



Avinashilingam Institute for Home Science and Higher Education for Women
(Deemed to be University under Category 'A' by MHRD, Estd. u/s 3 of UGC Act 1956)
Re-accredited with 'A+' Grade by NAAC. Recognised by UGC Under Section 12 B
Coimbatore - 641 043, Tamil Nadu, India

School of Engineering
B.E. Printing Technology

Programme Specific Outcomes:

PSO1: To facilitate students with technology, along hands-on experience in print and allied skill that will enable them to enter any vertical of Print-Pack Industry.

PSO2: To provide students with engineering experience side by side with human values, environmental and societal concerns.

Scheme of Instruction & Examination
(For students admitted from 2018-2019 & onwards)

Part	Course Code	Name of Course/component	Hours of Instruction/week		Scheme of Examination				
			Theory	Tutorial/ Practical	Duration of exam	CIA	CE	Total	Credit
First Semester									
II		Basic Sciences (BS)							
	18BESM01	Algebra and Calculus	3	1/0	3	50	50	100	4
	18BESP01	Engineering Physics	3	1/0	3	50	50	100	4
	18BESP02	Physics Practicals	-	0/3	3	50	50	100	1.5
III		Core Courses Engineering Sciences (ES)							
	18BEES01	Basic Electrical Engineering (ECE)	3	1/0	3	50	50	100	4
	18BEES02	Engineering Graphics	1	0/4	3	50	50	100	3
	18BEES03	Basic Electrical Engineering Practicals (ECE)	-	0/2	3	50	50	100	1
IV		Non Credit Mandatory Courses (NCMC)							
	18BEMC01	Environmental Science	3	-	2	100	-	100	Remark
	18BENSS1	NSS-I				100	-	100	Remark
Second Semester									
I		Humanities and Social Sciences (HS)							
	18BEHS01	English	2	0/2	3	50	50	100	3
II		Basic Sciences (BS)							
	18BESM02	Laplace Transforms and Complex Variables	3	1/0	3	50	50	100	4
	18BESC01	Engineering Chemistry	3	1/0	3	50	50	100	4
	18BESC02	Chemistry Practicals	-	0/3	3	50	50	100	1.5
III		Core Courses Engineering Sciences (ES)							
	18BEES04	Programming for Problem Solving (CSE)	3	1/0	3	50	50	100	4
	18BEES05	Workshop Practicals	1	0/4	3	50	50	100	3
	18BEES06	Programming for Problem Solving Practicals (CSE)	-	0/2	3	50	50	100	1
IV		Non Credit Mandatory Courses (NCMC)							
	18BEMC02	Constitution of India	3	-	2	100	-	100	Remark
	18BENSS2	NSS – II				100	-	100	Remark

Part	Course Code	Name of Course/component	Hours of Instruction/week		Scheme of Examination				
			Theory	Tutorial/Practical	Duration of exam	CIA	CE	Total	Credit
Third Semester									
I		Humanities and Social Sciences (HS)							
	18BEHS05	Human Values and Professional Ethics	3	-	3	50	50	100	3
II		Basic Sciences (BS)							
	18BESM04	Applied Statistics (S&H)	3	1/0	3	50	50	100	4
III		Core Courses Engineering Sciences (ES)							
	18BEPS01	Strength of Materials (Civil)	3	-	3	50	50	100	3
	18BEPS02	Electrical Technology (ECE)	3	-	3	50	50	100	3
	18BEPS03	Electrical Engineering Practicals (ECE)	-	0/3	3	50	50	100	1.5
III		Professional Core (PC)							
	18BEPC01	Printing Processes	3	-	3	50	50	100	3
	18BEPC02	Colour Reproduction	3	1/0	3	50	50	100	4
	18BEPC03	Image Design and Editing Practicals	-	0/3	3	50	50	100	1.5
IV		Non Credit Mandatory Courses (NCMC)							
	18BEMC03	Consumer Affairs	3	-	2	100	-	100	Remark
	18BEPV01	Value Added Course				100	-	100	Remark
	18BENSS3	NSS – III				100	-	100	Remark
Fourth Semester									
II		Basic Sciences (BS)							
	18BESM07	Computer Aided Numerical Methods (S&H)	3	1/0	3	50	50	100	4
III		Core Courses Engineering Sciences (ES)							
	18BEPS04	Fundamentals of Printing Machine Elements(FPPT)	3	-	3	50	50	100	3
	18BEPS05	Basic Electronics for Printers(ECE)	3	-	3	50	50	100	3
III		Core Courses Professional Core (PC)							
	18BEPC04	Printing Substrates	3	-	3	50	50	100	3
	18BEPC05	Offset Technology	3	1/0	3	50	50	100	4
	18BEPC06	Colour Management	3	1/0	3	50	50	100	4
	18BEPC07	Book Publishing Practicals	-	0/3	3	50	50	100	1.5
	18BEPC08	Offset Practicals	-	0/3	3	50	50	100	1.5
IV		Non Credit Mandatory Courses (NCMC)							
	18BECS01	Communication Skills	-	-	2	100	-	100	Remark
	18BENSS4	NSS – IV				100	-	100	Remark
6 to 8 weeks Industrial Internship during summer vacation*									

