazines			
	(Lecture, Discussion)			
3.2	Selecting Process of Printing For Stationary	4	2	
	Products			
	(Lecture, Discussion)			
3.3	Selecting Process of Printing For Advertising	2	1	
	Products	_	-	
	(Lecture, Discussion, Assignment)	2		
3.4	Selecting Process of Printing For Newspaper		2	
	(Lecture, Discussion)		2	
3.5	Selecting Process of Printing For Packaging	2		
	Products			
	(Lecture, Discussion)			

Unit-4	Selection of Substrates and Other Materials	L	Т	Р
	Characteristics			
4.1	Newspaper	2	2	
	(Lecture, Discussion, Presentation)			
4.2	Books	2	2	
	(Lecture, Discussion, Presentation)			
4.3	Magazines	3	1	
	(Lecture, Discussion, Presentation)			
4.4	Stationary & Advertising Products (Lecture,		1	
	Discussion, Presentation)	2		
4.5	Packaging Products			
	(Lecture, Discussion, Presentation)	3		

Unit-5	Selection of Binding, Finishing & Converting Products	L	Т	Р
5.1	Process and Study of Machines Utilized For Books & Magazines- Folding, Gathering (Lecture, Discussion, Practice)	2	2	
5.2	Process and Study of Machines Utilized For	3	1	

	Stitching, Sewing & Perfect Binding (Lecture, Discussion, Practice)			
5.3	Process and Study of Machines Utilized For Perfect Binding			
	(Lecture, Discussion, Practice)	2	1	
5.4	Newspaper- Folding, Gathering, Bundling (Lecture, Discussion, Practice)	3	2	
5.5	Packaging-Rigid, Inline Die Cutting, Creasing & Embossing, Die Cutting (Lecture, Discussion, Practice)	2	2	

- 1. To Identify And Study Advertising Media Ex. Flyers, Brochures, Pamphlet.
- 2. Understanding the Paper Weights or G.S.M.
- 3. To Understand and Identify the Various Printed Material (By Printing Process) 4. To Create and Print Advertising Material With Various Printing Process.
- Understanding the Binding Process for Book, Magazines. 5.

Suggested Readings:-

- 1. Fundamentals of Copy & Layout -A.C. Book(Ac)Sohick(Cd)- Ntc Publishing Group,U.S.; 3rd Edition Edition (1 April 1997) Isbn-10: 0844230227
- 2. Production For The Graphic Designer- Craig- Publisher: Watson-Guptill; 2nd Revised Edition Edition (1 October 1990)- Isbn-10: 0823044165
- 3. How To Brief Designs & Buy Print- Murray (Ray)- Publisher: Random House Business Books; New Edition Edition (16 April 1984)- Isbn-10: 0091501911
- 4. A Manual For Lithographic Press Operation / By A. S. Porter Published By London : Litho Training Services Ltd, [1977] Isbn 0906091012

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(Dr.P.Sasikal

4B.Tech(PP)4 4CCE-4: B.Food and Agro Based Packaging

Theory 80 Practical 00 Internal 20 Credits
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COURSE OBJECTIVES

- 1. To incorporate concept of food and agro base packaging
- 2. To introduce the concept of effects of processing of these products
- 3. To familiarize the students with Aseptic packaging and techniques used
- 4. To introduce students with the technique in packaging of fertilizers and pesticides
- 5. To impart students with basic knowledge of packaging waste and to make aware of 3R(Reuse, Reduce and Recycling)

- 1. To define the concept of processed foods and related terms
- 2. To describe the concept of dairy products and related terms
- 3. To demonstrate the Aseptic packaging
- 4. To analyze the concept of crops packaging
- 5. To produce the concept of dairy packaging waste

Unit-1	Introduction: Packaging of Processed Foods	L	Т	Р
1.1	Glass and tin containers	2	2	
	(Lecture, Presentation)	2	1	
1.2	Caps and Other closures	3	1	
	(Lecture, Presentation)	2	1	
1.3	Effects of processing (Lecture,	2	2	
	Discussion)	2	2	
1.4	Package selection according to spoilage	2	1	
	rate criteria (Lecture)		_	
1.5	Food Processing Techniques (Presentation)			

Unit-2	Packaging of Dairy Products,Bread & Confectionery and fruit juice	L	Т	Р
2.1	Introduction	2	1	
	(Lecture)	2	2	
2.2	packaging in flexible materials	2	2	
	(Lecture, Presentation)	2	2	
2.3	suitability of rigid containers (Lecture)	2	2	
2.4	Material properties	2	1	
	(Lecture, Discussion)	_	1	
2.5	Innovative packages			
	(Lecture, Presentation)			

Unit -3	Aseptic Packaging	L	Т	Р
3.1	Sterilization of Packaging Materials	2	2	
	(Presentation)	2	1	
3.2	Sterilization - Process Norms, Guidelines &	2	1	
	Applications		2	
	(Lecture)			
3.3	Packaging of Ready to Use Foods (Discussion,	3	2	
	Presentation)	2		
3.4	factors affecting RTS products (Lecture,			
	Discussion)	2		
3.5	Advantages of RTE and Sterilization (Lecture,	1		
	Discussion)			

Unit-4	Packaging of Horticultural crops	L	Т	Р
4.1	Introduction	2	2	
	(Lecture)	2	2	
4.2	Reasons for spoilage	2	2	
	(Lecture, Discussion)	2	1	
4.3	Role of ethylene and its effects on quality			
	(Lecture, Discussion)		2	
4.4	Packaging of Fertilizers and Pesticides Printing	2		
	(Lecture, Presentation)	_		
4.5	Printing on Fertilizers and Pesticides containers	3		
	(Lecture, Presentation)			

Unit-5	Packaging wastes	L	Т	Р
5.1	Introduction to packaging waste (Presentation)	2	2	
5.2	Recycling the paper and challenges (Discussion, Presentation)	2	1	
53	Recycling the plastic and challenges	2	2	
5.5	(Lecture)	2	2	
5.4	To study reuse, reduce, recycle concept related	1		
	with printing and packaging (Lecture,		2	
	Discussion, Presentation)			
5.5	Global Standards for packaging waste and	2		
	management			
	(Lecture, Presentation)			

1. Study of selection criteria for various Packaging material used for processed foods.

- 2. Study of Packaging of Flesh foods & Fruit Juices.
- 3. Study of Aseptic Packaging.
- 4. Study future of Food and Agro Based Packaging.
- 5. Study of Packaging wastes.

Suggested Readings:

- 1. Food processing and Agro based industries; Author: EIRI books; Publisher: Engineers India research institute; Edition 2004; ISBN: 9788186732120
- 2. Modern technology of food processing and agro based industries; Publisher: National Institute of Industrial Research; Edition: 2005; ISBN: 108186623345

07114040 01 D.C 2D (Ayan Tiwari) (M.M.Isaad (Dr.Asmita Khajanchi) (Umesh Upadhyay) (Dr.P.Sasikala) (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

4B.Tech(PP)5 4SEC-2: Packaging Design

Theory 40 Practical	00	Internal	10	Credits	3	
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COURSE OBJECTIVES

- 1. This course provides an opportunity to produce a series of publications suitable for portfolio inclusion.
- 2. Students will use industry-standard page-layout and graphics software
- 3. They will gain a thorough grounding on selection of corrugation types
- 4. They will gain a thorough grounding on selection of testing of packaged products
- 5. Will cover advance knowledge of innovative packaging

- 1. To recognize advantages and disadvantages of packaging media
- 2. To describe the carton production process
- 3. To describe the plastic production process and techniques
- 4. To create and design packages using computer aided tools
- 5. To classify and compare the end supporting material for packaged products

Unit-1	Packaging Media	L	Т	Р
1.1	Advantage & Disadvantage of Paper, Paper	2	1	
	Board			
	(Lecture, Discussion)			
1.2	Advantage & Disadvantage of Wood. (2		
	Lecture, Discussion)			
1.3	Advantage & Disadvantage of Glass (2		
	Lecture, Discussion)	2		
1.4	Advantage & Disadvantage of Metal And Wood			
	(Lecture, Discussion)	2		
1.5	Advantage & Disadvantage of Plastic (Bopp,			
	Hdpe, Ldpe, Lldpe, Pvc, Pp, Pet, Polyolefin,			
	Cellulosic)			
	(Lecture, Discussion)			

Unit-2	Carton Production	L	Т	Р
2.1	Folding Cartons-Its Production Steps, Types (2		
	Lecture, Discussion, Presentation)	2		
2.2	Corrugated Containers-Classifications,	2		
	Components in a Corrugated Board			
	(Lecture, Discussion, Presentation)			
2.3	Flutes and Its Type For Packaging Media (2	1	
	Lecture, Discussion, Presentation)	2		
2.4	Stages in Preparation of Corrugated Board			
	(Lecture, Discussion)	2		

2.5	Plastic Corrugated Containers- Features &		
	Advantages		
	(Lecture, Discussion, Presentation)		

Unit -3	Plastic Packaging Techniques/Processes	L	Т	Р
3.1	Introduction To Injection Blow Moulding (2		
	Lecture, Discussion, Presentation)	2		
3.2	Introduction To Extrusion Blow Moulding (2		
	Lecture, Discussion, Presentation)	2	1	
3.3	Compression Moulding			
	(Discussion, Presentation)	2		
3.4	Eps Foam Forming	2		
	(Lecture, Discussion, Presentation)			
3.5	Matched Mould Forming			
	(Lecture, Discussion, Presentation)			

Unit-4	Packaging Testing and Design	L	Т	Р
4.1	Understanding The Packaging Design Process	2		
	(Lecture, Discussion, Presentation)	2		
4.2	Computer Aided Package Design	2		
	(Lecture, Discussion, Assignment, Presentation)	2		
4.3	Hazards on Package –Mechanical, Climatic,			
	Biological and Other Hazards			
	(Lecture, Discussion)	2	1	
4.4	Tests on Package- Mechanical Test, Climatic			
	Test	2		
	(Demonstration, Presentation)			
4.5	Shelf Life			
	(Lecture, Discussion, Presentation)			

Unit-5	Ancillary Packaging Concept	L	Т	Р
5.1	Environmental Implications of Packaging (2		
	Lecture, Discussion, Presentation)	2		
5.2	Adhesive Tapes	Z		
	(Lecture, Discussion)	2		
5.3	Labels- Basic Elements of Correct Labelling,			
	Purpose, Types.			
	(Lecture, Discussion, Presentation)	2	1	
5.4	Strapping and Stapling	2	1	
	(Lecture, Discussion, Presentation)			

5.5	Futuristic Trends in Packaging (Discussion,	2	
	Presentation)		

- 1. Create 2d Drawings In Cad Software Using Different Basic Shapes
- 2. Create Graphics Design For Folding Cartons
- 3. Create Graphics Design For Glass Containers
- 4. Create Graphics Design For Plastic Containers
- 5. Create Graphics Design For Bags & Pouches
- 6. Create Dieline Layouts For Folding Cartons And Their Multiple Ups 7. Develop A 3d Package Design And Draw Out The Different Views In 2d.
- 8. Design An Artwork/Graphics For A Label.
- 9. Design An Artwork/Graphics For A Corrugated Fibre Board Box
- 10. Redesign of Different Flexible and Rigid Packages.
- 11. Test Conducted On Cartons, Corrugated Packages, Wooden Packages, Drop Test, Vibration Test, Inclined Impact Test, Compression Test, Rolling Test, Drum Test.

Suggested Readings:

1. Packaging Design And Performance- Frank Paine- Publisher: Pira International (1 May 1990)-Isbn-10: 0902799274

2. Advances in Plastic Packaging Technology- John Briston- Publisher: Pira International (1 December 1992) - Isbn-10: 0902799967

 Fundamentals of Packaging Technology-Fourth Edition, Walter Soroka, Cpp- Publisher: Institute Of Packaging Professionals; 4 Edition (21 January 2010) - Isbn-10: 1930268289 4. Packaging Technology: Fundamentals, Materials and Processes, Anne Emblem, Henry Emblem- Publisher: Woodhead Publishing (29 October 2012) - Isbn-10: 1845696654
 Packaging Design Strategy (Pira Packaging Guide) Hardcover – Import, 20 Jun 1994 Bill Stewart Publisher: Crc Press (20 June 1994) Isbn-10: 1858020646

Altended Ouli (Dr.Asmita Khajanchi) (Umesh Upadhyay) (Dr.P.Sasi (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)
4B.Tech(PP)6

OE-4: Industrial Safety and Management

Theory 40 Practical 00 Internal 10 Credits	3
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COURSE OBJECTIVES

- 1. To Understand Fire Safety ,Electrical And Chemical Safety
- 2. To study Safety Planning and Its Industrial Application
- 3. To understand Laws related to Safety, Health & Environment
- 4. To get knowledge of Pollution Control, Solid and Hazardous waste Management
- 5. To study of Environmental and Disaster management in industries

- 1. To Characterize Fire Safety, Chemical and Electrical Safety
- 2. To Demonstrate Safety Planning And Its Industrial Application
- 3. To Explain Laws Related To Safety, Health & Environment
- 4. To Define Pollution Control, Solid And Hazardous Waste Management
- 5. To Evaluate Environmental And Disaster Management In Industries

UNIT 1	Fire ,Electrical protection and Chemical Safety	Ĺ	Т	Р
1.1	Definition of fire, elements of fire, Causes of fire Classification of fire; spreading of fire; Method of extinguishing fire (Lecture, Discussion, Presentation)	2	1	

1.2	Earth fault protection, short circuit protection, Earth insulation, Flame proof Electrical equipment.(Lecture, Discussion, Presentation)	2	
1.3	Evaluation parameter, level of toxic risk, problem posed by determination of toxicity risk level. Different extinguishing medias- water, foam, dry powder, ABC Powder, CO2, Halon. Chemical risk analysis	2	
	(Lecture, Discussion, Presentation)		
1.4	Flammability - vapor pressure, limits of flammability, Flash points, auto-ignition temperature. (Lecture, Discussion, Presentation)	2	
1.5	Stability: - Experimental methods of determination, classifications of instability risk; Toxicity(Lecture, Discussion, Presentation)	2	

UNIT 2	Safety Planning and Its Industrial Application	L	Т	Р
2.1	Effective planning for safety- Definition, need, nature, principles, policy and formulation.(Lecture, Discussion, Presentation)	2		
2.2	Electrical Hazards, Danger from electricity, safe limit of amphere and voltage range, safe distance from electrical line, protection(Lecture, Discussion, Presentation)	2	1	
2.3	Safety in industries involving hazardous processes, highly			
	flammable liquids & flammable compressed gases (Lecture, Discussion, Presentation)	2		
2.4	safety in chemical works, application of safety in handling corrosive substances (Lecture, Discussion, Presentation)	2		
2.5	safety audit in various types of factories, types of safety audit, its methodology and reporting (Lecture, Discussion, Presentation)	2		

UNIT 3	Laws related to Safety, Health & Environment	L	Т	Р
3.1	Factories Act 1948. The Plantation Labour Act, 1955 (Lecture, Discussion, Presentation)	2		
3.2	Environment (Protection) Act 1986, (MSIHC) Rules 1989. (Lecture, Discussion, Presentation)	2	1	

3.3	The Water (Prevention & Control of Pollution) Act, 1974 (Lecture, Discussion, Presentation)	2	
3.4	amended 1988; Manufacture, Storage and Import of		
	Hazardous Chemicals Rules, 1989 amended 2000		
	(Lecture, Discussion, Presentation)	2	
3.5	Chemical Accidents (Emergency Planning,		
	Preparedness and Response) Rules, 1996; The Air (Prevention & Control of Pollution) Act, 1981 amended 1987, Chemical Accidents (Emergency, Planning, preparedness and response) Rules 1996 (Lecture, Discussion, Presentation)	2	

UNIT	Pollution Control, Solid and Hazardous waste	L	Т	Р
4	Management			
4.1	Air Pollution, Air pollution Measurement, Air quality	2	1	
	monitoring, Air pollution control Technology & method			
	(Lecture, Discussion, Presentation)			
4.2	Equipment Selection, Equipment design, Particulate	2		
	emission control			
	(Lecture, Discussion, Presentation)			
4.3	Concept of water pollution, characteristic of waste water,	2		
	Solid & hazardous waste management: Sources (Lecture,			
	Discussion, Presentation)			
4.4	Waste Minimization, Hazardous Waste Transport &	2		
	treatment facilities			
	(Lecture, Discussion, Presentation)			
4.5	Treatment systems for hazardous waste &handling and	2		
	treatment of plant residues. Training for waste			
	management operators			
	(Lecture, Discussion, Presentation)			

UNIT 5	Environmental and Disaster management in industries	L	Τ	Р
5.1	Principals & requirements of ISO 14001 EMS,	2		
	Environmental auditing & Auditing of waste minimization. (Lecture, Discussion, Presentation)			
5.2	Environment Impact Assessment ,Environment	2		
	Management Plan, EIA, EMP ;OHASAS –			
	18001(Lecture, Discussion, Presentation)			
5.3	Disaster Management-Types & consequence of major	2	1	
	accident hazards, Role of management (Lecture,			
	Discussion, Presentation)			

5.4	Local authorities and public, Disaster Management		
	Cycle – Prevention	2	
	(Lecture, Discussion, Presentation)		
5.5	Mitigation, Preparedness, Disaster impact, Response,	2	
	Restoration, Reconstruction	2	
	(Lecture, Discussion, Presentation)		

- 1. To study of fire & chemical and Electrical Safety methods.
- 2. To study about waste & hazards management in printing industry.
- 3. To study of Safety Planning Management.
- 4. To study of Pollution Control, Solid and Hazardous waste Management.
- 5. To study of Environmental and Disaster management in industries.

Suggested Readings:-

1. Fire and Explosion hazards Handbook of Industrial chemicals (Author - Tatyana Davletsniha, Nicholas P. cheremisin off, Publisher -Noyes Publication 1998, ISBN-0815514298,9780815514299

2. Fundamental of Industrial safety/ and Health- Third Edition 2012(Authored By- Dr K.U Mistry, Publisher-M/S Siddhartha Prakashan, Ahmadabad.