Part	Course Code	Name of Course/component	Hours of		Scheme of Examination				
			Instruction /week		Duration of exam	CIA	CE	Total	Credits
			Theory	Tutorial/ Practical					
Fifth Semester									
III		Core Courses Professional Core (PC)							
	18BEPC09	Quality Control Technology	3	-	3	50	50	100	3
	18BEPC10	Flexographic and Gravure Printing	4	-	3	50	50	100	4
	18BEPC11	Printing Inks and Chemicals	3	1/0	3	50	50	100	4
	18BEPC12	Digital Printing	2	1/0	3	50	50	100	3
	18BEPC13	Packaging Technology	2	1/0	3	50	50	100	3
	18BEPC14	FMCG Practicals	-	0/3	3	50	50	100	1.5
	18BEPC15	Quality Control Practicals	-	0/3	3	50	50	100	1.5
III		Professional Electives (PE)							
		Elective-I (PE1/PE2)	3	-	3	50	50	100	3
IV		Non Credit Mandatory Courses (NCMC)							
	18BESS01	Soft Skills	3	-	2	10 0	-	100	Remark
	18BENSS5	NSS-V				10 0	-	100	Remark
Sixth Semester									
III		Core Courses Professional Core (PC)							
	18BEPC16	Print and Publishing	4	-	3	50	50	100	4
	18BEPC17	Print Finishing and Converting	3	0/2	3	50	50	100	4
	18BEPC18	Package Designing	3	1/0	3	50	50	100	4
	18BEPC19	Publishing Practicals	-	0/3	3	50	50	100	1.5
	18BEPC20	Package Design Practicals	-	0/3	3	50	50	100	1.5
	18BEPC21	Mini Project	-	0/4	-	10 0	-	100	2
III		Professional Electives (PE)							
		Elective – II (PE1/PE2)	3	-	3	50	50	100	3
III		Open Elective (OE)							
	18BEVO01/ 18BEOO01/ 18BELO01/ 18BEFO01/ 18BEBO01	Open Elective – I	3	-	3	50	50	100	3
IVw		Non Credit Mandatory Courses (NCMC)							
		Co-curricular Course		-	2	10 0	-	100	Remark
	18BENSS6	NSS- VI				10 0	-	100	Remark
6 to 8 weeks Industrial Internship during summer vacation*									

Part	Course Code	Name of Course/component	Instruction /week		Scheme of Examination				
			Theory	Tutorial/ Practical	Duration of exam	CIA	CE	Total	Credits
Seventh Semester									
I		Humanities and Social Sciences (HS)							
	18BEHS13	Industrial Engineering	3	-	3	50	50	100	3
III		Core Courses Professional Core (PC)							
	18BEPC22	Cross Media Publishing	3	0/2	3	50	50	100	4
	18BEPC23	Industrial Internship*	-	-	-	10 0	-	100	1
	18BEPC24	Project Work I	-	0/4	-	10 0	-	100	2
III		Professional Electives (PE)							
		Elective – III (PE1/PE2)	3	-	3	50	50	100	3
		Elective – IV (PE1/PE2)	3	-	3	50	50	100	3
		Elective – V (PE1/PE2)	3	-	3	50	50	100	3
III		Open Elective (OE)							
	18BEVO02/ 18BEOO02/ 18BELO02/ 18BEFO02/ 18BEBO02	Open Elective – II	3	-	3	50	50	100	3
IV		Non Credit Mandatory Courses (NCMC)							
	18BEMC04	Disaster Management	3	-	2	10 0	-	100	Remark
	18BEMP01	Printing Technology - Computer Based Test (CBT)	-	-	2	10 0	-	100	Remark
Eighth Semester									
III		Core Courses Professional Core (PC)							
	18BEPC25	Project Work II & Dissertation	-	0/20	-	10 0	10 0	200	10
	18BEPC26	Seminar	1	-	1	10 0	-	100	1
III		Professional Electives (PE)							
		Elective – VI (PE1/PE2)	3	-	3	50	50	100	3
III		Open Electives (OE)							
	18BEVO03/ 18BEOO03/ 18BELO03/ 18BEFO03/ 18BEPO03	Open Elective – III	3	-	3	50	50	100	3
	18BEVO04/ 18BEOO04/ 18BELO04/ 18BEFO04/ 18BEBO04	Open Elective – IV	3	-	3	50	50	100	3