3. Water Pollution, Causes Effects & Control by P.K. Goel (publisher–New age international 2006,ISBN-8122418392,9788122418392)

Waste Management by Rajiv K. Sinha, V S sexena (INA Shree Publishers, ISBN8186653325)

(Dr.Asmita Khajanchi) (Umesh Upadhyay) (Dr.P.Sasik (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

5 B.Tech(PP)1 5CCC-15: Technology of Flexography

incory 50 indened 50 internal 20 credits 0	Theory	50	Practical	30	Internal	20	Credits	6
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COURSE OBJECTIVES

- 1. This course provides basic knowledge of flexography printing process along with their role, importance and applications.
- 2. Students will use industry-standard page-layout and graphics software
- 3. They will gain a thorough grounding on press calibration and use
- 4. They will gain a thorough grounding on Barcode and its type along with printing technique
- 5. Thorough understanding on Ink type used for flexography and recycling concept of chemical used in process

- 1. To describe the flexography and related terms
- 2. To Build and Performed the concept of Color theory for flexography pre-press
- 3. To explain and carry out the functions of flexography press
- 4. To explain and carry out the Bar codes
- 5. To characterized flexo inks and interpret the future of flexography

Unit-1	Introduction to Flexography	L	Т	Р
1.1	The Evolution of Flexography And Definition	2		2
	Scope & Principle of Flexographic Printing			
	(Lecture, Discussion)			
1.2	Narrow Web Press and Wide Web Presses	2		2
	(Lecture, Discussion, Presentation)			
1.3	Main Components of Flexography - Fountain			_
	Roll, Anilox Roll, Doctor Blade, Plate Cylinder,	3		4
	Impression Cylinder			
	(Lecture, Discussion, Presentation)			
1.4	Flexographic Printing Plates: Introduction,	2		2
	Rubber Plates, Photopolymer Plates its Kind,			
	Method, Preparation			
	(Lecture, Discussion, Presentation)	3		2
1.5	Care Handling and Storage Of Sensitive			
	Materials in Flexography			
	(Lecture, Discussion)			

Unit-2	Pre-Press	L	Т	Р
2.1	Image Capture, Preflight Quality Control	2		2
	(Lecture, Discussion)			

2.2	Job Assembly/Layout, Film Output/Image	3	4
	Setting		
	(Lecture, Discussion, Presentation)		
2.3	Proofing, Back-End Quality Control (Lecture)	2	2
2.4	Color Theory	2	2
	(Lecture, Discussion, Presentation)		
2.5	Colour Measurement, Achieving Optimum Press		
	Performance	3	2
	(Lecture, Discussion, Presentation)		

Unit -3	Press	L	Т	Р
3.1	Checking the Equipment	2		4
	(Lecture, Discussion, Presentation)	1		2
3.2	Operation and Care Of Equipment (Lecture,	4		Z
	Discussion, Presentation)			
3.3	Understanding the Mounting Instructions			2
	(Lecture, Discussion)	2		2
3.4	Press Room Practices	3		2
	(Lecture, Discussion, Presentation)			
3.5	Environment and Safety Concerns (Lecture,	2		
	Presentation)			

Unit-4	Flexography And Bar-Coding	L	Т	Р
4.1	Barcode Structures. Types	3		2
	(Lecture, Assignment, Presentation)	2		2
4.2	Verifying/Analysing Printed Barcodes (Lecture,	2		2
	Discussion, Presentation)			
4.3	UDC Film Masters And Printing Capability			
	Tests	4		4
	(Lecture, Discussion)	2		
4.4	Barcode Printing			
	(Presentation)	2		2
4.5	News Print For Water-Base Flexography			
	(Lecture, Discussion)			

Unit-5	Inks	L	Т	Р
5.1	Ink Formulation	2		2
	(Lecture, Discussion)			

5.2	Selecting Ink With Respect To End Use	2	4
	Requirement		
	(Lecture, Discussion)		
5.3	Substrate Used For Flexography Printing	4	2
	(Presentation)		
5.4	Future of Ink Distribution System and	3	
	Flexographic Plates		
	(Presentation)		
5.5	Future of Flexography	2	2
	(Discussion, Presentation)		

- 1. Introduction and Familiarizing Flexo Machine and Other Related Elements.
- 2. Preparation of Rubber Plates.
- 3. Study and Preparation of Liquid & Sheet Polymer Plates.
- 4. Registering and Plate Mounting on Flexo Plate Cylinder.
- 5. Study of Make Ready Procedures for a Flexo Machine.
- 6. Printing Single Color, Two Colors, And Four Color.
- 7. Studying of 6 Colors and 8 ColorFlexo Machines.
- 8. Printing on Various Substrates Ldpe, Hpde, Paper, and Aluminum Foil.
- 9. Identification of Flexography Printed Product.

- 1. Foundation of Flexography Technical Association Publisher: Foundation of Flexographic Technical Association (4 January 2014) Asin: B00dd5tt0q
- 2. Handbook on Printing Technology (Offset, Gravure, Flexo, Screen) Publisher: Asia Pacific Business Press Inc.; 2nd Edition Isbn-10: 8178330873 Isbn-13: 978-8178330

(Dr.Asmita Khajanchi) (Umesh Upadhyay) (Dr.P.Sas (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

5 B.Tech(PP)2 5CCC-16: Image Carrier for printing process

Theory	50	Practical	30	Internal	20	Credits	6
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COURSE OBJECTIVES

1. To Study about film making Process, film assembly and developing process. 2. Explain the Image Carrier process for gravure and screen print technology

- 3. To interpret the Type of Offset plate and Plate Making Process.
- 4. To Understand the Flexography Plate making Process and Its advantage
- 5. Describe the dry offset and waterless plate properties.

- 1. To get a evaluate Film making process with the help of process camera and types of film.
- 2. Differentiate Gravure cylinder making process and screen printing stencil making process.
- 3. Students are constructing/ generate making Offset Plate making.
- 4. Students are construct or making rubber and photopolymer plate.
- 5. Analysis the offset and dry offset technology and also able to use of quality control tool and equipment of image carrier

Unit-1	Introduction Film Image elements and	L	Т	Р
1.1	Types of Film use in Film Making, Light	4		2
	Sensitive film and Material			
	(Lecture, Discussion, Presentation, Practical)			
1.2	Basic steps of Planning Film Making and Plate	3		4
	Image assembly, Line Photography Process			
	.process Camera, image assembly for single			
	color			
	(Lecture, Discussion, Practical)			
1.3	Developing Process and chemical (Lecture,	2		2
	Discussion, Assignment)	2		
1.4	Multicolor printing Image assembly			2
	(Lecture, Discussion, Assignment)	2		2
1.5	Care and handeling of materials.			
	(Lecture, Discussion, Practical)			

Unit-2	Gravure And Screen Printing Image Generation	L	Т	Р
2.1	Image Carrier For Gravure , Types Of Gravure Cylinder Mandrel And Integrated Shaft (Lecture, Discussion, Presentation)	4		2
2.2	Various Process For Image Generation On Gravure Cylinder, Direct, Diffusion, Electro Mechanical, Laser Cutting (Lecture, Discussion, Practical ,Presentation)	3		2

2.3	Metals Layer on Cylinder, Thin Layer , Ballard Skin , Thick Layer Method	2	
	(Lecture, Discussion, Presentation, Practical)	2	2
2.4	Introduction of Gravure Wells Types and Its Structure, Copper Plating Polishing, Reuse of Cylinder	3	2
	(Lecture, Discussion, , Presentation)	2	2
2.5	Screen Printing Image Carrier: - Direct And Indirect Screen Making Process. (Lecture, Discussion, Practical)	2	Z

Unit -3	Image Carrier For Offset	L	Т	Р
3.1	Introduction, Types Of Plates – Conventional Plates , Basic Steps in Preparation of Conventional Plates –Surface Plates And Deep Etch Plates	4		2
3.2	General Processing Sequence for a Positive and Negative Working Plates. (Lecture, Discussion, Presentation, Assignment)	2		2
3.3	General Processing Sequence for A New Era Plates :- Ps, Photo Polymer, CTP Plates (Lecture, Discussion, Presentation)	2		2
3.4	Introduction of Multi-Metal Plates, Paper/ Film Based Plates (Lecture, Discussion, Practical ,Presentation)	3		
3.5	Introduction of Multi-Metal Plates, Bi Metal, Tri Metal Paper/ Film Based Plates (Lecture, Discussion, Practical, Assignment)	3		2

Unit-4	Image Carrier For Flexography	L	Т	Р
4.1	Introduction Flexography Process, Properties Of	2		4
	Flexography Plate.			
	(Lecture, Discussion, Presentation)			
4.2	Rubber Plates, Plates Making Process.	4		2
	(Lecture, Discussion, Assignment, Presentation)			
4.3	Solid/ Sheet Photo Polymer Plate Making, Pre	2		2
	Exposure, Post Exposure.			
	(Lecture, Discussion, Practical)			
4.4	Liquid Photo Polymer Plates Making Steps,	3		2
	Properties And Advantages, Limitation Of Plate			
	(Lecture, Discussion, Assignment, Presentation)			

4.5	Troubleshooting of platemaking. (Lecture, Discussion, Assignment, Practical)			
		2		l

Unit-5	Sources For Image Generation Sources For Image Generation	L	Т	Р
5.1	Dry Offset Technology, Comparison With Offset Technology (Lecture, Discussion, Presentation)	4		2
5.2	Dry Offset Plate Torrey Waterless Plate / Silicon Plate (Discussion, Practical)	3		2
5.3	Introduction To Tools & Equipments Used In Preparation Of Image Carrier For Major Printing Processes. (Discussion, Practical, Presentation)	2		2
5.4	Introduction To Light Sources For Plate-Making Department For Various Printing Processes (Lecture, Discussion)	3		2
5.5	Quality Control In Image Carrier Department: Introduction To Quality Control Aids, Tools And Equipments. (Lecture ,Practical, Discussion)	2		

- 1. Preparation of Film Making Process Camera.
- 2. Film Developing Process
- 3. Gravure Cylinder Wells Making
- 4. Electromechanical Process.
- 5. Flexography Plate (Rubber Plate
- 6. Quality Control Tools For Image Genration
- 7. Liquid Photo Polymer Making.
- 8. Preparations Of Deep Etch Plate
- 9. Preparations Of Pre Sensitized Plate

- 1. Dr. R.W.G. Hont: The Reproduction Of Color. Fountain Press, 4th Edition, Publisher, Fountain Press Ltd, 2004, ISBN, 0863433685, 9780863433689
- 2. Gravure: Process and Technology Publisher Gravure Association Ofamerica1991 ISBN18802900069, 781880280002
- Handbook Of Printing Processes, Deborah L Stevenson Charles Lucas Publisher: Graphic Arts Center Publishing Company (December 12, 2011)ISBN-10: 0883621649 ISBN13: 978-088362164

4. Color Separations Technique Miles South Worth PUB- Graphic ART ISBN-10-0933600003, ISBN13- 9780933600003

1110 0 j 114040 01 2.001. 11 19/2020 200 (M.M.Isaad) (Ayan Tiwari) (Dr.Asmita Khajanchi) (Umesh Upadhyay) ta N 20 9/2020 (Dr.P.Sasikala) 2 (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

5 B.Tech(PP)3 5CCC-17: Microprocessor & Microcontroller

COURSE OBJECTIVES

- 1. To study Microcontroller and Microprocessor.
- 2. To understand the Fundamental of Microprocessor 8086.
- 3. To Study Instruction Set of Microprocessor.
- 4. To Learn The Programming Skill of Microcontroller.
- 5. To understand the interfacing of different devices to microcontroller 8051.

- 1. To characterize use of microprocessor in field of printing and packaging.
- 2. To characterize use of microcontroller for automation in field of printing and packaging.
- 3. To characterize interfacing different devices such as; printer and stepper motor .
- 4. To characterize the programming of microcontroller 8051 to execute different task.
- 5. To characterize the interfacing of seven segments display and LED display.

Unit 1	Introduction of microprocessor	L	Т	Р
1.1		2		2
1.1	Introduction to embedded systems, Embedded	3		2
	(Lecture, Discussion, Presentation)			
1.2	Microprocessor v/s microcontroller, A micro			
	controller survey(Lecture, Discussion, Presentation)	2		
1.3	Development systems and Microcontrollers,			
	Application of Microcontroller and microprocessor			
	in Printing Industry.	3		4
	(Lecture, Discussion, Presentation)			
1.4	8086 Microprocessor: Architecture, Addressing			
	modes, Instruction set and assembly language	3		2
	programming	-		
	(Lecture, Discussion, Presentation)			
1.5	Assembler and advanced programming. Signals,			
	minimum and maximum modes of operation	2		2
	(Lecture, Discussion, Presentation)	2		2

Unit 2	The 8051 Architecture	L	Τ	Р
2.1	Introduction, 8051 Microcontroller hardware, input / output pins, ports and circuits External memory, (Lecture, Discussion, Presentation)	4		2
2.2	Counters and timers, serial data input /output (Lecture, Discussion, Presentation)	3		4
2.3	Data transfer Instructions (Lecture, Discussion, Presentation)	2		

2.4	Addressing modes, External data moves (Lecture, Discussion, Presentation)	2	2
2.5	push and pop Up codes, data exchanges and example		2
	programs (Lecture, Discussion, Presentation)	2	

Unit3	Arithmetic and Logic Instructions	L	Т	Р
3.1	Unsigned addition and subtraction, multiplication and	3		2
	division.			
	(Lecture, Discussion, Presentation)	2		4
3.2	Compare, rotate and swap instructions and example	Z		4
	programs. (Lecture, Discussion, Presentation)	2		2
3.3	8051 timers, counters and Serial	2		2
	communication(Lecture, Discussion, Presentation)			
3.4	8051 timers, counter programming, Basics of serial	3		2
	communication,	3		
3.5	8051 connection to RS 232, serial communication	E.		
	programming			

Unit4	8051 Interfacing	L	Т	Р
4.1	Programming 8255 in I/O mode	2		2
	(Lecture, Discussion, Presentation)			
4.2	Interfacing DAC			1
	(Lecture, Discussion, Presentation)	3		
4.3	Seven Segment display(Lecture, Discussion,			1
	Presentation)	2		
4.4	Logic Controller(Lecture, Discussion, Presentation)	2		2
4.5	Other devices of 8051 interfacing. (Lecture,	4		2
	Discussion, Presentation)			

Unit5	Programmable Peripherals and Memory Interfacing	L	Τ	Р
5.1	Study of interfacing device	2		2
	(Lecture, Discussion, Presentation)	4		2
5.2	Programmable DMA controller	4		Z
	(Lecture, Discussion, Presentation)	2		2
5.3	8251 USART			4
	(Lecture, Discussion, Presentation)			4

5.4	8259 Interrupt controller	2	
	(Lecture, Discussion, Presentation)	2	
5.5	Memory interfacing	3	
	(Lecture, Discussion, Presentation)		

- 1. Introduction to 8051 simulation software and familiarization of 8051 instruction set
- 2. Introduction and programming using 8051 trainer kit
- 3. Introduction to 8086 Programming
- 4. Arithmetic and logic operations related programs
- 5. Array handling and codes conversion programs
- 6. Signed and unsigned arithmetic
- 7. Programming using 8051 trainer kit in serial mode
- 8. Simple Interfacing programs using DAC, Seven segment display and Stepper motor 9. Arithmetic and Screen display programs

- Muhammad Ali Mazidi, Janice GillispieMazidi, Rolin D. McKinlay, "The 8051 Microcontroller and Embedded Systems Using Assembly and C", 2nd edition, Pearson Education India, 2008
- 2. Kenneth J.Alaya, "The 8051 Microcontroller", Thomson Delmar Learning, 3rd Edition, 2005.
- 3. I.Scott Mac Kenzie and Raphael C.W.Phan, "The 8051 Microcontroller", 4th edition, 2006, ebook.
- /*-Douglas V.Hall, "Microprocessors and Interfacing "Tata McGraw Hill International, Delhi, revised 2nd ed.,2005
- 5. Sunil K. Mathur "Microprocessor 8086: Architecture, Programming AndInterfacing", Prentice Hall of India, 2010

Altended Outine (Dr.Asmita Khajanchi) (Umesh Upadhyay) (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

5 B.Tech(PP)4 5CCE-5: A.Packaging Material Science

Theory	80	Practical	00	Internal	20	Credits	6

COURSE OBJECTIVES

- 1. To understand the use of science in packaging and its effect on material.
- 2. Explain of Photography material and color management techniques.
- 3. To Explain Surface Science for Printing surface and material.
- 4. Classify the Various types of colloids and polymers and use in printing technology
- 5. To understand the printing ink science and its ingredients.

COURSE OUTCOMES (CO)

- 1. Describe The Printing Science Use and Effect on Paper, Ink and on Process.
- 2. Explain The Light Sensitive Photography Material And Measurement Technique Colour.
- 3. Students are Able to Science of Surface Use in Printing Surface, Plate, Paper, Ink and Paper Etc.
- 4. Differentiate The Various Type of Polymer and Collides Use in Printing and Use in Printing Material.

		1	Г
of packaging.	2	1	
, Discussion)			
g the right material for packaging the	2	1	
	n of packaging. , Discussion) g the right material for packaging the c, Discussion, Presentation)	a of packaging.2, Discussion)2g the right material for packaging the2c, Discussion, Presentation)2	a of packaging.21, Discussion)21g the right material for packaging the21c, Discussion, Presentation)21

5. Student Get Knowledge of Various Types of Ink and Chemical.

1.3	Layers of packaging.			
	(Lecture, Discussion)	2	2	
1.4	Packaging and control (Lecture, Discussion)	2	2	
1.5	Recent Developments in packaging (Lecture, Discussion)	2	2	

Unit-2	Luminious flux	L	Т	Р
2.1	Definitions of luminous flux, luminous intensity,	2	1	
	(Lecture, Discussion)			
2.2	Illumination power, intensity of illumination of a	2	2	
	surface, brightness or luminance of a surface			
	(Lecture, Discussion)			
2.3	laws of illumination - inverse square law and	2	2	
	lambert's cosine law (Lecture, Discussion)			
		2	2	
2.4	Types of photometers, photovoltaic photometer			
	(Lecture, Discussion, Presentation)			
2.5	Effect of surface characteristics in material	2	1	
	purchasing			
	(Lecture, Discussion, Presentation)			

Unit -3	Drying methods	L	Т	Р
3.1	Oxidation	2	2	
	(Lecture, Discussion, Presentation)			
3.2	Evaporation	2	2	
	(Lecture, Discussion)			
3.3	Absorption	2	1	
	(Lecture, Discussion)			
3.4	Precipitation			
	(Lecture, Discussion, Presentation)	2	1	
3.5	Other methods such as IR/UV Drying/Heat set			
	(Lecture, Discussion, Presentation)	2	2	

Unit-4	Polymers For Packaging	L	Т	Р
4.1	Monomer and Polymer used in Packaging	2	2	
	(Lecture, Discussion)			
4.2	Types of Plastics- Thermo-sets &	2	1	
	Thermoplastics			
	(Lecture, Discussion)			
4.3	Natural Polymers, Cellulose Derivatives,	2	1	
	Synthetic Polymers,			

	(Lecture, Discussion)			
		2	2	
4.4	Polythene, Polypropylene, Polyvinyl (Lecture, Discussion)	2	2	
4.5	Other ancillary polymers used as packaging materials (Lecture, Discussion)			

Unit-5	Testing for Quality Control of packaging	L	Т	Р
5.1	Optical testing	2	2	
	(Lecture, Discussion)			
5.2	Package test	2	1	
	(Lecture, Discussion, Assignment)			
5.3	Machinability test	2	2	
	(Lecture, Discussion, Assignment, Presentation)			
5.4	Drop and vibration test	2	1	
	(Lecture, Discussion, Assignment)			
5.5	Other Physical test	2	2	
	(Lecture, Discussion, Assignment, Presentation)			

- 1. To study Layers of packaging.
- 2. To study and Luminous flux.
- 3. To study the drying techniques.
- 4. To study the package test.

- 1. Package Design Workbook: The Art and Science of Successful Packaging, Steven DuPuis, John Silva
- 2. Optics -BrijLal and Subrahmaniam
- 3. Optics Ajay Ghatak
- 4. Engineering Chemistry -Jain and Jain
- 5. Hand Book of Polymer & Plastic Technology- Engineers India Research In, 2007.

Alchar 2/9/2020 59,2020 Altended Online 2020 (M.M.Isaad) (Ayan Tiwari) (Dr.Asmita Khajanchi) (Umesh Upadhyay) mita in 20 (Dr.P.Sasikala) 2020 (Dr.Babita Agrawal) 2 (Dr.Pawan Singh Malik)

5 B.Tech(PP)5 5CCE-6: B.Paper Based Packaging

Theory	80	Practical	00	Internal	20	Credits	6

COURSE OBJECTIVE

- 1. To learn composition of fiber manufacturing process of paper and paper board.
- 2. To understand paper properties and measurement.
- 3. To understand paper board and types measurement.
- 4. To learn conversion process of flexible packaging.
- 5. To understand process of corrugation board.

- 1. To categorize the manufacturing process of paper and paper board.
- 2. To asses paper property and measurement.
- 3. To analyze paper board and type of measurement.
- 4. To implement flexible packaging manufacturing of sacks and boxes.
- 5. To demonstrate the process of corrugation board.

Unit-1	Paper and Paperboard	L	Т	Р
1.1	Raw material for Paper and paper board. (Lecture,	2	1	
	Discussion, Presentation)			
1.2	Mechanical Pulping.	2	2	
	(Lecture, Discussion, Presentation)			
1.3	Chemical pulping.	2	2	
	(Lecture, Discussion, Presentation)	2	2	
1.4	Paper sizes	2	2	
	(Lecture, Discussion, Presentation)	C	1	
1.5	Recycling of Paper.	Z	1	
	(Lecture, Discussion, Presentation)			

Unit-2	Paper Properties and Measurements	L	Т	Р
2.1	Printability.	2	1	
	(Lecture, Discussion, Presentation)			
2.2	Dimensional stability, Formation, Porosity,	_		
	Smoothness, Surface strength	2	2	
	(Lecture, Discussion, Presentation)			
2.3	Ink absorbency, Paper pH, Moisture, water			
	resistance, water absorption (Lecture,	2	l	
	Discussion, Presentation)			
2.4	Optical Properties – Color, Gloss (Lecture,	2		
	Discussion, Presentation)	2	2	

2.5 Mechanical Properties – Bursting strength, Tear, Stiffness, Tensile strength, Dimensional stability and Grain direction. (Lecture, Discussion, Presentation) 2 2

Unit -3	Paper Board & Types Measurements	L	Т	Р
3.1	Paper Board & Types Measurements : Paperboard Folding box board, white lined chipboard (Lecture, Discussion Presentation)	2	2	
3.2	solid bleached board, solid unbleached board, Liquid packaging board, Container boards, Specialty boards	2	2	
3.3	Rub resistance; Performance Properties: Weight, Thickness, Moisture Content, Tensile strength, Stretch or elongation	2	1	
3.4	(Lecture, Discussion, Presentation) Tear Strength, Burst strength, Stiffness, Compression strength, Crush strength, Creasability and fold ability, Ply bond strength (Lecture,	2	1	
3.5	Discussion, Presentation) Flatness and dimensional stability, Porosity, Water absorbency, Gullibility/Sealing, Taint and odor neutrality. (Lecture, Discussion, Presentation)	2	2	

Unit-4	Conversion Process	L	Т	Р
4.1	Flexible packaging manufacturing; Paper bags types	2	2	
	(Lecture, Discussion, Presentation)			
4.2	Composite cans manufacture, applications; Fibre			
	drums.	2	2	
	(Lecture, Discussion, Presentation)			
4.3	Multiwall paper sacks - types, manufacture; Rigid			
	boxes, Folding Cartons Design (Lecture, Discussion,	2	1	
	Presentation)			
4.4	Manufacturing; Solid fibreboard packaging			
	(Lecture, Discussion, Presentation)	2	1	
4.5	Paperboard based liquid packaging, Molded pulp			
	containers.			
	(Lecture, Discussion, Presentation)	2	2	

Unit-5	Corrugated Board	L	Т	Р
5.1	Corrugated Board construction - Flutes/Single,	2	1	
	Double, Triple Wall, Board grades			
	(Lecture, Discussion, Presentation)			
5.2	Flat Crush/Edge Crush Tests Box Certificates	2	1	
	(Lecture, Discussion, Presentation)			
5.2	Pox Lovout Types Manufacture/Scoring	2	2	
5.5	Allowances Ontimization Economy			
	(Lecture Discussion Presentation)			
5.4	(Lecture, Discussion, Presentation)	2	2	
5.4	Compression lest, McKee Formula/ECI,			
	Inserts/Partitions, Stack Height and calculation,			
	Pallet Patterns			
	(Lecture, Discussion, Presentation)	2	2	
5.5	Banding/Strapping/Taping, Corrugated Board	-	_	
	Pallets, Corrugated Board Cushions.			
	(Lecture, Discussion, Presentation)			

- 1. Introduction of paper & paper board Manufacturing.
- 2. Testing methods of Paper & paper board.
- 3. Study of Paper Properties and their measurement.
- 4. Study of different type Of paper & paper board conversion.
- 5. To study flutes features of corrugated board.

- Handbook of Paper and Paperboard Packaging Technology , Mark J. Kirwan Publisher: Wiley-Blackwell; 2nd Revised edition (11 January 2013) ISBN-10: 0470670665 ISBN-13: 978-0470670668
- 2. Pulp & paper Industry Pratima Bajpai ISBN-978-0-12-803411-8 (2016)
- Fundamentals of Packaging Tec/hnology-Fourth Edition Perfect Paperback Import, 21 Jan 2010 by Walter Soroka (Author) Publisher: Institute of Packaging Professionals; 4 edition (21 January 2010) ISBN-10: 1930268289

2/9/2020 61,2020 Alloy Altended Online 2020 (M.M.Isaad) (Ayan Tiwari) (Dr.Asmita Khajanchi) (Umesh Upadhyay) and wire 20 (Dr.P.Sasikala) 2020 (Dr.Babita Agrawal) 2 (Dr.Pawan Singh Malik)

5 B.Tech(PP)5 5SEC-3: Digital Pre Press

Theory 40 Practical	00	Internal	10	Credits	3
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COURSE OBJECTIVES

- 1. To learn digital imagine system and image generation technique.
- 2. To learn about electronic input devices.
- 3. To learn imposition technique and proof reading mark.
- 4. To understand auto processer.
- 5. To understand CTM,CIP3, CIP4

- 1. To analyze digital imaging and image generation technique.
- 2. To deffentiate input devices.
- 3. To construct imposition technique and proof reading mark.
- 4. To demonstrate auto processer.
- 5. To critique complete process of CTM, CIP3 CIP4.

Unit-1	Digital Imaging	L	Т	Р
1.1	Definition, applications and factors that accelerated	1	1	
	(Lecture, Discussion, Presentation)			
1.2	The development of Digital Imaging in graphic	2		
	prepress technologies.			
	(Lecture, Discussion, Presentation)			
1.3	Conventional film making vs. Digital plate making	2		
	system.			
	(Lecture, Discussion, Presentation)			
1.4	Digital imaging approaches used	2		
	in graphic reproduction.			
	(Lecture, Discussion, Presentation)	1		
1.5	Advantages of Digital Imaging prepress techniques			
	(Lecture, Discussion, Presentation)			

Unit-2	Electronic input devices	L	Т	Р
2.1	OCR, Scanner, Digital Back, Digital camera, Digital	2		
	pen. Its principles, types, components. Types of			
	scanning advanced scanning techniques and input			
	methods.			
	(Lecture, Discussion, Presentation)			
2.2	Digital camera, Digital pen	1	1	
	(Lecture, Discussion, Presentation)	1	1	
2.3	Principles, types, components.	1		
	(Lecture, Discussion, Presentation)	1		
2.4	Types of scanning advanced scanning techniques	2		
	(Lecture, Discussion, Presentation)			

2.5	input methods.(Lecture, Discussion, Presentation)	2	

Unit -3	Impositions techniques	L	Т	Р
3.1	Half sheet, sheet work.	2	1	
	(Lecture, Discussion, Presentation)			
3.2	Electro photography imaging (Lecture, Discussion, Presentation)	2		
3.3	Study of working principle (Lecture, Discussion, Presentation)	1		
3.4	Spectral sensitivity, and stages involved in electro photography	1		
2.5	(Lecture, Discussion, Presentation)	2		
3.5	Advantages, applications and limitations of electro photography (Lecture Discussion Presentation)	L		

Unit-4	Auto processor	L	Т	Р
4.1	Computer to film-CTF Principles and Feature	2		
	(Lecture, Discussion, Presentation)			
	(Lecture, Discussion, Presentation)	2		
4.2	Computer to plate (CTP) components, principles,			
	features.	2		
	(Lecture, Discussion, Presentation)	2		
4.3	CTF VS. CTP			
	(Lecture, Discussion, Presentation)	1		
4.4	Recent advancement in auto processor. (Lecture,	1	1	
	Discussion, Presentation)	1		
4.5	To study light source used for CTF and CTP.	-		
	(Lecture, Discussion, Presentation)			

Unit-5	СТМ	L	Т	Р
5.1	Components, principles, features	2		
	(Lecture, Discussion, Presentation)			
5.2	Recent advancements and of different	2		
	study Computer to machine			
	(CTM).	1		
	(Lecture, Discussion, Presentation)		1	
5.3	Light source used for CTM.	1	-	
	(Lecture, Discussion, Presentation)			
5.4	CIP3	2		
	(Lecture, Discussion, Presentation)			

5.5	CIP4		
	(Lecture, Discussion, Presentation)		

- 1. To study image manipulation techniques.
- 2. To study components and working of CTP.
- 3. To study components and working of CTM.
- 4. Study of advantages and features of Advanced CTM. 5. Study of imposition techniques (s/w)
- 6. Study of online & offline models.

- Pocket Guide to Digital Prepress Paperback June 29, 1995by <u>Frank Romano</u> (Author) Publisher: Cengage Learning; 1 edition ISBN-10: 0827371985 ISBN-13: 978-0827371989
- 2. Getting it Right in Print: Digital Prepress for Graphic Designers by <u>Mark Gatter</u> (Author) ISBN-13: 978-0810992061ISBN-10: 081099206X
- Professional Prepress, Printing, and Publishing 1st Editionby Frank Romano (Author) Publisher: Prentice Hall; 1 edition (March 4, 1999) ISBN-10: 0130997447ISBN-13: 9780130997449

20 (Dr.Asmita Khajanchi) (Umesh Upadhyay) (Dr.P.Sas (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

5 B.Tech(PP)6 OE-5: Quality Control & Supply Chain Management

	Theory	40	Practical	00	Internal	10	Credits	3	
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COURSE OBJECTIVES

- 1. To understand the quality control system
- 2. Student get a knowledge of material management and sampling system
- 3. To study about various quality control programmes system in printing industry 4. To get a knowledge of supply chain management and various sources
- 5. To understand of different citification programmes.

- 1. To Explain the quality control system in industry
- 2. To describe the material management, inspection and sampling process
- 3. To define different quality control programmes of printing industry 4. To demonstrate the supply chain management and various sources
- 5. To categorize the different certification programmes.

Unit 1	Introduction to Quality Control & system	L	Т	Р
1.1	Definition of Quality, Quality control, its meaning and purpose setting up Quality Control Program, and establishing necessary.	2		
	(Lecture, Discussion, Presentation)			
1.2	System and procedures, economic consideration.	1		
	(Lecture, Discussion, Presentation)			
1.3	Management Consideration: Quality Control as an	1	1	
	attitude and management tool			
	(Lecture, Discussion, Presentation)			
1.4	Management of Quality control system			
	management's responsibility, organization and	2		
	personnel functions, getting everybody involved			
	(Lecture, Discussion, Presentation)			
1.5	Total Quality Control. Quality Control procedures	2		
	and methods. Different shapes of quality control			
	(Lecture, Discussion, Presentation)			

Unit 2	Materials Control	L	Т	Р
2.1	Establishing clear specifications and standardization of materials to be purchased (Lecture, Discussion, Presentation)	2	1	
2.2	Inspection and testing of incoming materials as part of quality control (Lecture, Discussion, Presentation)	1	1	

2.3	Importance of proper handling and maintaining records of performance of materials (Lecture, Discussion, Presentation)	2	
		2	
2.4	Sampling and sampling plans. Establishing Quality control programme in different departments of Packaging Plant. Consistent with the appropriate quality level (Lecture, Discussion, Presentation)	1	
2.5	Introduction to ISO: 9000 and ISO: 14000 series.		
	(Lecture, Discussion, Presentation)		

Unit 3	Quality control programme in Printing Industry	L	Т	Р
3.1	Establishing Quality control programme in different departments of Printing organization(Lecture,	2		
	Discussion, Presentation)			
3.2	TQM System	2		
	(Lecture, Discussion, Presentation)			
3.3	5 S System	1	1	
	(Lecture, Discussion, Presentation)		1	
3.4	KAIZEN system	1		
	(Lecture, Discussion, Presentation)			
3.5	SIX SIGMA, 7 QC TOOLS, GRACOL	2		
	(Lecture, Discussion, Presentation)			

Unit 4	SCM System and Sourcing Procurement	L	Т	Р
4.1	Concept of logistics and SCM, decision phases,	2		
	design, planning and operation, decision areas			
	(Lecture, Discussion, Presentation)			
4.2	Type of supply chain views - flows in supply chain,	1		
	supply chain and competitive performance,			
	performance measures for SCM, strategic fit and			
	drivers of supply chain.			
	(Lecture, Discussion, Presentation)			
4.3	sourcing Procurement: factors in source selection,	1		
	vendor rating, qualitative and quantitative methods,			
	purchasing			
	(Lecture, Discussion, Presentation)			
4.4	Objectives and procedure, purchasing systems,	2		
	tender method, computer based systems/EDI	4		
	(Lecture, Discussion, Presentation)			

4.5	inventory concept – functions of inventory, selective inventory control techniques, structure of inventory problem, costs associated with materials management, relevant costs (Lecture, Discussion, Presentation)	2	1	
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Unit5	Certification & inventory Management	L	Т	Р
5.1	Introduction of ISO 9000 and ISO 14000,.	2	1	
	(Lecture, Discussion, Presentation)			
5.2	ISO -31000; Concept of just-in-time	1		
	(Lecture, Discussion, Presentation)			
5.3	KAN BAN-introduction to requirement	1		
	planning(Lecture, Discussion, Presentation)			
5.4	different kind method or modal for inventory	2		
	management(Lecture, Discussion, Presentation)			
5.5	KAN BAN-distribution requirement planning	2		
	(Lecture, Discussion, Presentation)			

- 1. Study importance of Quality control System.
- 2. Study TQM System and 5 S Systems.
- 3. Study of industrial certification such as ISO.
- 4. Study importance of SCM and its working in Industry.
- 5. Study certification & inventory Management

- 1. Fundamentals of industrial Quality control by Lawrence S Aft. Third Edition ,Publisher CRC Press1997, ISBN-1574441515,9781574441512
- Six Sigma Handbook by Thomas Pyzdek, 4rth Edition ,(Publisher Mc Graw-hill Education,, ISBN-13: 978-0071840538)
- 3. Total Quality Management(TQM) by L.Suganthi (publisher- Prentice Hall india Learning Private Ltd. ISBN-8120326555
- 4. E-business And Supply chain Issue in Book Publishing Industry in Asia (Conference Paper) by Leong Weng Fei, N Viswannadham (national University Singapore
- 5. Operation and supply chain Management by G.Srinivasan(Publisher-Prentice Hall india ,ISBN-10- 8120339819,ISBN-13-978-8120339811)

Allof 2/9/2020 51,2020 Altended Online (M.M.Isaad) (Ayan Tiwari) (Dr.Asmita Khajanchi) (Umesh Upadhyay) puta sure 20 (Dr.P.Sasikala) 2020 2 (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

6 B.Tech(PP)1 6CCC-18: Technology of Gravure

Theory	50	Practical	30	Internal	20	Credits	6
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COURSE OBJECTIVES

- 1. To understand the technology of Gravure.
- 2. Explain the Image carrier department work, and cylinder properties
- 3. Describe the various method of gravure cylinder making process.
- 4. To evaluate the doctor Blade properties and role of Impression roller.
- 5. Explain the various substrates, Ink, Paper and its calculation.

- 1. Describe the technology of Gravure and also acquire knowledge of Gravure Machine design.
- 2. Student performs on the Gravure cylinder Layer Construction and image generation.
- 3. Design the various method of cylinder construction and use of tools and Equipment.
- 4. To describe the types of doctor blade, problems and properties of impression roller.
- 5. Formulate and the calculation of Gravure ink, Substrate and also analyze the future gravure and recent trends.

Unit-1	History & Introduction	L	Т	Р
1.1	History and scope of Gravure technique and	2		2
	press work			
	(Lecture, Discussion, Presentation)			
1.2	Gravure printing process, impression Roller	4		
	(Lecture, Discussion, Presentation)			
1.3	Gravure Machine Designs	2		2
	(Lecture, Discussion, Presentation)			
1.4	Ink Pan, Feeding Unit, Sensor, drying Unit	3		
	,chilling roller			
	(Lecture, Discussion, Presentation)			4
1.5	Rollers, printing Unit, delivery unit (Lecture,	3		
	Discussion, Practical)			

Unit-2	Image Carrier Preparation & Image Generation	L	Т	Р
2.1	Property of metal for Image generation ,Gravure	4		
	Screen			
	(Lecture, Discussion, Presentation)			
2.2	Cylinder Construction & Preparation Thin	2		2
	Layer Method, Thick Layer Method			
	(Lecture, Discussion, Practical, Presentation)			
2.3	Ballard Shell Treatment, Cylinder Design & Its	2		2
	Types			
	(Lecture, Discussion)			

2.4	Gravure Cylinder Preparation, Sleeve & Solid	3	2
	Cylinders, Considerations For Gravure Cylinder		
	Preparation.		
	(Lecture, Discussion, , Presentation)		4
		2	
2.5	Cell Configuration, Advantages &	2	
	Disadvantages,		
	(Lecture, Discussion, Presentation)		

Unit -3	Methods Of Gravure Cylinder Preparation	L	Т	Р
3.1	Diffusion-Etch Method, Direct Transfer,	2		2
	(Discussion, Presentation)			
3.2	Electro-Mechanical Process, Laser Cutting.			
	(Lecture, Discussion, Presentation, Assignment)	3		2
3.3	Cylinder Correction Method. Well Formation			
	And Structure- Variables	3		
	(Lecture, Discussion, Presentation)			2
3.4	Basic Types, Balancing The Cylinder, Copper			
	Plating & Polishing, Reuse Of Cylinders	2		2
	(Lecture, Discussion, Practical , Presentation)			
3.5	Sleeve & Integral Shafting Of Cylinders.	4		
	Cylinder Imbalance- Static & Dynamic			
	(Lecture, Discussion, Practical, Assignment)			

Unit-4	Doctor Blade & Impression Roller Mechanism	L	Т	Р
4.1	Doctor Blade Materials, Doctor Blade Assembly, Blade Angles, Blade Distance From Nip, Blade Edge, Blade Mounting. (Lecture, Discussion, Presentation)	2		2
4.2	Doctor Blade Holder Configurations, Preparing Blade For Use Doctor Blade Problems. Doctor Blade Wear - Fatigue, Corrosion, Abrasive, Adhesive Wear (Lecture Discussion Assignment Presentation)	4		2
4.3	Gravure Impression Roller- Function Of Impression Roller, Roller Covering, Roller Pressure, Balance- Static & Dynamic (Lecture, Discussion, Practical)	3		4

4.4	Gravure Roller Coating. Handling & Storage of Impression Roller. Impression Roller Problems. Impression Mechanisms- Mechanical, Hydraulic, Pneumatic. New Developments (Lecture, Discussion, Assignment, Presentation)	2	
4.5	Drying System In Gravure: Gravure Ink Dryers - Need For Ink Dryer, Dryers Functioning, Dryer Limitations, Heat Sources- Steam, Electric And	2	2
	Gas, Combination Gas/Oil. (Lecture, Discussion, Assignment)		

Unit-5	Gravure Substrates And Their Calculations	L	Т	Р
5.1	Publication Paper Substrates, Packaging Paper	4		2
	Substrates, Non Paper Substrates Metalized			
	Films & Foils			
	(Lecture, Discussion, Practical)			
5.2	Inks & Additives For Gravure And Their	2		
	Calculations.			2
	(Lecture Discussion, Presentation)			
5.3	Gravure Inks - Constituents of Gravure Ink,	2		2
	Dilution of Printing Ink, Types of Gravure Ink	5		2
	Water Based, Solvent Based. Polyurethane			
	Based, Vinyl Based, Dye Based			
	Lecture, Discussion, Practical			
	(Lecture Discussion, Presentation)			
5.4	Diff. Kind Of Additives Used For Respective	2		
	Inks, Other Additives, Solvent Recovery System	2		
	-Solvent Recovery System And Their Advantage			
	In Gravure Printing Ink.			
	(Lecture, Discussion, Presentation)			
5.5	Future Of Gravure: Future Of Gravure Printing &	4		
	Packaging Industry, Future Of Gravure	4		
	Publication industry. Recent Irends And New Developments In Grouping Industry			
	(Lecture Discussion Presentation)			
	(Lecture, Discussion, Tresentation)			

- 1. Study of Various Gravure Printing Machine Configurations.
- 2. Study of Various Components of a Gravure Printing Machine.
- 3. Study of Cylinder Preparation Methods.
- 4. Pre-Make And Make Ready In Gravure Printing Process.
- 5. Study of Feeding Unit of Gravure Printing Process.
- 6. Cylinder Setting In Gravure Printing Machine.