18BEPMC1	#MOOC					10	100	2
							Total Credits	175

Semester	Course Code	Name of Course/component	Hours of Instruction/ week/Course	Credit/ Course
Part – IV Non-Credit Mandatory Courses (NCMC)				
A. Ability Enhancement Courses				
1. Ability Enhancement Compulsory Courses(AECC)				
1	18BEMC01	Environmental Science	3	Remark
2	18BEMC02	Constitution of India	3	
3	18BEMC03	Consumer Affairs	3	
4	18BECS01	Communication Skills	3	
5	18BESS01	Soft Skills	3	
7	18BEMC04	Disaster Management	3	
7	18BEMP01	Printing Technology-Computer Based Test (CBT)	-	
II. Skill Enhancement Courses (SEC)				
3		Value Added Course (from a basket of choices offered)	40 hrs. duration	Remark
6		Co-Curricular Courses Add on Certificate/ Quantitative Aptitude / Certificate Courses – Gandhian Studies / Women’s Studies / Ambedkar Studies / GK / Verbal and Non-Verbal Reasoning/ others as per list	Varied duration	
C. Extra-Curricular Courses (ECC)				
1-6	18BENCC1-6/ 18BENSS1-6/ 18BXSP01-6	NCC/NSS/Sports (Representing the Institute)	-	Remark

Total credits required to earn the degree

Part I, II & III components: 175 and successful completion of Part IV - Non-Credit Mandatory Courses

***6 to 8 weeks Industry Internship during 4th and /or 6th semester summer vacation**

Other courses offered by the Department

Value Added Course – 18BEPV01 Screen Printing

#Any one course by MOOC from Swayam (NPTEL)

S.No	Course Code	Course Title
1.	18BEPMC1	MOOC (Title of the course completed with certificate)

PROFESSIONAL ELECTIVES (PE1) Printing Technology domain

<i>Part</i>	<i>Subject Code</i>	<i>Name of Course/component</i>	<i>Instruction periods/week</i>		<i>Scheme of Examination</i>				
			<i>Theory</i>	<i>Tutorial/ Practical</i>	<i>Duration of exam</i>	<i>CIA</i>	<i>CE</i>	<i>Total</i>	<i>Credits</i>
III	18BEPE01	Screen and Textile Printing	3	-	3	50	50	100	3
	18BEPE02	Financial Management for Printing	3	-	3	50	50	100	3
	18BEPE03	Surface Preparation	3	-	3	50	50	100	3
	18BEPE04	Packaging Materials	3	-	3	50	50	100	3
	18BEPE05	Customized Printing	3	-	3	50	50	100	3
	18BEPE06	Digital Pre-Press and Printing	3	-	3	50	50	100	3
	18BEPE07	Scheduling and Planning for Print Production	3	-	3	50	50	100	3
	18BEPE08	Advertising Techniques	3	-	3	50	50	100	3
	18BEPE09	Specialty and Security Printing	3	-	3	50	50	100	3
	18BEPE10	Print Plant and Layout Design	3	-	3	50	50	100	3
	18BEPE11	Printing Machine Maintenance	3	-	3	50	50	100	3
	18BEPE12	TQM for Graphic Art Industry	3	-	3	50	50	100	3
	18BEPE13	Cost Estimation for Printers	3	-	3	50	50	100	3

PROFESSIONAL ELECTIVES (PE2) Allied Printing Technology domain

<i>Part</i>	<i>Subject Code</i>	<i>Name of Course/component</i>	<i>Instruction periods/week</i>		<i>Scheme of Examination</i>				
			<i>Theory</i>	<i>Tutorial/ Practical</i>	<i>Duration of exam</i>	<i>CIA</i>	<i>CE</i>	<i>Total</i>	<i>Credits</i>
III	18BEPE21	Visual Programming	3	-	3	50	50	100	3
	18BEPE22	Microprocessor and Microcontroller	3	-	3	50	50	100	3
	18BEPE23	Multimedia for E-Publishing	3	-	3	50	50	100	3
	18BEPE24	Web Technology	3	-	3	50	50	100	3
	18BEPE25	Image Processing	3	-	3	50	50	100	3
	18BEPE26	MIS for Graphic Art Industry	3	-	3	50	50	100	3
	18BEPE27	Digital Media Management	3	-	3	50	50	100	3
	18BEPE28	Nano Technology	3	-	3	50	50	100	3
	18BEPE29	3D Printing	3	-	3	50	50	100	3
	18BEPE30	Printed Electronics	3	-	3	50	50	100	3
	18BEPE31	Augmented Reality	3	-	3	50	50	100	3
	18BEPE32	Employability skills	3	-	3	50	50	100	3
	18BEPE33	Entrepreneurship Development	3	-	3	50	50	100	3