- 7. Printing On Single Color and Multicolor On Different Substrate.
- 8. Identification of Problems in Gravure Printing.

Suggested Readings:-

1. Gravure: Process and Technology Publisher Gravure Associatio Ofamerica1991, Isbn18802900069, 781880280002

2. Handbook On Printing Technology (Offset, Gravure, Flexo, Screen) Publisher: Asia Pacific Business Press Inc.; 2nd EditionIsbn-10: 8178330873 Isbn-13: 978-81783308

3. The Complete Book on Printing Technology, Niir Board Publisher: Asia Pacific Business Press Inc. (2003)Isbn-10: 8178330520 Isbn-13: 978-8178330525

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6 B.Tech(PP)2 6CCC-19: Multimedia for E-Publishing

Theory	50	Practical	30	Internal	20	Credits	6
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COURSE OBJECTIVES

- 1. To explore Multimedia concept in e-publishing.
- 2. To understand image and audio editing techniques.
- 3. To understand editing techniques for animation.
- 4. To evaluate the online publishing models.
- 5. Explain the tools and software used for publishing on multimedia devices.

- 1. To know and apply different layout design for various digital gadgets.
- 2. Choose proper software for image and audio editing.
- 3. Choose proper software for graphics and animation.
- 4. Create and conceive different online publishing models.
- 5. Know about use of multimedia software in e-publishing.

Unit-1	Introduction	L	Т	Р
1.1	Components of Multimedia, Interaction Devices.	3		2
	(Lecture, Discussion, Presentation)			
1.2	Introduction and Implications of Digital Text	2		4
	(Lecture, Discussion, Presentation)			
1.3	Font, Character Codes	2		2
	(Lecture, Discussion, Presentation)			
1.4	Formatting Aspect Text	2		4
	(Lecture, Discussion, Presentation)			
1.5	Hypertext and Hypermedia	2	1	
	Lecture, Discussion, Practical			

Unit-2	Image and Audio	L	Т	Р
2.1	Introduction of image- representation,	2		4
	Acquisition, Picture display.			
	(Lecture, Discussion, Presentation)			
2.2	Color and Brightness, scanning, Iconography	4		2
	(Lecture, Discussion, Practical , Presentation)			
2.3	Basic Image Editing Steps and File format.			
	(Lecture, Discussion)	2		
2.4	Introduction of Audio-Digital Audio, Sample,			2
	sample rate Digital Audio editing and	3		
	representation, pitch, Volume, Amplitude and			
	Frequency			
	(Lecture, Discussion, , Presentation)			
2.5	Audio File Format, Audio compression (Lecture,	2		2
	Discussion, Presentation)			

Unit -3	Graphics and Animation	L	Т	Р
3.1	Design of statistical and schematic data, Cartography.	3		4
	(Discussion, Presentation)			
3.2	Scanning images - creating gif images	2		2
	(Lecture, Discussion, Presentation,			
	Assignment)			
3.3	Animation principles, Types, Frame rate.	2		2
	(Lecture, Discussion, Presentation)			
3.4	Introduction of Flash-Timeline, Frame based			
	Animation, Tween-Based Animation, Layers	4		2
	(Lecture, Discussion, Practical , Presentation)			
3.5	Action Script, File Formats.	2		
	(Lecture, Discussion, Practical, Assignment)			

Unit-4	Creating the data for Publishing	L	Т	Р
4.1	HTML5: Tags, web page, Frame, Form.	3		4
	(Lecture, Discussion, Presentation)			
4.2	Table, Image and Embedding media Lecture,	2		2
	(Discussion, Assignment, Presentation)			
4.3	Java script: syntax & conventions. Creating			2
	script, Hiding the script, Variables. (Lecture,	4		
	Discussion, Practical)			
4.4	Expressions, Branching & Looping statements,			
	Functions, Arrays Objects, Events & Document	2		
	(Lecture, Discussion, Assignment, Presentation)			
4.5	Object Model - on Click, on Mouse Over, on	2		
	Submit, on Focus, on Change, on Blur, On Load,	2		2
	on Unload, Alerts, Prompts & Confirms (Lecture,			
	Discussion, Practical)			

Unit-5	Auxiliaries For Multimedia	L	Т	Р
5.1	Introduction of eBooks	4		2
	(Lecture, Discussion, Practical)			
5.2	eBook reading devices	2		2
	(Lecture, Discussion)			
5.3	e-book reader software	2		2
	(Lecture, Discussion)			

5.4	E Magazine and Journals	3	
	(Lecture, Discussion, Assignment)		
5.5	File formats for e publishing	2	4
	(Lecture, Discussion, Practical)		

- Study of Image editing techniques. 1.
- 2. Study and introduction to audio editing technique.
- 3. Study and introduction to video editing technique.
- 4. Creating a gif.
- Editing the cover of a book with HTML. 5.
- Study of file formats for publishing. 6.

Suggested Readings:-

- 1. Multimedia Technologies, Ashok Banerji
- 2. Multimedia: Making It Work,7/E Tay Vaughan

Altended Online 2000 (Ayan Tiwari (Umesh Upadhyay) (Dr.Asmita Khajanchi)

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(Dr.Babita Agrawal)
6 B.Tech.(PP) 3 6CCC-20: Technology of color separation

Theory	50	Practical	30	Internal	20	Credits	6
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COURSE OBJECTIVES

- 1. To understand basic theory of Color and visibility.
- 2. To learn original for color reproduction and color measurement.
- 3. To learn basic of color reproduction.
- 4. To learn planning for color work and color proofing.

- 1. To Analyze basic theory of color and visibility,
- 2. To perform the original form color reproduction and color measurement.
- 3. To analyze basic of color reproduction.
- 4. To assess basic of color correction.
- 5. To Rate planning for color work and color proofing.

Unit-1	Introduction to color and Visibility	L	Т	Р
1.1	Sources of Radiant energy	3		
	(Lecture, Discussion, Presentation)			
1.2	Structure of human eye with parts function, Factors affecting visibility (Lecture, Discussion, Presentation)	2		4
1.3	Optical Filters, Various reflecting materials ,Basic color theory (Lecture, Discussion, Presentation)	4		
1.4	Additive and subtractive colors, process colors, application of the color theory in color reproduction (Lecture, Discussion, Presentation)	2		2
1.5	Overview of color reproduction from original to printing. (Lecture, Discussion, Presentation)	3		2

Unit-2	Choosing a original for color Reproduction and color Measurement	L	Τ	Р
2.1	Exposure level, color balance, memory colors, contrast (Lecture, Discussion, Presentation)	3		4
2.2	Highlight retouched original, evaluation the transparency (Lecture, Discussion, Presentation)	2		2
2.3	Basic Concept of colorimetric analysis, The CIE system (Lecture, Discussion, Presentation)	3		2
2.4	Basic photometry concept and the standard photometric system	2		2

	(Lecture, Discussion, Presentation)	2	2
2.5	Visual matching procedures. (Lecture, Discussion, Presentation)		

Unit -3	Color Reproduction	L	Т	Р
3.1	Essential requirements of cameras, lens, illuminations filters (Lecture, Discussion, Presentation)	2		2
3.2	Half tone screen for color reproduction work Tone and color controls Gray scale and color control patches	4		2
3.3	The ink/paper/print interaction Measurement and control of color printing Using the densitometers and color pantone guide. (Lecture, Discussion, Presentation)	3		4
3.4	Color Separating methods -Basic principles of color separation Direct separation method (Lecture, Discussion, Presentation)	2		
3.5	Indirect color separation method procedure, Fake color separation method and procedures followed for making the black printer (Lecture, Discussion, Presentation)	3		

Unit-4	Color correction	L	Т	Р
4.1	Objectives of color correction; Hand correction, Purposes and procedure followed.	2		2
	(Lecture, Discussion, Presentation)			
4.2	Retouching techniques; correcting colors, tones	2		4
	and shades given inks and paper. (Lecture,			
	Discussion, Presentation)			
4.3	Dot etching, purposes and procedure, flat etching,	4		2
	staging and etching			
	(Lecture, Discussion, Presentation)			
4.4	Local reduction, blending; Masking; purposes of	2		
	masking types of masking			
	(Lecture, Discussion, Presentation)			2
4.5	Electronic color separation and correction.	3		
	(Lecture, Discussion, Presentation)	2		

Unit-5	Planning for color work & Color proofing	L	Т	Р
5.1	Introduction & Working of image	3		2
	capturing techniques of Scanners & Digital			
	camera.			
	(Lecture, Discussion, Presentation)	2		4
5.2	Press proofing methods and various pre-press			
	proofing systems			
	(Lecture, Discussion, Presentation)			
5.3	uses and limitations of prepress sheet Interpreting pre	2		2
	press proofs and predicting (Lecture, Discussion,			
	Presentation)			
5.4	Press results Control devices for proofing systems.	2		2
	(Lecture, Discussion, Presentation)			
5.5	Color appearance model			
	Visual response function and spectral properties of	4		
	pigments, Neural models, Line elements of color			
	space.			
	(Lecture, Discussion, Presentation)			

- 1. Preparation of own color control patches.
- 2. Preparation of Gray Scale.
- 3. Study of spectrophotometer curve.
- 4. Study of Color Correction methods and its need.
- 5. Study of Software for color separation.
- 6. Preparations of fake color separation
- 7. Preparations manual color separation
- 8. Study of electronic color separation.

- The Reproduction of Color in Photography, Printing & Television (4th) Fourth EditionHardcover – 1987 by <u>Dr. R. W. G. Hunt</u> (Author) Publisher: Fountain Press; Fourth Edition edition (1987)ASIN: B00I62HGNI
- Miles Southworth& Donna South worth :-Color Reproduction. Graphic Arts Publishing, 3.1 edition. ISBN 10: <u>1879847019</u> ISBN 13: <u>9781879847019</u>
- Handbook of Printing Processes (GATF publications) by <u>Deborah L</u> <u>Stevenson</u> (Author), <u>Charles Lucas</u> (Illustrator) ublisher: Graphic Arts Center Publishing Company (December 12, 2011) ISBN-10: 0883621649 ISBN-13: 978-0883621646
- Coor Science: Concepts and Methods, Quantitative Data and Formulae (Wiley Series in Pure and Applied Optics) Publisher: Wiley-Blackwell; 2nd Revised edition edition (25 August 2000) ISBN-10: 0471399183
- 5. The science of color(2nd Edition) *Edited by:Steven K. Shevell* ISBN: 978-0-444-51251-210: 1845696654 ISBN-13: 978-184569665

Allop 61,200 2/9/2020 Altended Outine (M.M.Isaad) (Ayan Tiwari) (Dr.Asmita Khajanchi) (Umesh Upadhyay) anta sure (Dr.P.Sasikala) 2020 2 (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

6 B.Tech(PP)4 6CCE-7: A.Metal and Glass Based Packaging

Theory80Practical00Internal20Credits6

COURSE OBJECTIVES

- 1. To understand metal container.
- 2. To study aluminum foil and composite tube
- 3. To study aerosol Can
- 4. To study G.I drum
- 5. To understand concept of glass.

COURSE OUTCOMES

- 1. To Evaluate metal container.
- 2. To Differentiate aluminum foil and collapsible tube
- 3. To Analyze aerosol can.
- 4. To Assess GI drum.
- 5. To Synthesis types of Glass.

Unit 1	Metal containers	L	Т	Р
1.1	Manufacturing of metal containers	2	2	
	(Lecture, Discussion, Presentation			
1.2	Metals for can making, Two and three piece cans			
	(Lecture, Discussion, Presentation	2	2	
1.3	Types of cans –DRD, DWI and DI, Can closures and			
	seaming	2	1	
	(Lecture, Discussion, Presentation			
1.4	Chemistry of Can coatings and its application in food			
	Packaging	2	1	
	(Lecture, Discussion, Presentation			
1.5	Advantages and disadvantages of container	2	2	
	packaging			
	(Lecture, Discussion, Presentation			

Unit 2	Aluminium Foils and collapsible tubes	L	Т	Р
2.1	Manufacturing of Aluminum Foil – Direct and indirect extrusion process (Lecture, Discussion, Presentation)	2	2	
2.2	Conventional and continuous casting, Properties of Aluminium foils, Coating and printing. (Lecture, Discussion, Presentation)	2	1	
2.3	Application in Packaging including Laminates and metallized films. Advantages and disadvantages of foil packaging. (Lecture, Discussion, Presentation)	2	1	

2.4	Manufacturing of Collapsible tube – Metals for Collapsible tube, impact extrusion process, Tube drawing, coatings and curing for collapsible packaging,.	2	2	
		2		
	(Lecture, Discussion, Presentation			
2.5	Printing process of collapsible tube, Testing for collapsible tube performance. Application of collapsible tube and Lamitube in packaging industry. Advantages and disadvantages of collapsible tube (Lecture, Discussion, Presentation)			

Unit 3	Aerosol cans	L	Т	Р
3.1	Manufacturing of Aerosol cans	2	1	
	(Lecture, Discussion, Presentation)			
3.2	Metals for Aerosol cans, Components of aerosols.	2	2	
	(Lecture, Discussion, Presentation)			
3.3	Working of aerosol cans, Filling in aerosol cans	2	2	
	(Lecture, Discussion, Presentation)			
3.4	Applications in various packaging industries.	2	1	
	(Lecture, Discussion, Presentation)			
3.5	Advantages and disadvantages of Aerosol cans	2	2	
	(Lecture, Discussion, Presentation)			

Unit 4	G.I. Drums	L	Т	Р
4.1	Manufacturing of G.I. Drums	2	2	
	(Lecture, Discussion, Presentation)			
4.2	Metals for G.I. Drums	2	2	
	(Lecture, Discussion, Presentation)			
4.3	Galvanization process	2	1	
	(Lecture, Discussion, Presentation)			
4.4	Coating in G.I Drums	2	1	
	(Lecture, Discussion, Presentation)			

4.5	Closures	for	G.I.Drums	Advantages	and	2	2	
	disadvanta	iges of	G.I. Drums					
	(Lecture, Discussion, Presentation)							

Unit 5	Glass	L	Τ	Р
5.1	Manufacture of Glass	2	1	
	(Lecture, Discussion, Presentation)			
5.2	Types of glass for commercial use (Lecture,	2	2	
	Discussion, Presentation)			
5.3	Application of Glass as packaging material (Lecture,	2	2	
	Discussion, Presentation)			
5.4	Printing on glass substrates	2	1	
	(Lecture, Discussion, Presentation)			
5.5	Advantages and disadvantages of Glass in packaging	2	2	
	industry			
	(Lecture, Discussion, Presentation)			

1. To Study procedure of Metals for can making.

2. Comparative study of design used for various metal and glass container.

3. To study aerosol can making Process.

4. To study of Manufacturing of G.I. Drums.

5. To study manufacture of Glass containers. Suggested Readings:-

1. Packaging design and performance- Frank

Paine.ISBN 10: 0902799274 ISBN 13: 9780902799271Publisher: Pira International, 1990

2. Packaging Technology: Fundamentals, Materials and Processes (Woodhead Publishing in Materials) Hardcover – by <u>Anne Emblem</u> (Editor)Publisher: Woodhead Publishing (29 October 2012) ISBN-10: 1845696654 ISBN-13: 978-184569665

Allended Online 20 (Dr.Asmita Khajanchi) (Umesh Upadhyay) (Dr.P.Sas (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

6 B.Tech(PP)4 6CCE-8: B.Plastic and Polymer Based Packaging

						0	<u> </u>	
Theory	80	Practical	00	Internal	20	Credits	6	
								_

COURSE OBJECTIVES

- 1. Introduction and knowledge of Polymerization and various Processing methods.
- 2. To Understand the Types of Polyethylene and polyethylene Manufacturing process 3. Explain The Introduction of Polypropylene and making process. 4. Describe The Introduction of PVC, Polystyrene
- 5. Interpret the Various plastic films.

- 1. Differentiate the various method of polymerization
- 2. Student are able to identify the substrate and also get knowledge of poly films making process
- 3. Describe the types of Polypropylene and Its manufacturing process.
- 4. To demonstrate the PVC and cushioning material properties and making process.
- 5. To recognize of various plastic film and its Properties.

Unit-1	Introduction Polymerization Techniques And	L	Т	Р
	Frocessing Michious			
1.1	Polymers In Packaging	2	1	
	(Lecture, Discussion, Assignment)	2	2	
1.2	Injection Moldings, Compression Molding, Blow	Z	Z	
	Molding			
	(Lecture, Discussion, Presentation)	2	2	
1.3	Co-Extrusion: Cast Film Co-Extrusion, Blow	2	2	
	Film Co-Extrusion Technique			
	(Lecture, Discussion, Presentation)			
1.4	Closures And Closure Liners, Multilayer Film	2	2	
	Manufacturing			
	(Lecture, Discussion, Assignment)			
1.5	Blister Packaging, Shrink And Stretch Wrapping,	2	1	
	Dry Bond And Wet Bond Adhesive Lamination.			
	(Lecture, Discussion, Practical)			

Unit-2	Polyethylene	L	Т	Р
2.1	LDPE: Manufacturing, and properties.	2	2	
	(Lecture, Discussion)			
2.2	LDPE conversion techniques,	2	1	
	packaging applications.			
	(Lecture, Discussion, Presentation)			
2.3	LLDPE: Manufacturing, properties packaging	2	1	
	Applications.			
	(Lecture, Discussion)			
2.4	HDPE: Manufacturing, properties and packaging	2	2	
	Applications.			
	(Lecture, Discussion, Presentation)			
2.5	PE -Material Handling and additives used.	2	2	
	(Lecture, Discussion)			

Unit -3	Polypropylene	L	Т	Р
3.1	Introduction of Polypropylene, Properties,	2	1	
	Applications in Printing & Packaging			
	(Lecture, Discussion)		2	
3.2	Copolymers of Polypropylene.	2		
	(Lecture, Discussion, Presentation, Assignment)	_		
3.3	BOPP : Properties, Application in Food	2	2	
	Packaging			
	(Lecture, Discussion, Presentation)			
3.4	Types Of BOPP Film, Met BOPP, Pearlized	2	2	
	BOPP film and Use in Various Application.			
	(Lecture, Discussion, Practical , Presentation)			
3.5	Polycarbonate: Introduction, Application in	2	1	
	Packaging.			
	(Lecture, Discussion, Practical, Assignment)			

Unit-4	PVC and Polystyrene	L	Т	Р
4.1	Properties, Grades, Processing: Injection	2	2	
	Molding, Extrusion, Sheet Forming, Applications	2	2	
	(Lecture, Discussion, Presentation)			
4.2	Pvc: Introduction, Properties, Applications	2	2	
4.2	(Lecture, Discussion, Assignment, Presentation)	-	_	
4.5	CoExtruction Applications (Lecture Discussion)			
	COExtrusion, Applications (Lecture, Discussion)	2	1	
4.4	Polyester: Introduction, Properties, Applications	C	1	
	(Lecture, Discussion, Presentation)	Z	1	

4.5	Types Of Polyester and their application In		
	Packaging		
	(Lecture, Discussion, Assignment)		

Unit-5	Miscellaneous Polymers and Testing	L	Т	Р
5.1	Expanded Polstyrene: Properties And	2	2	
	Applications, Plastic woven Sacks: Material, Method Construction Use			
	(Lecture, Discussion)			
5.2	Testing On Plastics: Introduction, Scope, And	2	1	
	Preparation Of Sample. (Lecture Discussion Presentation)			
	(Lecture, Discussion, Presentation)	2	2	
5.3	Testing On Plastics Solubility Test, Melting	Z	Δ.	
	Behavior, Approximate Density			
	(Lecture, Discussion, Presentation)			
5.4	Ignition Test, Dry Distillation Test, Chemical	2	1	
	Color Identification Test, Pyrolysis Test	2	1	
	(Lecture, Discussion, Presentation)			
5.5	Refractive Index, Basic Equipments, And Other	2	2	
	Testing Measures For Individual Plastics.	4		
	(Lecture, Discussion)			

- 1. Study of Various Polymers Used In Packaging Industry.
- 2. Study Various Polymerization Techniques.
- 3. Study Properties of Polymers and Their Selection Criteria For A Package.
- 4. Testing Methods of Various Polymers.
- 5. Detail Study of Miscellaneous Polymer.