Open Electives offered by the Department

Part	Course Code	Name of Course/component	Instruction periods/week		Scheme of Examination				
			Theory	Tutorial/ Practical	Duration of exam	CI A	CE	Total	Credits
III	18BEPO01	Multimedia Development	3	-	3	50	50	100	3
	18BEPO02	Augmented Reality Concepts	3	-	3	50	50	100	3
	18BEPO03	3D Printing Methods	3	-	3	50	50	100	3
	18BEPO04	Cross-Media Publishing Techniques	3	-	3	50	50	100	3

HUMAN VALUES AND PROFESSIONAL ETHICS

Semester III
18BEHS05

Instruction Hours/ week: 3 T
No. of Credits: 3

OBJECTIVES:

- To enable the students to create an awareness on Engineering Ethics and Human Values, to instill Moral and Social Values and Loyalty and to appreciate the rights of others.

UNIT I HUMAN VALUES

9

Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time– Cooperation – Commitment – Empathy – Self-confidence – Character – Spirituality.

UNIT II ENGINEERING ETHICS

9

Senses of ‘Engineering Ethics’ – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg’s theory – Gilligan’s theory – Consensus and Controversy – Models of professional roles - Theories about right action – Self-interest – Customs and Religion – Uses of Ethical Theories

UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION

9

Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law – The Challenger Case Study

UNIT IV SAFETY, RESPONSIBILITIES AND RIGHTS

9

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk – The Three Mile Island and Chernobyl Case Studies Collegiality and Loyalty – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination

UNIT V GLOBAL ISSUES

9

Multinational Corporations –Environmental Ethics – Computer Ethics –Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership – Sample Code of Conduct

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, students are able to

CO1:To apply ethics in society

CO2:To discuss the ethical issues related to engineering

CO3: Analyse the engineering ethics

CO4: Realize the responsibilities and rights in the society

CO5: Impart the global issues

REFERENCES:

1. Mike W. Martin and Roland Schinzinger, “Ethics in Engineering”, Tata McGraw Hill, New Delhi, 2003. 99
1. Charles B. Fleddermann, “Engineering Ethics”, Pearson Prentice Hall, New Jersey, 2004.
2. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, “Engineering Ethics – Concepts and Cases”, Thompson Wadsworth, A Division of Thomson Learning Inc., United States, 2000
3. John R Boatright, “Ethics and the Conduct of Business”, Pearson Education, New Delhi, 2003
4. Edmund G Seebauer and Robert L Barry, “Fundamentals of Ethics for Scientists and Engineers”, Oxford University Press, Oxford, 2001

WEB SOURCES:

1. www.onlineethics.org
2. www.nspe.org
3. www.gloalethics.org
4. www.ethics.org

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	M	L				H		H	M	M		M	H	
CO2	M	H				M	H	M		M		M	M	
CO3	M					M	H	M		M		M	M	
CO4	M						M	H	M	H		M	M	
CO5	M					M	M	H		H		M	M	

APPLIED STATISTICS

Semester III
18BESM04

Instruction Hours/ week: 3 T+1Tu
No. of Credits: 4

OBJECTIVE:

- To understand the concepts of statistical inference and to apply the statistical tools in real world problems

UNIT I STATISTICAL CONCEPTS

(9+3)

Measures of dispersion, correlation analysis – rank correlation – correlation of bi-variate data - regression analysis - Binomial, Poisson and Normal distributions – application problems

UNIT II TESTS OF SIGNIFICANCE FOR LARGE SAMPLES

(9+3)

Sampling distributions -tests of significance for large samples: Tests for single mean, proportion, standard deviation, difference of means, difference of proportions and standard deviation

UNIT III TESTS OF SIGNIFICANCE FOR SMALL SAMPLES

(9+3)

Test for small samples: Student's t distribution – test for single mean and difference of means - F distribution – Test for difference between population variances

UNIT IV CHI – SQUARE TEST

(9+3)

Chi-square distribution- observed and theoretical frequencies - uses of Chi-square distribution- conditions for the validity of the Chi-square test - test of goodness of fit, contingency table, test of independence of attributes

UNIT V DESIGN OF EXPERIMENTS

(9+3)

Completely randomized design - Randomized block design - Latin square design - 2² factorial designs – one way and two way classification.

Total Hours: 60

COURSE OUTCOMES:

At the end of the course, students are able to

- CO1: Gain Knowledge of distribution and solve problems
- CO2: Improve their skills to apply statistical concepts to solve problems involving large data set
- CO3: Gain knowledge in testing of hypothesis for large and small samples applied to real world problems
- CO4: Test the goodness of fit and independence of attributes using Chi Square test
- CO5: Gain knowledge in various types of design of experiments

REFERENCES:

1. *T.Veerarajan, Probability, Statistics and Random Processes*, Tata McGraw –Hill.
2. *Gupta S.C. and Kapoor V.K., Fundamentals of Applied Statistics*, Sultan Chand & Sons, New Delhi..
3. *T.Veeraraja), Probability, Statistics and Random Processes with queuing theory and queuing networks*, Tata McGraw –Hill, Third Edition (2010).
4. *E.Kreyszig Advanced Engineering Mathematics*, Eighth Edition, John Wiley and Sons (Asia) Ltd, Singapore (2014).
5. *B.S.Grewal, Higher Engineering Mathematics*, Thirty Sixth Edition, Khanna Pub., Delhi (2014).

Course Outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H	H	M	M		L					L	M		
CO2	H	H	M	M		L					L	M		
CO3	H	H	M	M		L					L	M		
CO4	H	H	M	M		L					L	M		
CO5	H	H	M	M		L					L	M		

STRENGTH OF MATERIALS

Semester III
18BEES14

Instruction Hours/ week: 3T
No. of credits: 3

OBJECTIVE:

- To understand the properties of solids in terms of its strength and the behaviour. All these should be achieved conceptually with worked out examples.

UNIT I CONCEPT OF STRESS AND STRAIN

9

Simple stresses and strains at a point, Normal and shear Stresses, Hooke's Law, Young's modulus, Bars subjected to axial Forces, simple problems, Thermal stresses, Simple statically Indeterminate problems like compound bars. Changes in dimensions and volume, Poisson's ratio, Modulus of Rigidity, Surface and volume strains, Bulk modulus, Relation between Elastic constants, Simple Tension Test on a Mild Steel rod, Stress, strain diagram, Concept of Factor of Safety and permissible stresses.

UNIT II SHEAR AND BENDING IN BEAMS

9

Beams and bending- Types of loads, supports- Shear force and bending moment diagrams for statically determinate beams with concentrated load, UDL, uniformly varying load.

UNIT III BENDING STRESS & SHEAR STRESSES

9

Theory of simple bending, Stress distribution due to shear force and bending moment, Design of beams, Beams of uniform strength, Flitched beams.

UNIT IV TORSION AND SPRINGS

9

Torsion of solid and hollow circular shafts, Power transmitted through shafts, Strain energy due to torsion, Combined bending and torsion, Close coiled and open coiled helical springs, Leaf springs

UNIT V DEFLECTION OF DETERMINATE BEAMS

9

Double integration method -Macaulay's method -Area moment method -conjugate beam method for computation of slope and deflection of determinant beams.

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- CO1: Apply the fundamental concepts of stress and strain in the design of various structural components and machines.
- CO2: Determine Shear force and bending moment in beams.
- CO3: Determine the bending and shear stresses produced in a beam subjected to system of loads.
- CO4: Apply basic equation of torsion in the design of circular shafts and helical springs used in vehicles and structures.
- CO5: Calculate the deflection of beams by different methods and selection of method for determining slope and deflection.

TEXT BOOKS:

- Bansal R.K.(2010). "Strength of Materials", Laxmi Publications, New Delhi.*
- Rajput, RK..(2007). "Strength of Materials", S. Chand & Company Ltd., New Delhi.*

REFERENCES:

- Sadhu Singh(2012) "Strength of Materials", Khanna Publishers, New Delhi.*
- PrakashRao D.S.,(2002). "Strength of Materials" Volume I, Universities Press (India) Limited., Hyderabad.*
- Lehri, RS.,Lehri., AS.(2009). "Strength of Materials", S K Kotaria& Press, New Delhi.*
- Timonshenko, S.P, Gere, J.M.(2002). "Mechanics of Materials", CBS Publishers, New Delhi.*
- Punmia BC, Ashok Jain and ArunJain(2000)"Strength of Materials and Theory of Structures" Vol 1, Laxmi Publications, New Delhi.*
- EgorP.Popov.(2003)."Introduction to Mechanics of Solids". Prentice Hall of India, New Delhi.*