- 1. Plastics: Materials and Processing", 3rd Ed, Strong A. B., Pearson-Prentice Hall, 2006.
- 2. Polymer Science", 1st Ed, Gowariker V. R., Viswanathan N. V., Sreedhar J, New Age International Publishers, 1986.
- 3. Plastics Packaging: Properties, Processing, Applications And Regulation, Selke, S. E. M., Culter, J. D., Hernandez, R. J, Carl Hanser Verlag, USA, 2004
- 4. Handbook Of Packaging Plastics', 1st Ed, Athalye A. S., Multi Tech Publishing Co., 1999.
- 5. The Wiley Encyclopedia of Packaging Technology", 3rd Ed, Yam K. L, Wiley, 2009.

2/9/2020 59,2020 Altended Online Alla 2020 (M.M.Isaad) (Ayan Tiwari) (Dr.Asmita Khajanchi) (Umesh Upadhyay) mita in 20 (Dr.P.Sasikala) 2020 (Dr.Babita Agrawal) 2 (Dr.Pawan Singh Malik)

6 B.Tech(PP)5 6SEC-4: Machine Design

COURSE OBJECTIVES

- 1. To explain the principle of stress and stress analysis.
- 2. To understand the technique of force transfer devices and tools
- 3. To get a knowledge of spring design and its working in various application 4. To understand the design of bearing and its problems.
- 5. To classify the types of gear and selection procedure of gear

- 1. To define the Principle of stress and its analysis.
- 2. Characterize the technique of force transfer devisees and working process. 3. Demonstrate the spring design and its use various application
- 4. Analysis the bearing problem and its design.
- 5. Categories the Gear system and selection process according application.

Unit 1	Stress Analysis	L	Т	Р
1.1	Type of stresses-stress strain diagram in tension- mechanical properties of materials, (Lecture, Discussion, Presentation)	2	1	
1.2	static stress equation in axial, bending and torsion	2		
	loadings (Lecture Discussion Presentation)			
1.3	criteria for failure, factor of safetycombination of normal and shear stresses (Lecture, Discussion,	1		
	Presentation)			
1.4	principal stresses, theories of failure,	1		
	variable loads, fatigue strength (Lecture, Discussion, Presentation)			
1.5	SN curves, sobererg and Goodman equations,	2		
	factors affecting fatigue limit (Lecture,			
	Discussion, Presentation)			

Unit 2	Design of Shafts	L	Т	Р
2.1	Forces on shafts due to gears (Lecture,	2		
	Discussion, Presentation)			
2.2	belts and chains	2		
	(Lecture, Discussion, Presentation)			
2.3	estimation of shaft size	2		
	(Lecture, Discussion, Presentation)			

2.4	Based on strength and critical speed (Lecture, Discussion Presentation)	1		
2.5	Selection of material	1	1	
	(Lecture, Discussion, Presentation)			

Unit 3	Design of Springs	L	Т	Р
3.1	Stresses and deflection	1		
	(Lecture, Discussion, Presentation)			
3.2	In round wire helical springs-accounting for	1	1	
	variable stresses		1	
	(Lecture, Discussion, Presentation)	2		
3.3	Concentric springs, design of helical and leaf			
	springs.	2		
	(Lecture, Discussion, Presentation)			
3.4	Design of helical and leaf springs. (Lecture,	2		
	Discussion, Presentation)			
3.5	leaf springs			
	(Lecture, Discussion, Presentation)			

Unit 4	Design of Bearings	L	Т	Р
4.1	Hydrodynamic theory, Summerfield number (Lecture Discussion Presentation)	2	1	
4.2	Dimensionlessparameters,Optimumjournal bearings, Design(Lecture, Discussion, Presentation)	1		
4.3	problems in journal bearings, Newer bearing materials (Lecture, Discussion, Presentation)	1		
4.4	Types of antifriction bearings, static and dynamic load capacity (Lecture, Discussion, Presentation)	2		
4.5	Cubic mean load, variable load, selection of antifriction bearings (Lecture, Discussion, Presentation)	2		

Unit 5	Design of Gears & Selection of V-Belts and Chains	L	Т	Р
5.1	Classification of gears, gear tooth terminology (Lecture, Discussion, Presentation)	2		

5.2	Base circle and pressure angle (Lecture,			
	Discussion, Presentation)	2	1	
5.3	Design procedure for spur, helical, bevel and worm			
	gears	2		
	(Lecture, Discussion, Presentation)			
5.4	Selection procedure for V belts and (Lecture,			
	Discussion, Presentation)	1		
5.5	Chains for given power and velocity ratio (Lecture,	1		
	Discussion, Presentation)			

- 1. Study of various controls, operation and mechanisms of
 - Cutting Machine
 - Folding Machine
 - Perfect Binding Machine
 - Wire Stitching Machine
 - Lamination Machine (Wet and Dry types)
 - Die-cutting and punching
- 2. Design of Bearings
- 3. Design of Gears & Selection of V-Belts and Chains
- 4. Designing and sketching of components contained in syllabus.

- 1. Faires, V.M., "Design of Machine Elements". The Macmillan Co., London.
- 2. Dobrovalskyet., "Machine Elements", MIR Publications, 1980.
- 3. Shigley, "Mechanical Engineering Design": McGraw Hill, 1992.
- 4. Faculty of Mechanical Engineering PSG College of Technology, "Design Data Hand Book", DAV Printers, Coimbatore, 1993.

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6 B.Tech(PP)6

OE-6: Project Management and Entrepreneurship Development

	Theory	40	Practical	00	Internal	10	Credits	3	
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COURSE OBJECTIVES

1. To understand the Entrepreneurship and management 2. To study about purpose and objectives of entrepreneurship.

- 3. To explain basic characteristics of entrepreneurs.
- 4. To get a knowledge of start-ups.
- 5. To study about analytical approach to project, planning and design so as to manage the new entrepreneurs.

- 1. Learn and explain basic is management and acquire basic entrepreneurship skills
- 2. Analyze the nature, purpose & objectives of a Project
- 3. Learn and build the qualities and characteristics of entrepreneurs.
- 4. Describe the importance of small scale industries in economic development
- 5. Students will be able to understand the project management, product planning, and project design and network analysis.

UNIT 1	Introduction	L	Т	Р
1.1	History and evolution	1	1	
	(Lecture, Discussion, Presentation)			
1.2	Need for entrepreneurship and self-employment		1	
	development.	1		
	(Lecture, Discussion, Presentation)			
1.3	Modern means of management			
	(Lecture, Discussion, Presentation)	1		
1.4	Design process- morphology of design, role of a			
	technocrat, trade cycle, production, consumption cycle,			
	industrial policies, design of an industrial project, stages of	2		
	development of the project (Lecture, Discussion,			
	Presentation)		1	
1.5	Preparation of the project report.	1		
	(Lecture, Discussion, Presentation)			

UNIT 2	Project Management	L	Т	Р
2.1	Concept, Nature, Development Scope, Planning.	1	1	
	(Lecture, Discussion, Presentation)			
2.2	Motivating, Controlling resources, Managing timeline			
	approaches, traditional approaches. (Lecture,	2		
	Discussion, Presentation)			
2.3	Organizing. critical chain project management, event chain	2	1	
	management	1		
	(Lecture, Discussion, Presentation)	1		

2.4	process based management, lean project management		
	(Lecture, Discussion, Presentation)		
2.5	Extreme project management		
	(Lecture, Discussion, Presentation)		

UNIT 3	Feasibility study	L	Τ	Р
3.1	Information and needs analysis. Translation into goals. (Lecture, Discussion, Presentation)	1	1	
3.2	Input/output analysis. (Lecture, Discussion, Presentation)	1	1	
3.3	Physical reliability, economic viability. (Lecture, Discussion, Presentation)	1	1	
3.4	Market survey, demand forecasting (Lecture, Discussion, Presentation)	1		
3.5	Predicting share in the market. (Lecture, Discussion, Presentation)	1	1	

UNIT 4	Product design and development	L	Т	Р
4.1	Physical reliability, functional aesthetic (Lecture,	1	1	
	Discussion, Presentation)			
4.2	production and economic cost aspects	1	1	
	(Lecture, Discussion, Presentation)			
4.3	Value analysis, product analysis and specifications.	1		
	(Lecture, Discussion, Presentation)			
4.4	Distribution: sales strategies, sales organization.	2		
	(Lecture, Discussion, Presentation)			
4.5	Distribution channels, after sales service.	2		
	(Lecture, Discussion, Presentation)			

UNIT 5	Financial and capital requirements	L	Т	Р
5.1	Price fixation, cash flow statement (Lecture, Discussion, Presentation)	1		
5.2	Return on investment, sources of finance (Lecture, Discussion, Presentation)	1	2	
5.3	Execution of project and commencement of production. (Lecture, Discussion, Presentation)	1		

5.4	Introduction to network analysis			
	(Lecture, Discussion, Presentation)	1	1	
5.5	Organizations and institutes promoting entrepreneurship in India. (Lecture, Discussion, Presentation)	2		

- 1. To study design process.
- 2. To study about the process of product design and development.
- 3. To study network analysis ex. Steps in PERT, CPM etc.

Suggested Readings:-

1. Principles of Management – P. C. Tripathi, P.N Reddy, McGraw Hill Education, 6th Edition, 2017. ISBN-13:978-93-5260-535-4. 2.

2. Entrepreneurship Development Small Business Enterprises- Poornima M Charantimath, Pearson Education 2008, ISBN 978-81-7758-260-4 3. Dynamics of Entrepreneurial Development and Management by Vasant Desai. HPH 2007, ISBN: 978-81-8488-801-2.

3. Essentials of Management: An International, Innovation and Leadership perspective by Harold Koontz, Heinz Weihrich McGraw Hill Education, 10th Edition 2016. ISBN- 978-93392-2286-4.

THE OTHOUGO OF Altended Online (Dr.Asmita Khajanchi) (Umesh Upadhyay) (Dr.P.Sasi (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

7 B.Tech(PP)1 7CCC-21: Technology of Web Offset

Theory 50 Practical 3	0 Internal	20	Credits	6		

COURSE OBJECTIVES

- 1. To understand and development and component of web offset presses.
- 2. To study of inking dampening and web control system.
- 3. To learn about plate, blanket and auxiliary equipment.
- 4. To study about folder.
- 5. To learn about inclined finishing.

- 1. To recognize the development and component of web offset presses.
- 2. To explain the inking dampening and web control system.
- 3. To perform on plate blanket and auxiliary equipment.
- 4. To describe about the type of folder and folder section.
- 5. To perform about inclined finishing.

Unit-1	Development and Components web offset presses	L	Т	Р
1.1	Full size and mini web presses	2		2
	(Lecture, Discussion, Presentation)			
1.2	Classification of web offset presses in terms of their			
	use in newspaper and magazine production in single	4		4
	and multicolor			
	(Lecture, Discussion, Presentation)			
1.3	Factors to be considered for selecting the press;	3		2
	Infeed, tension control Pre-conditioners	5		2
	(Lecture, Discussion, Presentation)			

1.4	Drier and chill rolls, folders, sheeters and winders,		
	Adjustment	2	
	(Lecture, Discussion, Presentation)		
1.5	Operation and maintenance of the major components	2	2
	(Lecture, Discussion, Presentation)		

Unit-2	Inking , dampening & web control systems	L	Т	Р	
2.1	Conventional and non-conventional	2		2	
	dampening systems.				
	(Lecture, Discussion, Presentation)				
2.2	UV inks and curing systems, Cause and remedies of				
	ink-related problems Properties and requirements of	4		2	
	heat set inks				
	(Lecture, Discussion, Presentation)				
2.3	Roll stands and automatic pasters, Detection of web	2		4	
	breaks and control of tension (Lecture, Discussion,			-	
	Presentation)				
2.4	Web Flutter, cause and correction of misregister Control	3			
	of fan out	5			
	(Lecture, Discussion, Presentation)	2		2	
2.5	Side lay, cut-off, web-to-web and ribbon				
	control.(Lecture, Discussion, Presentation)				

Unit -3	Plate ,Blanket &Auxiliary equipment	L	Т	Р
3.1	Various types of in-built and optional equipment availability for web-offset and their uses. (Lecture, Discussion, Presentation)	2		2
3.2	Equipment essentially needed for newspaper & magazine production (Lecture, Discussion, Presentation)	3		4
3.3	Plate and blankets: Various types used for weboffset their characteristics (Lecture, Discussion, Presentation)	3		4
3.4	Merits and demerits for specific work (Lecture, Discussion, Presentation)	2		
3.5	Cylinder pressures and Printing Make-ready (Lecture, Discussion, Presentation)	2		2

Unit-4	Folders	L	Т	Р
4.1	Introduction, folding principles, parts of	2		2
	folder(Lecture, Discussion, Presentation)			
4.2	combination folder, ribbon folder, double-former	3		2
	folder(Lecture, Discussion, Presentation)			

4.3	Chances of folding process of jaw fold, chopper fold	2	4
	mechanism.		
	(Lecture, Discussion, Presentation)		
4.4	Operation of collect cylinder, press folders double	3	
	former prefolder		
4.5	Flow folders, insert folders	3	2
	(Lecture, Discussion, Presentation)		

Unit-5	Inline finishing	L	Т	Р
5.1	Introduction, gluers, pesters wheels, remoisterable pattern gluers, segmented gluers, envelope pattern gluers, and backbone gluers. (Lecture, Discussion, Presentation) (Lecture, Discussion, Presentation)	4		2
5.2	Pattern perforating and numbering units-sheeters, variable rotary cutters. (Lecture, Discussion, Presentation)	2		
5.3	Auxiliary Equipments -Remote control console, Plate scanners, scanning densitometer, closed-loop system, web preconditioners, sheet cleaners, ink agitators, water coded ink oscillators, fountain solution recirculation systems, fountain solution	4		2
	mixers, refrigerating fountain solution, (Lecture, Discussion, Presentation)			
5.4	Automatic blanket washers, side lay sensors, web break defectors, re moisturizers-liquid applicator system, roller applicators systems (Lecture, Discussion, Presentation)	2		4
5.5	Antistatic devices, Imprinters, Perfectos, cutoff controls, stroboscope, synchro scope, countersDenex laser counter, stobb counter. (Lecture, Discussion, Presentation)	2		

Study multicolor job printing.

- 2. Study trouble shooting during printing.
- 3. Study of electronic panel.
- 4. Study of blanket and plate cylinder setting.
- 5. Study of dampening roller setting.
- 6. Study of ink roller setting.
- 7. Study of web-breaks.
- 8. Study of web folders. Suggested Readings:-
- 1. Web Offset Press Operating Hardcover by Graphic Arts Technical

<u>Foundation</u> (Corporate Author), <u>David B. Crouse</u> (Editor) Publisher: Graphic Arts Technical Fndtn; 4th edition (1 October 1996) ISBN-10: 0883621819 ISBN-13: 978-0883621813

- Hand Book Of Offset Printing Technology Paperback 2008 by <u>Eiri Board</u> (Author) Publisher: Engineers India Research Institute (2008)ISBN-10: 8186732829 ISBN-13: 978-8186732822
- 8186732823
- 3. The Complete book on Printing Technology by NIIR board Published by Asia Pacific Business press ISBN 81-7833-052-0

30 mi fendea 20 (M.M.Isaad) (Ayan Tiwari) (Dr.Asmita Khajanchi) (Umesh Upadhyay) 2020 (Dr.P.Sasikala 2 (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

7 B.Tech(PP)2 7CCC-22: Ink technology

Theory	50	Practical	30	Internal	20	Credits	6
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COURSE OBJECTIVES

- 1. This course is provide the knowledge of Ink Technology for various type of Printing Techniques
- 2. Explain the Various Ingredients of Ink and Its Properties.
- 3. To differentiate the types of Ink and quality control testing of ink.
- 4. Student will get knowledge Process of Ink Manufacturing.
- 5. Explain the some special inks and coating for different application.

- 1. Develop the knowledge of Ink and Its various properties.
- 2. Describe the various chemical and material use in Ink Manufacturing.
- 3. Students are able to perform quality control testing method and devices.
- 4. Develop the knowledge Ink Manufacturing machine, devices and process.
- 5. To explain the various type special coating and energy curing inks foe special printing.