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H	M	L	L		L	L		L	L		L		
CO2	H	M	L	L	L	L			L	L		L		
CO3	H	M	L	L		L		L	L	L		L		
CO4	H	M	L	L	L	L		L	L	L		L		
CO5	H	M	L	L	L	L			L	L		L		

ELECTRICAL TECHNOLOGY

Semester III
18BEES15

Instruction Hours/ week: 3T
No. of credit: 3

OBJECTIVE:

To analyze the basic Electrical circuits and to understand the working of Electrical machines and its application in various fields.

UNIT I: BASICS OF CIRCUIT ANALYSIS

9

Kirchhoff Laws- series and parallel DC circuits-AC Circuits-Energy calculations-Case studies and applications.

UNIT II : DC MACHINES AND TRANSFORMERS

9

Construction and operating principle of DC machines-Construction and operating principle of transformer - quantitative treatment only - Case studies and applications.

UNIT III: AC MACHINES

9

Construction and operation of alternators -synchronous motor- single phase induction motor- types- methods of starting- quantitative treatment only -case studies and applications.

UNIT IV: DC DRIVES

9

Types of electrical drives- classes of duty –determination of power rating- selection of drives, Single phase and three –phase converter fed drives-continuous and discontinuous condition modes-chopper fed drives-four – quadrant operation-quantitative treatment only, case studies and applications.

UNIT V: INDUCTION MOTOR DRIVES

9

Voltage controlled drive-V/f control-VSI and CSI fed drives-Rotor resistance control – slip power recovery scheme-sub synchronous and super synchronous operations-power factor improvement –quantitative treatment only- case studies and applications.

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the student should be able to

- CO1:** Acquire knowledge to analyze the Electrical circuits.
- CO2:** Understand the construction and operation of DC and AC machines.
- CO3:** Impart knowledge on the methods of starting AC Machines.
- CO4:** Understand the concepts in converter fed DC drives.
- CO5:** Acquire knowledge on different methods of speed control by AC drives.

REFERENCES:

1. *Sudhakar, A., Shyam Mohan S. Palli, "Circuits and Networks",* Tata McGraw Hill Publishing Company Limited, Second Edition, 2006.
2. *Cotton.H, "Electrical Technology",* 7th edition, New Delhi, CBS Publishers, Reprint 2005.
3. *PILLAI, S.K."A First Course On Electrical Drives" 3rd Edition.LWiley Eastern Ltd, New Delhi.2012.*
4. *Joseph Edminister and MahmoodNahri, "Electric Circuits",* Thrid Ed, Tata Mc GrawHillNew Delhi, 2005.
5. *V.K.Mehta,Rohit Mehta,"Pinciples of Electrical Machines",S.Chand& company.Ltd-2005.*

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H	H			M				H					
CO2	H								M					
CO3	H	L							M	L				
CO4	H	L							L	L				
CO5	H	L							L	L				

ELECTRICAL ENGINEERING PRACTICALS

Semester III
18BEES16

Instruction Hours/ week: 3P
No. of credits: 1.5

OBJECTIVES:

To experiment with Electrical Machines to find its performance characteristics and Efficiency.

LIST OF EXPERIMENTS

1. Verification of Kirchhoff's laws, Superposition theorem and Thevenin's and Norton's theorem.
2. Power measurement by three ammeter method and three voltmeter method. Power measurement in two watt meter method.
3. Open circuit and load tests on D.C. Shunt generator.
4. No load and load test on separately excited D.C. generators.
5. Swinburne Test.
6. Load Test on D.C. shunt motor.
7. Speed control of D.C. shunt motor
8. OC and SC test on single phase transformer.
9. Load Test on single phase transformer.
10. No load and blocked rotor test on single phase Induction motor.
11. Load test on 3 phase Induction motor.
12. Measurements of resistance, inductance and capacitance

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the student should be able to:

CO1: Verify basic law's and Theorems in Electrical circuits.

CO2: Measure the three phase power using different methods.

CO3: Determine the Performance characteristics and Efficiency of AC and DC Machines.

CO4: Control the speed of DC Shunt Motor.

CO5: Measure the Passive elements using AC and DC Bridges.

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	M	H	L		L				M		L			
CO2	H	M	L		M				M		L			
CO3	M	L	M		L				M		L			
CO4	H	L	L		L				M		L			
CO5	M	M	L		M				M		L			

PRINTING PROCESSES

Semester III
18BEPC01

Instruction Hours/ week: 3T
No. of credits: 3

OBJECTIVE:

- To impart knowledge on various printing processes, designing. This introductory course will provide an overview to printing.

UNIT I INTRODUCTION: PRINTING INDUSTRY 9

Introduction , printing technology, printing industry and its structure , workflow, pre- press, press and post press, state-of-the-art , scope of printing technology , preparing for a career in printing.

UNIT II PRE PRESS: DESIGNING WITH DTP 9

Prepress workflow, electronic reproduction. System requirement, Typography, measurement, size, font, characters, typefaces. Proof correction & standards, handling text, handling Image-originals, colour, colour reproduction, scanners, file formats, DTP make-up, planning & assembly.

UNIT III PRESS: CONVENTIONAL / IMPACT PRINTING PROCESSES 9

Introduction, types of printing processes, latest trends in printing processes. Impact printing, Relief Printing Processes: Letterpress and Flexographic printing, Recess Printing Processes: Intaglio and Gravure printing, Planographic Printing Processes: Lithography and offset printing , Stencil Printing Process: Screen printing ,Principle , process , applications, image carriers , parts of a press , substrates and inks used.

UNIT IV PRESS: NON-IMPACT / DIGITAL PRINTING PROCESSES 9

Non-Impact printing , Types : Computer to film (CTF) , computer to plate & computer to print (CTP) technologies, Electrophotography, Ionography, Magnetography, Thermography Thermal transfer and Dye sublimation, Electrography, photography, “X”-graphy , Ink Jet: continuous and drop-on-demand techniques Principle, imaging systems, printing systems , fixing and cleaning, applications.

UNIT V POST-PRESS: PRINT FINISHING & PACKAGING 9

Introduction, Latest trends in post-press. Print Finishing: finishing techniques, binding materials, guillotines, folding, gathering, securing operations. Packaging: Types, Function of a package, factors influencing design of a package, computer aided package design, Colour for package design.

Total Hours: 45

COURSE OUTCOMES:

- CO1:** Comprehend the relationship between designer, customer and printer.
- CO2:** Understand & Create layout and designs for various print products
- CO3:** Learn the key identifying characteristics of each impact printing process
- CO4:** Learn the key identifying characteristics
- CO5:** Gain knowledge about finishing operations and packing techniques

REFERENCES:

- Kipphan Helmut “Handbook of Print Media” Springer, Germany (2001)*
- Hugh M Speirs “Introduction to Prepress” Pira International (1998)*
- Adams J.M., Faux. D.D. and Rieber L.J. “Printing Technology” Delmar Publishers, New York (1998)*
- F.A.Paine, “Fundamentals of Packaging “, Brookside Press Ltd., London, 1990.*
- Aaron L. Brody, Kenneth S. Marsh, The Wiley Encyclopaedia for Packaging Technology, Wiley Publication.*
- David Browne “Teach yourself PageMaker” MIS: Press Newyork, 1996.*
- Gergory Georges “Photoshop CS Professional “Wiley Publishers Ltd., 2004.*

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H		M		H				L	L	M	M	M	M
CO2	H	M	H	M	H			H	M	M	H	H	H	
CO3	H	M										M		
CO4	H		M									M		
CO5	H											M	H	

COLOUR REPRODUCTION

Semester III
18BEPC02

Instruction Hours/ week: 3T+1Tu
No. of credits: 4

OBJECTIVE:

- To impart knowledge on the fundamental concepts of Colour Science and It also introduces the basic concepts of Color Management Systems.

UNIT I: COLOUR SCIENCE & MEASUREMENT

(9+3)

Electromagnetic Spectrum, Light, colour, human eye, Light sources Sample, Observer, Colour vision, Colour matching experiment, Additive and Subtractive colour theory, Colour temperature, Attributes of colour, Tristimulus values, Chromaticity diagram, Colour matching experiments, Colour spaces, Chromaticity diagram, Colour spaces – CIELAB, CIELUV, CIELCH, Munsell; Colour difference equations, Spectrophotometer, Viewing conditions and standards.

UNIT II: PRINCIPLES OF COLOUR REPRODUCTION

(9+3)

Image Acquisition, Colour originals for reproduction, reproduction objectives, colour reproduction, photography, printing, display devices; Colour printing, Colour separation techniques, Screen angles and moire patterns. Introduction, principle and development of electronic scanning, basic elements of scanners, basics of electronic scanning, pixels, binary, resolution, AM and FM Screening, digital halftones, Pantone, focaltone, trumatch, special / spot color, Applications of special color, digital images- bitmap, raster, vector graphics.