Unit-1	Introduction To Ink Technology		Т	Р
1.1	Different Printing Processes and specifications of	2	2	
	Inks Used			
	(Lecture, Discussion, Presentation)			
1.2	Pigment Used in Printing – Organic , Inorganic	4		2
	,Metallic Compounds ,White, Black			
	(Lecture, Discussion, Presentation)			
1.3	Thixotropic, Length, Tack	2		2
	(Lecture, Discussion, Assignment)			
1.4	Emulsification: Water In Ink Emulsion and Ink in	3		2
	Water Emulsion.			
	(Lecture, Discussion, Practical)			
1.5	Ink Terminology Ph., Viscosity, Ink defects	2		
	(Lecture, Discussion, Assignment)			

Unit-2	Ingredients of Inks	L	Т	Р
2.1	Printing Ink Ingredients. State The Functions Of	2		
	The Ingredients			
	(Lecture, Discussion)			
2.2	Vehicles - Function & Types - Drying Vehicles,	4		2
	Non Drying Vehicles			
	(Lecture, Discussion, Presentation)			
2.3	Resins -Natural Resins, Synthetic Resins, Solvents	2		
	- Hydrocarbons, Aliphatic, Alcohols,			
	Wash Up Solvents			
	(Lecture, Discussion)			

2.4	Additives - Plasticizers, Waxes, Wetting Agents,		
		3	2
	Anti Set Off, Shortening Compounds, Reducers,		
	Stiffening Agents		
	(Lecture, Discussion)		
2.5	Driers - Liquid Driers, Paste Driers, Inhibitors,	4	2
	Accelerators, Extenders, Anti Oxidants, Waxes.		
	Oils- Vegetable Drying Oils, Semi Drying Oils,		
	Non Drying Oils.		
	(Lecture, Discussion, Presentation)		

Unit -3	Inks used for different Printing Processes &	L	Т	Р
	Testing			
3.1	Different Printing Inks. Ink Drying Methods.	2		2
	Offset Inks - General Formulation, Properties			
	;Gravure Inks - General Formulation, Properties			
	(Lecture, Discussion)			
3.2	Flexographic Inks - General Formulation,			2
	Properties, Screen Printing Inks –General	4		
	Formulation, Properties Specialty Inks - Toners,			
	Ink Jet Inks, Magnetic Inks, OCR Inks, Scratch			
	Off Inks, Water Washable Inks;			
	(Lecture, Discussion, Presentation, Assignment)			2
3.3	Q.C Tests- Viscosity, Heat- Sealing, Shade	2		
	Matching, Odor and Taste, Water and Bleed			
	Resistance			
	(Lecture, Discussion, Presentation)			
3.4	Ink Film Thickness, Light Fastness, Rub			
	Resistance Test, Crumpling Resistance Test,	4		2
	Grinding Control, Block Resistance, Color			
	Control,			
	(Lecture, Discussion, Practical, Presentation)			
3.5	Control of The Rheological Properties, Control	2		
	of Drying Time, Control of Various Specific	-		
	Properties.			
	(Lecture, Discussion, Practical, Assignment)			

Unit-4	Ink Manufacturing and Properties	L	Т	Р
4.1	Ink Manufacturing Process , Infer And End Use	3		
	Properties			
	(Lecture, Discussion, Presentation)			2
4.2	Manufacture – Mixing & Milling, Ball Mill, Pearl	3		
	Mill, Sand Mill, Bead Mill, Shot Mill.			
	(Lecture, Discussion, Assignment, Presentation)			

4.3	Trends And Developments In Ink Process; Paste Ink Manufacture :Mixing & Milling, Three Roll Mill (Lecture, Discussion)	2	2
4.4	End Use Properties : Rub And Scuff Resistance, Adhesion Flexibility Block Resistance, (Lecture, Discussion, Presentation)	2	2
4.5	Skid & Product Resistance, Light Fastness, Heat Seal Resistance, Lamination Tests; Optical Properties -Opacity, Gloss. (Lecture, Discussion, Assignment)	4	2

Unit-5	Energy – Curing Inks and Coatings	L	Т	Р
5.1	Energy Curing Ink System, Advantage or	2		2
	Disadvantage of Curing System			
	(Lecture, Discussion)			2
5.2	Types of System: Microwave, Infrared, UV	3		
	System.			
	(Lecture, Discussion, Presentation)			
5.2	Padiation Curing Inks Ink Cure Considerations			
5.5	Continues And Ingradients	4		2
	(Lecture Discussion Presentation)			
	(Lecture, Discussion, Presentation)			
5.4	Cationic Curing, Electron Beam Curing.	2		
	(Lecture, Discussion, Presentation)	2		
5.5	Curing and Coating Application for Various	4		
	Product And Future.	т		
	(Lecture, Discussion)			

- 1. Study of Different Samples of Inks.
- 2. Study Light Fastness Test.
- 3. Study Ink Tackiness Test And Rub Resistance.
- 4. Study Printed Samples of Different Printing Processes.
- 5. Study of Ink Viscosity Test In Paste & Liquid
- 6. Study of Introduction to Various Chemicals Used In Printing.
- 7. Study Various Properties Of Ink
- 8. Study Ingredients Of Ink

- The Printing Ink Manual: 4th Edition Paperback Import, 1 Mar 2012by Robert Leach (Author) Publisher: Springer; Soft Cover Reprint Of The Original 1st Ed. 1988 Edition (1 March 2012) ISBN-10: 1468469088ISBN-13: 978-1468469080
- 2. Complete Technology Book on Printing Ink Paperback Import, 2003 by NIIR

Board (Author) Publisher: Asia Pacific Business Press Inc. (2003) ISBN-10: 8178330482 ISBN-13: 978-8178330488

114045 01 210- $_{J}$ 1 67.3020 21912020 Hended Oul 2020 (M.M.Isaad) (Ayan Tiwari) (Dr.Asmita Khajanchi) (Umesh Upadhyay) 10 np (Dr.P.Sasikala) 020 2 (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

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7 B.Tech(PP)3 7CCC-23: Specialized Packaging

Theory 80 Practical	00	Internal	20	Credits	6
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COURSE OBJECTIVES

- 1. To Classify the Lamination Process and Its Application
- 2. Describe the Thermoforming Technology and also discussing about Strip and Stretch Packaging.
- 3. Explain the Wooden Packaging And Dei Cutting Process For Packaging
- 4. To Understand The Machine Of Caps and Closure and Testing Method.
- 5. Interpret The Latest Packaging Trends and New Innovation In Packaging.

- 1. Students are Able to Recognise Lamination Machinery Process and Its Types.
- 2. Define The Thermoforming Technology and Its Use In Pharmaceutical and Food Grade Industry
- 3. Demonstrate Of Wooden Packaging Application and Die Cutting Process For Corrugation.
- 4. Categorize the caps and closures and types of thread Explain The Recent and Upcoming 5. Analyze the Trends of Packaging and Also Enhance The Idea and Creativity of Packaging.

Unit-1	Lamination Process & Machineries	L	Т	Р
1.1	Principles And Process Of Lamination,	2	1	
	Application			
	(Lecture, Discussion, Presentation)			
1.2	Low Pressure Lamination, High Pressure	2	2	
	Lamination, Types Of Lamination Films (Lecture,			
	Discussion, Presentation)			
1.3	Special Effects :-Pattern, Interactive (Lecture,	2	2	
	Discussion, Assignment)			
1.4	Lamination Machine- Hot Lamination Process	2	1	
	Machine Functions And Use In Packaging			
	(Lecture, Discussion, Assignment)			
1.5	Cold Lamination Process ,Cold Lamination	2	2	
	Machine Process And Functions, Application			
	(Lecture, Discussion, Practical)			

Unit-2	Thermoforming	L	Т	Р
2.1	Introduction Of Thermoforming, Use In Packaging Industry.	2	2	
	(Lecture, Discussion)			
2.2	Types Of ThermoformingMatch MouldForming, Vacuum Forming, Pressure Forming.(Lecture, Discussion, Presentation)	2	1	

2.3	Shrink Wrap, Skin Pack, Blister Packing			
	Process, Wrapping Machines, (Lecture,			
	Discussion)	2	1	
2.4	Strip Packing, Stretch Packing, Pasting			
	Machine,	2	2	
	(Lecture, Discussion)			
		2	2	
2.5	Stitching Machine, Sealing Machine, Pouch			
	Sealing Packaging.			
	(Lecture, Discussion, Presentation)			

Unit -3	Wooden Containers & Die Cutting	L	Т	Р
3.1	Classification Of Wood Species Identification,	2	1	
	Quality Control In Wood			
	(Lecture, Discussion)			
3.2	Principles Of Construction Of Box And Crates,	2	2	
	Styles Of Box And Crates, Choice Of			
	Thickness, Width Of Planks, Battens ;			
	(Lecture, Discussion, Presentation, Assignment)			
3.3	Case Closures – Captive Screw Closures, Palm	2	2	
	Bolts, Strap Bolts			
	(Lecture, Discussion, Presentation)	2	1	
3.4	Wire Bound Boxes, Large Frame Wooden Cases,			
	Wooden Casks Instruments For			
	Strapping, Nailing	2	2	
	(Lecture, Discussion, Presentation)			
3.5	Die Cutting Processes: Cutting, Scoring,			
	Creasing, Bandings, Perforating, Punching,			
	Slitting Process, Bending, Cutting.			
	(Lecture, Discussion, Assignment)			

Unit-4	Packaging closures And Label Printing	L	Т	Р
4.1	Types of Packaging Closures, Peel able Seal lids (Lecture, Discussion)	2	2	
4.2	Temper Evidence, Testing & Performance (Lecture, Discussion)	2	1	
4.3	Machines Used In Making Caps And Closures Mill	2	2	
4.4	(Lecture, Discussion, Presentation)Trends In Label Type: Self Adhesive , Wet Glue, Specification, Printing Process, Future Trends (Lecture, Discussion, Presentation)	2	1	

4.5	Skid & Product Resistance, Light Fastness, Heat Seal Resistance, Lamination Tests: Optical	2	2	
	Properties -Opacity, Gloss. (Lecture, Discussion, Assignment)	2	2	

Unit-5	Packaging Trends	L	Т	Р
5.1	Innovative Packaging, properties of Packaging	2	1	
	:-Product, Size, Style, Shape			
	(Lecture, Discussion)			
5.2	Durability, Aroma, Specialty, Met Pack. (Lecture,	2	2	
	Discussion, Presentation)			
5.3	Indicative Packing, Show Through Packing	2	1	
	(Lecture, Discussion, Presentation)	2	2	
5.4	Interactive, Self Cooling & Heating Packaging	2	2	
	process and use			
	(Lecture, Discussion, Presentation)			
5.5	Braille Printed Packages. Oxygen Scavengers,	2	1	
	Ethylene Scavengers			
	(Lecture, Discussion)			

To study of Lamination Process.

- 2. To study Thermoforming Process.
- 3. To study of Wooden containers & die cutting
- 4. To study of closures for packaging. 5. To study recent Packaging Trends..

- 1. Advanced Thermoforming- Sven Engelmann , Publisher: Wiley; 1 edition (June 19, 2012), ISBN-10: 0470499206 ISBN-13: 978-0470499207
- Fundamentals of Packaging Technology-FOURTH EDITION, Walter Soroka, CPP-Publisher: Institute of Packaging Professionals; 4 edition (21 January 2010)- ISBN-10: 1930268289
- 3. Packaging Machinery Handbook: The complete guide to automated packaging machinery including packaging line design Paperback November 17, 2012. by John R Henry CPP (Author), ISBN-10: 1479274518 ISBN-13: 978-1479274512

...... 11 2/9/2020 59,200 Altended Oul (M.M.Isaad) (Ayan Tiwari) (Dr.Asmita Khajanchi) (Umesh Upadhyay) Inta in A.20 (Dr.P.Sasikala) 2 9 2020 (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

7 B.Tech(PP)4 7CCE-9:A. Machine Maintenance Management

Theory50Practical30Internal20Credits6								
	Theory	50	Practical	30	Internal	20	Credits	6

COURSE OBJECTIVES

- 1. To understand wear and tear in printing equipment and lubrication method
- 2. To learn about erecting and testing of various printing and packaging.
- 3. To understand problem and its rectification in printing machine.
- 4. To understand problem and its rectification in packaging machine.
- 5. To learn about maintenance management and procedure.

- 1. Students can understand wear and lubrication system in machinery.
- 2. Students can understand the erection, testing and commioning of printing and packaging machineries.
- 3. Students can analyze and understand problem identification and rectification in printing machines.
- 4. Students can analyze and understand problem identification and rectification in packaging machines.
- 5. Student can understand various maintenance policies and procedures in printing and packaging machines.

UNIT 1	Wear and tear in Printing and Packaging	L	Т	Р
	Equipment & Lubrication			
1.1	Wear, its types and causes,	2		2
	(Lecture, Discussion, Presentation)			
1.2	Effects and reduction methods	4		2
	(Lecture, Discussion, Presentation)			
1.3	Lubricants, their properties, types and functions	2		2
	(Lecture, Discussion, Presentation)			
1.4	Lubricating methods - Manual lubricating, Grease			
	and Oil lubrication	4		
	(Lecture, Discussion, Presentation)			
1.5	Central lubrication with return	2		2
	(Lecture, Discussion, Presentation)			

UNIT 2	Erecting and Testing	L	Т	Р
2.1	Equipment needed for erection (Lecture,	4		
	Discussion, Presentation)			
2.2	Selection of location and environmental condition	2		2
	(Lecture, Discussion, Presentation)			
2.3	Erection procedure for various	3		4
	printing and packaging machines			
	(Lecture, Discussion, Presentation)			

2.4	Loading and transport of raw materials and final product with respect to layout design (Lecture, Discussion, Presentation)	3	2
2.5	Commissioning	2	
	(Lecture, Discussion, Presentation		

UNIT 3	Problem identification and rectification in Printing Machines	L	Т	Р
3.1	Maintaining different types of Letterpress, Offset, Gravure & Flexography Machine,	2		4
	(Lecture, Discussion, Presentation)			
3.2	Principles of reconditioning, Roller copperising	3		2
	, rerubberising, ebonite covering, (Lecture,			
	Discussion, Presentation)			
3.3	Damping and inking systems,	4		2
	(Lecture, Discussion, Presentation)			
3.4	Paper transport systems and feeder head	2		
	(Lecture, Discussion, Presentation)			
3.5	Construction and maintenance of cylinder, bush	2		2
	and bearings			
	(Lecture, Discussion, Presentation)			

UNIT 4	Problem identification and rectification in	L	Т	Р
	Packaging Machines			
4.1	Identification & rectification of faults in Form, fill	2		4
	and sealing.			
	(Lecture, Discussion, Presentation)			
4.2	Labeling, conveyor	3		
	(Lecture, Discussion, Presentation)			
4.3	Capping, cartooning and corrugating machines,	2		
	(Lecture, Discussion, Presentation)			
4.4	Tamper-evident sealing, bag/pouch packaging,	3		2
	(Lecture, Discussion, Presentation)			
4.5	Liquid filling and powder filling problems and	4		2
	their rectification			
	(Lecture, Discussion, Presentation)			

UNIT 5	Maintenance procedures	L	Т	Р
5.1	Need and importance of maintenance - (Lecture,	3		
	Discussion, Presentation)			

5.2	Definition, principle, types and maintenance	2	2
	policies		
	(Lecture, Discussion, Presentation)		
5.3	Maintenance organization, maintenance of pumps,	3	4
	(Lecture, Discussion, Presentation)		
5.4	Compressors and motors	3	2
	(Lecture, Discussion, Presentation)		
5.5	Auxiliary systems in printing and packaging	2	2
	processes. (Lecture, Discussion, Presentation)		

- 1. Study various type of Lubrication System.
- 2. Study of procedure for erection of machine.
- 3. Study of maintenance of different printing machines.
- 4. Study of maintenance of different packaging machines.

5. Study of importance of maintenance. Study of various type of maintenance in the industry. **Suggested Readings:-**

- 1. Maintenance Engineering and Management by <u>Mishra R.C</u>, Prentice Hall India Learning Private Limited, ISBN-10: 8120345738, 2012
- 2. Offset Printing and Troubleshooting Practical Guide by <u>K. Goswami</u>, <u>All India Federation</u> of <u>Master Printers</u>, ISBN-10: 8192183807, 2011
- 3. TOTAL PRODUCTIVE MAINTENANCE TPM by K S Madhavan, Muthukumaran M, Shingo Institute of Japanese Management, ISBN-10: 8190671553, 2014
- 4. Plant Maintenance with SAP Practical Guide –by Karl Liebstuckel, SAP Press; 3rd New edition, ISBN-10: 1592299296, 2017
- 5. Principles of Machine Operation and Maintenance by Dick Jeffrey, Newnes; 1 edition, ISBN-10: 0750602937, 1991

(Dr.Asmita Khajanchi) (Umesh Upadhyay) (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

7 B.Tech(PP)4 7CCE-10:B. Industrial Plant and layout Design

Theory	80	Practical	00	Internal	20	Credits	6
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COURSE OBJECTIVES

1. To understand the site selection for organisation 2. To study about plant layout and factory layout design.

- 3. To explain of plant layout procedure and types of layout
- 4. To get a knowledge of types of construction and types of building.
- 5. To study about analytical approach and managing printing material resources.

- 1. To describe the site selection for plant or factory
- 2. To make a design of factory layout and plant layout 3. To describe about plant layout procedure and types of layout
- 4. To categories the types of construction of press building.
- 5. To analyze the analytical approach and management of printing material resources

UNIT 1	Site Selection	L	Т	Р
1.1	Strategic issues of location. The supply-distribution	2	2	
	system, dynamic nature of plant location. (Lecture,			
	Discussion, Presentation)			
1.2	Location strategy-factors influencing choice of	2	1	
	location. State regulations on location. (Lecture,			
	Discussion, Presentation)			
1.3	Backward areas and industrial policy. (Lecture,	2	1	
	Discussion, Presentation)			
1.4	Government policies for decentralization, industrial			
	estates, comparison of locations-urban v/s rural areas	2	2	
	advantages, sub-urban area. Economic survey of site			
	selection.			
	(Lecture, Discussion, Presentation)	2	2	
1.5	Case study			
	(Lecture, Discussion, Presentation)			

UNIT 2	Plant Layout	L	Т	Р
2.1	OBJECTIVES of good plant layout, principles of	2	2	
	plant layout, importance of plant layout (Lecture,			
	Discussion, Presentation)			

2.2	Types of plant layout -product layout or live layout -process layout or functional layoutcombination layout -static layout or fixed position layout, situations problem, factors influencing plant layout (Lecture, Discussion, Presentation) Methods of plant and factory layout-operation	2	1	
	process chart, flow process chart, flow diagrams, string diagrams, machine data cards, templates three dimensional models, correlation chart, travel chart, load path matrix method. (Lecture, Discussion, Presentation)	2	2	
2.4	Symptoms of bad layout. Flow pattern-line flow, L-type flow, circular flow, U-type flow, S or inverted S combination of U and line flow pattern. (Lecture, Discussion, Presentation)	2	1	
2.5	Characteristics and applications. Factors governing flow patterns: Combination of line flow and S-type of pattern. Combination of line flow and circular type. Processing upwards. Inclined flow. Workstation design, storage space requirements (Lecture, Discussion, Presentation)	2	2	

UNIT 3	Layout Procedure	L	Т	Р
3.1	Basic data, analysis, equipment and machinery required, select the material handling system, sketch plan of the plot for making factory building. (Lecture, Discussion, Presentation)	2	2	
3.2	Determine a general flow pattern, design the individual workstation. (Lecture, Discussion, Presentation)	2	1	
3.3	Assembly the individual layout into the total layout, (Lecture, Discussion, Presentation)	2	2	
3.4	Determination of storage space required, workflow diagrams in work stations and allocation of areas on plot plan, plan and locate service areas, make master layout. (Lecture Discussion Presentation)	2	1	
3.5	Checking final layout, official approval of the			
	final layout, installation. Case study (Lecture, Discussion, Presentation)	2	2	

UNIT 4	Press Building	L	Т	Р
4.1	Introduction, types of press building -single story building, high bay and monitor type buildings(Lecture, Discussion, Presentation)	2	2	
4.2	Multi-storey buildings, building of special types. Comparison between single storey and multi-story building. (Lecture, Discussion, Presentation)	2	1	
4.3	Types of construction of factory building Wood frame construction, brick construction, slow burning mill construction, steel frame construction (Lecture, Discussion, Presentation)	2	2	
4.4	Reinforced concrete construction, precast concrete construction. Specific parts of factory building-roof, walls. Floor factors affecting press building-nature. (Lecture, Discussion, Presentation)	2	2	
4.5	Manufacturing process-flexibility -expandability service facilities -employee facilities-lighting- heatingventilating-air conditioning-appearance-durable construction-security measures-noise control. (Lecture, Discussion, Presentation)	2	1	

UNIT 5	An Analytical approach:-	L	Т	Р
5.1	Heuristic and other methods of line balancing. Planer single facility location problems. Mini sum examples, insights for mini sum problem, mini sum location problem with distance. MLP with Euclidean distance. (Lecture, Discussion, Presentation)	2	2	
5.2	Managing Printers Materials Resources: Material management overview, duties, purchasing function, links with other areas, inspection and quality control, materials storage, materials identification and location, stock records, material handling equipment, training, stock and inventory control, waste materials, disposal, packing and dispatch. (Lecture, Discussion, Presentation)	2	1	
5.3	Materials Handling methods: Importance of material handling department. Receiving. Service roads and dock approaches. Dock doors. Dock levellers. (Lecture, Discussion, Presentation)	2	2	

5.4	Dock seals and shelters. Dock accessories. Dock			
	platforms. Operational procedures. Load platforms:	2	1	
	pallets Types: Stringer pallet. Block pallet. Materials			
	used to construct pallets. In-plant vehicles. Pallet truck.			
	Walkie stacker. Lift truck. Very-narrow-aisle lift			
	vehicles. (Lecture, Discussion, Presentation)			
5.5	Safety and training. Storage rack classification. Two			
	deep pallet storage racks. Drive-in/Drive-thru pallet			
	storage racks. Stacker racks. Cantilever storage racks.			
	Pallet flow racks. Mobile racks. Cranes, Conveyor	2	2	
	systems. Warehouse: Physical description Waste and			
	trash handling. (Lecture, Discussion, Presentation)			

To study of Site selection procedure.

- 2. To study about Plant Layout procedure.
- 3. To study printing press Plant layout structure.
- 4. To study process & product plant layout.
- 5. To study of Process Engineering

- 1. Francis R.L. and White J.A. (2000)"Facility layout and location" GATF, USA
- 2. Khanna O.P. (1996) "Industrial Engineering AND Management" Dhanpatraiand Sons, New Delhi
- 3. Mahajan M. (2001) "Industrial Engineering and Production Management" Dhanpatraiand Sons, New Delhi
- 4. Geis A.J. and Addy Paul L. (2000)"Materials handling for Printer"GATF, USA
- Facility Layout and Location: An Analytical Approach (Prentice-Hall International Series in Industrial & Systems Engineering) Paperback – Import, 1 Oct 1991 Richard L. Francis (Author), F. McGinnis Jr. (Author), John A. White (Author) Publisher: Pearson; 2 edition (1 October 1991) ISBN-10: 0132992310 ISBN-13: 978-0132992312
- Practical Plant Layout Hardcover Import, 1 Jan 1956 by <u>Richard Muther</u> (Author) Publisher: McGraw Hill Higher Education (1 January 1956) ISBN-10: 0070441561 ISBN-13: 978-0070441569
- 7.Industrial Engineering & Production Management Unbound 1 Jan 2012byMahajan (Author) ISBN-10: 8177000470 ISBN-13: 978-8177000474by
- Materials Handling for the Printer (Anglais) Broché décembre 1997de A. John Geis (Auteur), Paul L. Addy (Auteur) Editeur : Graphic Arts Technical Fndtn; Édition : LATEST EDITION (December 1997).
2/9/2020 61,2020 Alloy Altended Online 2020 (M.M.Isaad) (Ayan Tiwari) (Dr.Asmita Khajanchi) (Umesh Upadhyay) and wire 20 (Dr.P.Sasikala) 2020 (Dr.Babita Agrawal) 2 (Dr.Pawan Singh Malik)

7 B.Tech(PP)5 7SEC-5: Industrial Training

Theory 00 Flactical 40 Internal 10 Cledits 5
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- Industrial training (4 week during vacation) -80 contact hours workload is expected during training including the preparation and presentation time.40 hours are invested in training during vacation, remaining 40hrs-2hrs/ will be used for the rest of work.
- Guideline and evolution criteria for the industrial training will be decided by committee duly proposed by head of department.

7B.Tech(PP)6 OE-7: Recycling Technique & Waste Management

Theory 40 Practical 00 Internal 10 Credits	3	
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COURSE OBJECTIVES

- 1. The Aim of Syllabus is to introduce the types Of Waste.
- 2. To Understand E Waste Management And Nuclear Waste
- 3. Explain Recycling Technology And Management.
- 4. To Understand Plastic And Packaging Waste.
- 5. To Explain The New Trend Of Recycling And Opportunity In India.

- 1. To Identify The Type Waste Material And Resources.
- 2. Characterise The E Waste Management And Also Describe The Nuclear Waste.
- 3. Students Are Recognising The Types Of Plastic Waste And Its Effect On Environment.
- 4. Analyze The Plastic Waste Management And Recycling Process Of Plastic.
- 5. Generate A New Tends In Plastic Recycling and Analyze the Opportunity for Entrepreneur.

Unit-1	TYPES OF WASTE MATERIAL	L	Т	Р
1.1	Source and Types Waste :- Solid Waste, Liquid	1		
	waste			
	Lecture, Discussion, Presentation,			
1.2	Waste Generated from industries such as	2		
	Textiles, Tanneries, Pharmaceuticals			
	Lecture, Discussion, Presentation		1	
1.3	Electroplating Industries, Dairy, Sugar, Paper,	1		
	Distilleries			
	Lecture, Discussion, Assignment			
1.4	Steel Plants, Refineries, Fertilizer, Mining,	2		
	Lecture, Discussion, Assignment			
1.5	Thermal Power Plants, chemical, organic and	2		
	biological.			
	Lecture, Discussion, Practical			

Unit-2	E-WASTE And Nuclear Waste	L	Т	Р
2.1	Introduction, Toxicity Due To Hazardous Substances In E-Waste And	1		
	Their Impacts. Lecture, Discussion,			

2.2	Domestic E-Waste Disposal, E-Waste Management, Technologies For Recovery Of	2	1	
	Resource From Electronic Waste			
	Lecture, Discussion, Presentation	1		
2.3	Guidelines For Environmentally			
	Sound Management Of E-Waste.			
	Lecture, Discussion,			
2.4	Uranium Mining And Processing – Power	2		
	Reactors – Refinery And Fuel Fabrication Wastes			
	Occupational Lecture, Discussion, ,	2		
2.5	Environmental Health Perspectives Of Recycling			
	Nuclear In India.			
	Lecture, Discussion, Presentation,,			

Unit -3	Types Of Plastic & Packaging Waste And	\mathbf{L}	Т	Р
	Effect			
3.1	Waste Of Packaging Material ,Plastic Material,	1		
	Source Of Plastic Waste Lecture, Discussion			
3.2	Plastic Film Use And Properties:- PETE,			
	HDPE, PVC, LDPE	2		
	Lecture, Discussion, Presentation, Assignment			
3.3	PP, PS, BOPP Properties And Applica Source Of			
	Material Or Plastic And Packaging Waste.			
	.Lecture, Discussion, Presentation	2		
3.4	Industrial Waste Plastic. Pharmaceutical Waste			
	Lecture, Discussion, Practical , Presentation		1	
3.5	Single Use Plastic Waste. Economic Effect and	1		
	Environmental Effect Of Plastic or Packaging			
	Material	2		
	Lecture, Discussion, Practical, Assignment			

Unit-4	Management Of Plastic Waste And Recycling Method	L	Т	Р
4.1	4R Concept (Reductions, Reuse , Recycling And	1	1	
	Recovery			
	Lecture, Discussion, Presentation			
4.2	Flow or Life Cycle of Plastic Waste Lecture,	2		
	Discussion,	-		
4.3	Introduction of Recycling, Process Advantage	2		
	and Disadvantage Method, Lecture, Discussion,	1		
	Presentation			
4.4	Primary Recycling Method, Secondary Recycling	2		
	Method Lecture, Discussion,			
	Presentation			

4.5	Tertiary Recycling Method and Analysis of Various Method. Select Suitable Method	
	According Plastic Waste.	

Unit-5	New Trend In Recycling And Opportunities	L	Т	Р
5.1	New Trends And Technology For Plastic Waste Recycling. Smart City Plastic Waste Recycling Process Lecture, Discussion,	2		
5.2	Making Fuel Or Energy Resources And House Hold Items With Use Of Plastic Lecture, Discussion, Presentation	2		
5.3	Indore And Madhya Pradesh Waste Management And Plastic Recycling Technique Lecture, Discussion, Presentation	1	1	
5.4	Introduction Of Biodegradable Plastic ,Lecture, Discussion, Presentation	2		
5.5	Entrepreneurship Opportunities In Recycling Or Plastic Waste In India. Lecture, Discussion	1		

Practical/Projects/Assignments:-

- 1. To study of categorized the Waste Material and Resources
- 2. To study of management of E-waste and Controlling
- 3. To Study of various type of plastic & plastic Film waste
- 4. To study of recycling management for Plastic films or material
- 5. To study of new recycling process for plastic material.
- 6. Future opportunities for young entrepreneur.

Text & Reference books and E-Resource

- The Complete Technology Book On E-Waste Recycling (Printed Circuit Board, LCD, Cell Phone, Battery, Computers) Hardcover – 2015 by <u>NPCS Board of Consultants &</u> <u>Engineers</u> (Author)
- 2. <u>http://cbs.teriin.org/pdf/Waste_Management_Handbook.pdf</u>
- 3. SOLD AND HAZARDOUS WASTE MANAGEMENT (PB 2017) Paperback 2017 by CHEERY PM (Author) ISBN-13: 978-8123928302
- Waste Management and Resource Efficiency: Proceedings of 6th IconSWM 2016 Hardcover – Import, 22 Sep 2018 by Sadhan Kumar Ghosh (Editor) ISBN-13: 9789811072895

5. Integrated Solid Waste Mgmt Paperback – 28 Apr 2014 by Tchobanoglous (Author) ISBN-10: 9339205243 ISBN-13: 978-9339205249

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8 B.Tech(PP)1 8CCC-24: Binding and Finishing Technology

COURSE OBJECTIVES

- 1. To understand the technology of Binding.
- 2. Explain the Adhesives and their application
- 3. Describe the various methods of folding and securing.
- 4. To evaluate and understand finishing operations associated.
- 5. Explain the binding and finishing machines.

- 1. Describe the technology of binding and also acquire knowledge of binding and related terms
- 2. Student will be able to select type of adhesives to be used for a particular project.
- 3. Student will ground the folding and imposition scheme used.
- 4. To describe the types of finishing operations done on the product.
- 5. Student will have an understanding of advancements in the folding techniques via machines.

Unit-1	Introduction to the Bindery and Related	L	Т	Р
	Terms			
1.1	Bindery In The New Millennium, Latest	4		
	Developments in Print Finishing. Importance of			
	Book Binding. Growths Factors In Print			
	Finishing.			
	(Lecture, Discussion, Presentation)			
1.2	Organization and Workshop Layout. (Lecture,	2		
	Discussion, Presentation)	2		4
1.3	Book Binding Tools- Forwarding Tools, Finishing	3		4
	Tools.			
	(Lecture, Discussion, Presentation)	_		
1.4	Binding Room Equipment's- Laying Press,	3		2
	Standing Press, Sewing Frame, Glue Pot, and			
	Board Cutting.			
	(Lecture, Discussion, Presentation)	2		2
1.5	Book Binders Materials & Quality Control.			
	British Standard Paper Sizes. International Paper			
	Sizes. Ra & Sra Sizes. Advantages of Iso Paper			
	Sizes. Board - Kinds of Boards.			
	(Lecture, Discussion)			

Unit-2	Adhesives and Ancillary Material	L	Т	Р
2.1	Adhesives- Factors Governing The Choice Of	3		
Adhesives	Adnesives.	2		

	(Lecture, Discussion, Presentation)		
2.2	Principles and Theories of Adhesion. (Lecture,		
	Discussion, Presentation)		
2.3	Use of Adhesives In Print Finishing (Lecture,	2	2
	Discussion)		
2.4	Types of Adhesives ex. Solvent Based Adhesives,		
	Water Based Adhesives, Pressure Sensitive	4	4
	Adhesives.		
	(Lecture, Discussion, , Presentation)		
2.5	Reinforcing Materials. Securing	3	2
	Materials, Covering Materials,	5	2
	Miscellaneous Material. (Lecture, Discussion,		
	Presentation)		

Unit -3	Methods Of Folding and Securing	L T			
3.1	Hand Folding- Folding To Paper, Folding To Print, Lump Folding, Puckering, Advantages & Limitations of Hand Folding. (Discussion, Presentation)	2		4	
3.2	Machine Folding - Knife Principles, Buckle Principle, Combination of Knife & Buckle. Folding & Machine Direction. Lecture, (Discussion, Presentation, Assignment)	3		2	
3.3	Advancements & Developments on Folding Machine (Lecture, Discussion, Presentation)	2			
3.4	Securing Methods: Wire Stitching - Saddle Stitching, Side Stitching, Stabbing. (Lecture, Discussion, Presentation)	3		4	
3.5	Thread Sewing Adhesive Binding/Perfect Binding - Advantages. (Lecture, Discussion, Assignment)	2		2	

Unit-4	Finishing Processes	L	Т	Р
4.1	Print Finishing Operations - Embossing & Debossing, Blind Embossing, Gold Blocking /Foil Stamping. Ultra Violet Curing & Infra-Red Curing. (Lecture, Discussion, Presentation)	4		2
4.2	Die Printing. Thermography, Velvet Printing, Marbling, Varnishing, (Lecture, Discussion, Assignment, Presentation)	3		2

4.3	Graining, Laminating, Gumming, Gluing, Punching, Perforating, And Drilling. .(Lecture, Discussion)	3	
4.4	Edge Decoration - Requirement, Colouring The Edges, Marbling Edges, Edge Guilding. Round	3	2
	Corner Cutting. Lecture, Discussion, (Assignment, Presentation)		
4.5	Numbering - Folio Numbering, Double Numbering, Duplicate Numbering. Principle of Rotary Numbering. Skip Numbering, Automatic Numbering. Kind of Indexes. (Lecture, Discussion, Assignment)	2	

Unit-5	Binding & Finishing Machines	L	Т	Р
5.1	Study of Various Modern Machines. Modern Guillotines - Single Knife Guillotines. Three Knife Trimmers. Box Waste Disposal Process. (Lecture, Discussion)	4		4
5.2	Gold Blocking/Foil Stamping M/c. Wire Stitching M/c. Straw Board Cutter. (Lecture Discussion, Presentation)	3		2
5.3	Laminating M/c - Small Laminating M/c. Pouch Laminating M/c. Tunnel Laminating M/c. Tipping M/c. Smashing M/c. Back Gluing M/c. (Lecture, Discussion, Presentation)	2		2
5.4	Knife Grinding M/c. Roller Gliding M/c. Inline Rounding M/c. Lining M/c. Modern Lining M/c. Cloth Cutting M/c. Foil Blocking M/c. Rotary Blocking M/c. Casing In M/c. Case Making M/c. (Lecture, Discussion, Presentation)	3		
5.5	Box & Carton Manufacturing Process. Adhesive binding machine. (Lecture ,Discussion, Presentation)	2		

Practical/Projects/Assignments:-

- 1. Preparation of Mechanical binding Spiral wire binding, Wire 'O' binding, Ring binding.
- Preparation of files of following designs Loose leaf file single piece, loose leaf file Two piece tab binder, loose leaf guard file - Boards joined with spine strip, Court case file, Portfolio - Closed file to keep confidential loose sheets.
- 3. Preparation of telephone directory with Indexes and Tabs.
- 4. Study of various controls, operations and mechanisms of the following machines: Folding machine, Guillotine machine, Cutter and Creaser, Varnishing machine, laminating machine.
- 5. Print finishing operation to be conducted, Gold blocking, Embossing, Edge decoration, 6. Thermography, Marbling, Velvet printing, Rubber printing, die printing, Pouch lamination.

7. Book Printing (Flush Cut/ Extra squires)

- 1 Book Binding- John Mason
- 2. Binding and Finishing- Ralph Lyman
- 3. Finishing Processes in Printing- A. G. Martin

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8 B.Tech(PP)2 8CCC-25: Estimating and Costing

COURS OBJECTIVES

- 1. This course provides basic knowledge of printers costing and estimating
- 2. Students will gain a thorough grounding on direct and indirect cost
- 3. They will gain a thorough grounding on paper and Ink estimation
- 4. They will gain a thorough grounding estimation of binding material
- 5. Understanding on costing and estimating helps student to aid in budgetary control

- 1. To Analyse cost system and outline the difference between Cost and Budgetary control
- 2. To Explain and Utilize Budget to promote sales
- 3. To describe Cost incurred during machine operations
- 4. To perform Estimate incurred of Paper and Inks consumption
- 5. To Assess Estimate incurred during process of Binding

Unit-1	Cost Accountancy	L	Т	Р
1.1	Understanding Cost And Need Of Accountancy	2	2	
	(Lecture, Presentation)			
1.2	A Review of Costing Systems (Lecture,	2	2	
	Presentation)			
1.3	Relationship Between Cost Control & Budgetary	2	1	
	Control			
	(Lecture, Discussion)			
1.4	Marginal Costing	2	1	
	(Lecture, Discussion)	_		
1.5	Profit Analysis	2	2	
	(Lecture, Discussion)			

Unit-2	Budgeting	L	Т	Р
2.1	Types of budgets (Lecture)	2	1	
2.2	Budgetary control (Lecture, Discussion)	2	2	
2.3	Budgetary control as an aid to management (Lecture, Assignment)	2	2	
2.4	Preparing sales forecasts (Lecture)	2	1	
2.5	Budgets for printing & allied organizations (Lecture, Presentation)	2	2	

Unit -3	Costing	L	Т	Р
3.1	Classification of costs(Fixed and variable cost) in printing its need and procedures	2	2	
	(Lecture, Discussion)			
3.2	Work Docket and Costing direct materials (Lecture, Discussion)	2	2	
3.3	Costing of machine operations (Lecture,	2	1	
	Presentation)	2 2	1	
3.4	Costing of manual operations (Lecture)		2	
3.5	Procedures for preparing estimates & submitting quotations (Lecture, Presentation)			

Unit-4	Estimating papers and Inks	L	Т	Р
4.1	Selection of papers	2	1	
	(Lecture, Presentation)	2	1	
4.2	allowance for wastage	2	1	
	(Lecture)	2	2	
4.3	allowance for trimming, weight of loose sheets	2	2	
	(Lecture, Assignment)	2	2	
4.4	weight of reel of papers	2	2	
	(Lecture, Assignment)			
4.5	Inks consumption formula, Ink allowance for			
	spoilage.			
	(Lecture, Assignment)			

Unit-5	Estimating binding materials	L	Т	Р
5.1	Board requirement	2	1	
	(Lecture, Assignment)	2	2	
5.2	covering materials	2	2	
	(Lecture)	2	2	
5.3	Estimating sewing thread		1	
	(Lecture)	2	1	
5.4	estimating wire	2	2	
	(Lecture)			
5.5	Estimating adhesives			
	(Lecture, Assignment)			

Practical/Projects/Assignments:

Study the importance of Costing & estimating in industry by live examples such as

1. Ink consumption

- 2. Material consumption
- 3. Preparation of job sheet
- 4. Power consumption
- 5. Break even analysis

- 1. "Cost Accounting for Printers", Part I and II, British Printing Industries Federation, 1982.
- 2. Vohra, N.D., "Quantitative Techniques in Management", Tata McGraw Hill Publishing Company Limited 1990.
- 3. Battacharya, S.K. AND John Dearden, "Accounting for Management, Text & Cases", Vikas Publishing Home Pvt. Ltd., New Delhi, 1990.
- 4. Venkataraman, K.S. &Balaraman, K.S., "Estimating Method and Cost analysis for Printers". Ramya Features & Publications, 1987.
- 5. Mendiratta, B.D., "Printer's Costing & Estimating", Printing India Publications, Pvt. Ltd., 1999.
- 6. Hugh, M. Peirs, "Print Estimators, the Handbook", BPIF, 1996 Vikas Publishing Home Pvt. Ltd., New Delhi (1990).
- Printing Estimating: Costing Methods for Digital and Traditional Graphic Imaging (Graphic Comm (Non-Software)) by Philip k. Ruggles 25 Apr 1996 ISBN-10: 0827364393 ISBN-13: 978-0827364394
- 8. A Text Book of Estimating and Costing- M. A. Aziz Zoberi Publisher Zoberi Publisher, 1967 ISBN-10: 082733805 ISBN-13: 978-0827338050

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8 B.Tech(PP)3 8CCC-26: Major Project

Theory 00 Pr	ractical 80	Internal	20	Credits	6
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COURSE OBJECTIVES

- 1. To develop the ability to explore ideation of design.
- 2. To understand the technical aspects of design selected.
- 3. To develop a structural and graphical model with the use of appropriate software.
- 4. To explore and acquire skills of material science and moulding technique for assembling.
- 5. To test for the successful completion of the working model prepared.

Project time /man hours

Student is required to do a project and submit a project based on the work done by him/her during the project period.

The B.Tech (P.P) Project would be approximately 90 man-hours (in a span of 15 week and carries a total of 100 mark (80 Ext 20IA) i.e. Credit-6

Project would be based on syllabus or application area of the subject learned.

Number of student in project group will not be more than ten.

Synopsis of the project would be submitted within the first 15 day of duration to the date assigned by respective faculty members.

Project report should be submitted 15 day before the final exam for evaluation.

Project development:

Project work shall be evaluated in two major criteria

The product

The process

I. The Product

The final product developed during the project work should be innovative need based where

- 1 The product developed should have a meaningful contribution in Printing and Packaging and or Packaging like a. Working model
 - b. Printed Product design/Development
 - c. Package design and Development.

II. The Process

The process shall be evaluated in the following areas:

- 1 Application 2.Clarity in Need Identification/OBJECTIVES (Converting this into Idea)
- 3. Idea how to implement/Evidence for each idea 4. Reduce manpower 5. Reduce wastage
- 6.Increase /Improve production 7.Design
- 9. Validation/performance
- 7.Design8.Development10. Ability to defend the ideas through questioning.

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8 B.Tech.(PP)4 8CCE-11: A.Digital & Advanced Printing Processes

Theory	80	Practical	00	Internal	20	Credits	6
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COURSE OBJECTIVES

- 1. To study digital document. And color management.
- 2. To learn about principle of AM and FM screening.
- 3. To understand the concept of Inkjet and Thermal printing.
- 4. To study 3D printing.
- 5. To understand advance printing technique.

- 1. To Describe principle of color management and digital file formats used.
- 2. To Analyze concepts of AM and FM screening.
- 3. To Generated total concept of inkjet and thermal transfer printing.
- 4. To Analyze and describe 3D printing.
- 5. To Describe advance printing technique.

Unit-1	Digital Documents and Color Management	L	Т	Р
1.1	Introduction and formats used ex. TIFF, EPS JPEG files	2	2	
	text files and post description languages (Lecture,			
	Assignment)			
1.2	Digitization and Half toning (Lecture,	2	1	
	Assignment)			
1.3	Rendering Type line Art and images.			
	Color management	2	1	
	(Lecture, Presentation)			
1.4	Acquiring: Scanning of different original (Lecture,			
	Presentation)	2	2	
1.5	Introduction, Defining on demand Defining Digital			
	Printing. Defining variable printing (Lecture,	2	2	
	Assignment)			

Unit-2	Introduction to Security printing	L	Т	Р
2.1	Introduction to the security printing and examples.	2	2	
	(Lecture, Discussion, Presentation)			
2.2	Spot patterns Graininess or noise			
	(Lecture, Discussion, Presentation)	2	2	
2.3	Combining AM and FM screening, Screen angles,			
	Spot size, Claimed benefits for FM screening	2	1	
	(Lecture, Discussion, Presentation)			
2.4	Rosettes and moiré patterns			
	(Lecture, Discussion, Presentation)	2	1	
2.5	RFID and Hologram printing			
		2	2	

Unit-3	Ink Jet and Thermal Transfer	L	Т	Р
3.1	Inkjet: Study and working principle, construction. (Lecture, Discussion, Presentation)	2	2	
3.2	Application and classification or types of ink jet digital printing system (Discussion, Presentation)	2	2	
3.3	ThermalTransfer:Study ofworkingprinciple, construction, application(Lecture, Discussion, Presentation)	2	1	
3.4	classification or types of thermal transfer digital printing system (Discussion, Presentation)	2	1	
3.5	Study of required properties of substrates used in ink jet and thermal transfer digital printing system. (Discussion)			

Unit -4	Advance Printing and Graphic Production-2	L	Т	Р
4.1	Laser printing technique and principle (Lecture,	2	1	
	Discussion, Presentation)			
4.2	Risography	2	2	
	(Discussion, Presentation)			
4.3	Dye sublimation Printing	2	2	
	(Discussion, Presentation)			
4.4	Pad Printing Technique and application (Lecture,	2	1	
	Discussion, Presentation)			
4.5	Hydro transfer printing	2		
	(Lecture, Discussion, Presentation)			

Unit-5	Advance Printing and Graphic Production-2	L	Τ	Р
5.1	3D printing and its application.	2	2	
	(Lecture, Discussion, Presentation)			
5.2	Abrasive Blasting and Water jet cutting (Lecture,	2	2	
	Discussion, Presentation)			
5.3	Laser and Vinyl cutting	2	2	
	(Discussion, Presentation)			

5.4	Nano printing and recent engineering trends in printing	2	1	
	and packaging.			
	(Lecture, Presentation)			
5.5	Hybrid printing processes and system.	2	1	
	(Lecture, Discussion, Presentation)			

Practical/Projects/Assignments:-

- 1. Study of Different files Format and their creation.
- 2. Study of Color Calibration & Measurement System.
- 3. Study about AM & FM Screening
- 4. Study & practicing of customized and variable data printing.
- 5. Study of Inkjet Printing & application.
- 6. Study of 3D Printing & software tools.
- 7. Study of Thermal Printing Technology.

Suggested Readings:-

1. Digital Printing On demand Printing- Howard M. Fen ten, Frank J. Romano, Publisher: Printing Industries Press; 2 edition (March 1997)

Beginning Design for 3D Printing Paperback – Import, 9 Oct 2015by Joe
Micallef (Author) Publisher: Apress; 1st ed. edition (9 October 2015) ISBN-10: 1484209478
ISBN-13: 978-1484209479

- 3. Graphics and Packaging Production-Thompson Rob Publisher-Thames and Hudson ISBN 9780500289884
- A Guide of Graphic ART Production by <u>Kaj Johansson</u> (Author), <u>Peter Lundberg</u> (Author), <u>Robert Ryberg</u> (Author, Publisher: Wiley; 3 edition (November 1, 2011)ISBN-10: 0470907924,ISBN-13: 978-0470907924.

5. Introduction to Security Printing Book by Richard D warner (Publisher -Graphic Arts Center Publishing Company 2005-07-30. ISBN-10 : 0883623757 ISBN-13 : 9780883623756

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8 B.Tech.(PP)4 8CCE-12: B.Printed Electronics

Theory	80	Practical	00	Internal	20	Credits	6

COURSE OBJECTIVES

- 1. To provide an overview of the emerging field including its underlying principles, challenges and opportunities
- 2. Students will understand material used for printing electronics output
- 3. They will gain a thorough grounding on surface preparation so as to print perfectly on the material used
- 4. They will gain a thorough grounding on printing technique for PE
- 5. To develop understanding of PE future and environment prospect

- 1. To explain the printed electronics and related terms
- 2. To classify and compare material for printable electronic
- 3. To analyze surface preparation for printed electronics
- 4. To describe and apply the concept of printing for printed electronics
- 5. To Assess End products of printed electronics

Unit-1	Introduction	L	Т	Р
1.1	Printed electronics	2	2	
	(Lecture)			
1.2	Printing technology for electronics manufacturing	2	1	
	(Lecture)			
1.3	PE technology and their benefits (Lecture,	2	1	
	Presentation)			
1.4	products used for PE	2	2	
	(Lecture, Presentation)			
1.5	Advantages of PE	2	2	
	(Lecture)			

Unit-2	Organic & Inorganic printable electronic materials	L	Т	Р
2.1	Organic conductive material(History, Polymer used)	2	1	
	(Lecture, Presentation)			
2.2	printed organic and polymer semiconductors (Lecture,	2	2	
	Presentation)			
2.3	other printable organic materials (Lecture,	2	1	
	Presentation)			
2.4	Inorganic printable electronic materials- Introduction	2	2	
	(Lecture, Presentation)			
2.5	Metallic materials and processing transparent oxide,	2	2	
	single wall carbon nanotube, grapheme etc.			
	(Lecture, Presentation)			

Unit -3	Pre & Post printing Process	L	Т	Р
3.1	Pattern Design	2	2	
	(Lecture, Presentation)			
3.2	modification of surface energy (Lecture,	2	1	
	Discussion)	2	2	
3.3	surface coating (Lecture,	2	2	
	Discussion)	2	1	
3.4	Embossing and Nano imprinting	_	-	
	(Lecture, Discussion, Presentation)	2	2	
3.5	Post process Sintering. UV curing and annealing			
	(Lecture, Discussion)			

Unit-4	Printing process and equipment's	L	Т	Р
4.1	Introduction	2	2	
	(Lecture, Discussion)			
4.2	Inkjet printing	2	2	
	(Lecture, Discussion, Presentation)			
4.3	Aerosol printing	2	2	
	(Lecture, Discussion, Presentation)			
4.4	Direct printing process with advantages and	2	1	
	disadvantages			
	(Lecture, Presentation)			
4.5	Indirect printing process with their advantages and	2	1	
	disadvantages			
	(Lecture, Presentation)			

Unit-5	Applications and Future prospects of Printed	L	Т	Р
	electronics			
5.1	Introduction	2	2	
	(Lecture)			
5.2	Application areas at different field such as Organic	2	2	
	photovoltaic, flexible display, organic lighting,			
	Electronics and components, Integrated smart systems			
	etc.			
	(Lecture, Discussion, Presentation)			
5.3	Challenges for printed electronics-Materials, printing	2		
	process and equipment's Encapsulation (Lecture,			
	Discussion, Presentation)	2	1	
5.4	Design methodology and Standardization			
	(Lecture, Discussion, Presentation)			

5.5	Future prospects of Printed electronics and	2	1	
	environment concern			
	(Lecture, Discussion)		2	

Practical/Projects/Assignments:

- 1. To study Inkjet in Electronics printing.
- 2. To study and understand organic & inorganic materials used in Electronic Printing.
- 3. To study and understand Futuristic potential printed electronics.
- 4. To study Pre & Post printing process.
- 5. To study of applications and future prospects of Printed electronics.

- 1. Printed Electronics: Materials, Technologies and Applications by Zheng cui Publisher: Wiley; 1 edition (September 26, 2016) ISBN-10: 1118920929
- Applications of Organic and Printed Electronics: A Technology-Enabled Revolution by Eugenio Cantatore Publisher: Springer; 2013 edition (September 19, 2012) ISBN10: 146143159

110 0 114045 01 2.2 Allended Oul 200 (Umesh Upadhyay) (Dr.Asmita Khajanchi) (Dr.P.Sasil (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

8 B.Tech(PP)5 8SEC-6: Instrumentation and Process Control for Printing and Packaging Machines

Theory 40 Practical 00 Internal 10 Credits 3

COURSE OBJECTIVES

- 1. Understand Measurement system
- 2. Analyze Control system
- 3. Learn Process to control system
- 4. Understand the concept of controllers
- 5. Understand the PLC

- 1. To generate clear understanding of fundamentals of basic measuring devices.
- 2. To provide details of data gathering, processing and computing for printing and packaging machinery
- 3. To make students familiar with the various methods of process control for packaging instruments
- 4. To realize students the need of controller modes and designs
- 5. To make aware of Programmable Logic Controller and embedded system

Unit-1	Measurement	L	Т	Р
1.1	Introduction to the concept of measurement.,	1	1	
	(Lecture, Presentation)			
1.2	Basic characteristics of a measuring device	2		
	(Lecture, Presentation)			
1.3	Block diagram of measuring system, error and	2		
	its types			
	(Lecture, Discussion)			
1.4	Transducers: Need of transducer, definition,	1		
	classification (Lecture)			
1.5	selection criteria Quantities to be measured:	2		
	sensors and their comparison with transducers			
	(Presentation)			

Unit-2	Control System Dynamics	L	Т	Р
2.1	Introduction to control engineering, , classification of control systems (Lecture)	1	1	
2.2	Concept of stability and causality, Role of a control engineer, , Block diagram of basic control system (Lecture, Presentation)	2		

2.3	Test input signals, Time domain response: Transient response specifications and Steady state error for various input signals (Lecture)	2	
2.4	frequency domain specifications, hydraulic system, pneumatic system (Lecture, Discussion)	1	
2.5	control system components: AC and DC servomotor, stepper motor (Lecture, Presentation)	2	

Unit -3	Process control	L	Т	Р
3.1	Block diagram of Process control, Process characteristics (Presentation)	1		
3.2	Control system parameters, role of a controller (Lecture)	2		
3.3	Controller modes: Discontinuous: Two position, multiposition, floating, (Discussion, Presentation)	2	1	
3.4	Continuous and Composite: Proportional, Integral (Lecture, Discussion)	1		
3.5	Block diagram of final control operation (Lecture, Discussion)	2		

Unit-4	Controller design	L	Т	Р
4.1	Concept to electronic controller	1		
	(Lecture)			
4.2	use of OP-AMP in controllers (Lecture,			
	Discussion)	2		
4.3	continuous controller modes using OP-AMP and			
	derivations for final outputs	1		
	(Lecture, Discussion)		1	
4.4	Composite modes using OP-AMP (Lecture,	2		
	Presentation)			
4.5	Derivations for final outputs with examples for	2		
	each mode			
	(Lecture, Presentation)			

Unit-5	Programmable logic controller	L	Т	Р
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5.1	Concept of relay logic	1		
	(Presentation)			
5.2	introduction to ladder diagram and its elements,	2		
	illustration of ladder diagram with examples			
	(Discussion, Presentation)			
5.3	introduction to PLC, advantages of PLC over	2		
	relay logic (Lecture)		1	
		1	1	
5.4	introduction to DAS, data logger (Lecture,			
	Discussion, Presentation)	1		
5.5	SCADA Application of PLC in pad printing			
	machine PLC controlled automatic packaging	1		
	machine			
	(Lecture, Presentation)			

Practical/Projects/Assignments:

- 1. C.S. Rangan, G.R. Sarma, "Instrumentation devices and systems" TMH.
- 2. A.K.Sawhney, "Electronic and Electrical measurements and instrumentation", DhanpatRai and CO.
- 3. H.S.Kalsi, "Electronic Instrumentation", TMH
- 4. Johnson, "Process Control Instrumentation Technology", Pearson Education 5. Norman.S.Nise, "Control Systems Engineering", Wiley Publications **8B.Tech(PP)6**

19/2020 Allended Online (Dr.Asmita Khajanchi) (Umesh Upadhyay) (Dr.P.Sasi (Dr.Babita Agrawal) (Dr.Pawan Singh Malik)

OE-8: AUGMENTED REALITY

COURSE OBJECTIVES

- 1. Learn what augmented reality is
- 2. To Explain The New Trend Of Recycling And Opportunity In India.
- 3. To understand the tools required for AR creation
- 4. Discover it's possible uses in various domains
- 5. Learn to create an augmented reality for a given scenario

- 1. Understand the AR Concepts.
- 2. Handle the AR tool
- 3. Building and designing of AR
- 4. Apply augmented reality on various application
- 5. Create augmented reality on their own.

Unit-1	INTRODUCTION	L	Т	Р
1.1	History of Augmented Reality (AR), , Mixed	1		
	Reality (MR), QR codes, Experience AR with samples			
	(Lecture, Discussion, Presentation)			
1.2	Virtual reality Vs Augmented Reality (Lecture,	1		
	Discussion, Presentation)		1	
1.3	Mixed Reality (MR)	2		
	(Lecture, Discussion, Assignment)			
1.4	QR codes	2		
	(Lecture, Discussion, Assignment)			
1.5	Experience AR with samples (Lecture,	2		
	Discussion, Practical)			

Unit-2	AR TOOLS, DEVICES, IMAGES AND VIDEOS	L	Т	Р
2.1	AR browsers (Lecture, Discussion)	1		

2.2	Creating AR images	2		
	(Lecture, Discussion, Presentation)		1	
2.3	Creating AR videos (Lecture,	1		
	Discussion)			
2.4	Devices for AR	2		
	(Lecture, Discussion)			
2.5	Augmented reality packaging as marketing-tools	2		
	(Lecture, Discussion, Presentation)			

Unit -3	BUILDING AN AR	L	Т	Р
3.1	AR system architecture.	1		
	(Lecture, Discussion)			
3.2	Creating images and interactive videos	2		
	(Lecture, Discussion, Presentation, Assignment)			
3.3	Mapping images and videos to form AR	2		
	(Lecture, Discussion, Presentation)			
3.4	Installing on hand-held devices such as smart	1		
	phones and tablets		1	
	(Lecture, Discussion, Presentation)			
3.5	Installing in browser or as application.	2		
	(Lecture, Discussion)			

Unit-4	DESIGN AR FOR SPECIFIC SCENARIOS	L	Т	Р
4.1	Augmenting a book.	1	1	
	(Lecture, Discussion, Presentation)	2		
4.2	Augmenting a city map, (Lecture,	2		
	Discussion)	2		
4.3	Augmenting flyers and visiting card (Lecture,			
	Discussion, Presentation)	I		
4.4	Augmenting a package for a commercial product	2		
	(Lecture, Discussion, Presentation)			
4.5	Movie poster, and newspaper advertisement			
	(Lecture, Discussion, Assignment)			
4.5	Movie poster, and newspaper advertisement (Lecture, Discussion, Assignment)			

Unit-5	APPLICATIONS OF AR	L	Т	Р
5.1	AR in education. (Lecture, Discussion)	2		
5.2	AR in advertising. (Lecture, Discussion, Presentation)	2		

5.3	AR in Packaging and news.			
	(Lecture, Discussion, Presentation)	1	1	
5.4	AR in marketing, gaming, movies, sports, and		1	
	travel	2		
	(Lecture, Discussion, Presentation)			
5.5	Recent trends and research perspective of AR			
	(Lecture, Discussion)	1		

Text & Reference books and E-Resource

- 1. http://www.wikitude.com/
- 2. http://educationar.wikispaces.com/
- 3. http://futurestories.ca/toronto/
- 4. http://www.multinationalunited.com/training/
- 5. http://www.layar.com/
- 6. https://web.cs.wpi.edu/~gogo/courses/cs525A/papers.shtml
- 7. http://augmented-reality-in-education.wikispaces.com/
- 8. https://www.aircards.co/blog/augmented-reality-print-examples
- 9. https://www.wikitude.com/blog-augmented-reality-product-packaging-asmarketingtools/
- 10. https://medium.com/better-marketing/5-ways-you-can-use-augmented-realitytocreate-engaging-packaging-ee8c874ccc88

2/9/2020 Altended Outine. (M.M.Isaad) (Umesh Upadhyay) (Dr.Asmita Khajanchi)

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