UNIT III: COLOUR CORRECTION , IMAGE ADJUSTMENTS & PRINT CONTROL

(9+3)

Properties of coloured inks, Masking and its principles, Balanced inks, Jones Diagram, Gray balance, Masking equations, Neugebauer equation, Look Up Table, Image Adjustments, Colour correction, White point & Black point, Colour cast removal, USM, Black printer, UCR, GCR, UCA. Print Control: Densitometry, type of densities- specular-diffuse-double diffuse density, Color Printing-factors in color printing, printed ink density and trapping, tone value, additivity and proportionality failure, color control strip and punch register system, duo ones, dot area measurement, Murray Davis equation and Yule Neilson correction. Pre-press color proofing, Factors in Proofing - substrate, color of ink, solid ink density, trapping, tone reproduction, Understanding UGRA, FOGRA, BIS, ISO 12647, GRACOL, SWOP standards. Proofing Methods - soft proof, digital proof, photomechanical proof, press proof, simulation proof and other proofing methods.

UNIT IV: SPECTRAL SENSITIVITIES, INK & PAPER

(9+3)

Substrate – Whiteness, Brightness, Fluorescence, Gloss, Smoothness, Texture, Absorptivity; Ink – Pigment colour, transparency, opacity, mass tone, undertone; Optics of ink film – first surface reflection, multiple internal reflections. Additivity and Proportionality rules; Light Source, colour filters, photographic emulsion.

UNIT V: COLOUR MANAGEMENT

(9+3)

Colour Management – Need, Open loop, Closed loop, Calibration, Characterization, Conversion, ICC, Profiles, Rendering intent, Gamut mapping. Device link and Dynamic device link profiles, Colour Servers, Digital proofing – Need & issues, Soft proofing, Remote proofing.

Total Hours: 60

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- CO1:** Understand the basic of colour and evaluate the colour measurement
- CO2:** Learn and apply the color reproduction and color reparation
- CO3:** Evaluate and apply the color correction and image adjustments
- CO4:** Study and analyse light ink and paper
- CO5:** Learn and apply color management techniques

REFERENCES:

1. *John A.C. Yule and Gary G.Field, "Principles of colour reproduction"* GATF Press, USA(2000).
2. *Phil Green, "Understanding Digital Color"*, 2nd edition, GATF Press (1999).
3. *R.W.G. Hunt, "Reproduction of Colour in Printing, T.V. & Photography"*, Fountain Press (1981).
4. *Gary Field, "Color and its Reproduction"*, 3rd edition, GATF Press (2004).
5. *Berns R S, "Billmeyer& Saltzman 's Principle of Colour Technology"*, 3rd Edition, Wiley (2000).
6. *J.Michael Adams David, Fauz, Llyod, J.Rieber, "Printing Technology"*, 3rd Ed., Delmar Publishers (1988).
7. *AbhaySharma, "Understanding Colour Management"*, Thomson Delmar (2004)
8. *Colour Management For Packaging By Drew(John.T)Barcode: 32441 Publication: Switerland Rotovision*
9. *Colourmanagement & Quality Output By Ashe(Tom.P)Barcode: 32445 Publication: Newyork Focal Press 2013*

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H		H	H	H									
CO2	M												H	
CO3	H	M	H	H	H							H		
CO4	H	H	M											
CO5	H	H		M	M							M		

IMAGE DESIGN AND EDITING PRACTICALS

Semester III
18BEPC03

Instruction Hours/ week: 3P
No. of credits: 1.5

OBJECTIVE

- To learn designing and editing using different DTP software.

LIST OF EXPERIMENTS

1. Design an Image and layout models
2. Prepare a document
 - a. Non –illustrated notepad
 - b. Illustrated leaflet
3. Prepare a Report on
 - a. Theorem in mathematical setting
 - b. Nature in regional language
 - c. Image area calculation using scientific setting
4. Prepare the steps for color image creation
5. Editing the original for reproduction
 - a) Image enhancement
 - b) Retouching
6. Preparing the document for film processing
7. Creating the effect to the image for special attachment
8. Converting the image for channels
9. Crating the poster
 - a. Masking effect
 - b. Collage
10. Designing the text for Headlines
11. Creating the vector images
 - a. Logo
 - b. Architecture images
12. Calibration of the document to the proof

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the student should be able to:

CO1: Design graphics for a wide range of media and applications.

CO2: Design graphics using image editing tools

CO3: Edit and retouch graphics creatively

CO4: Calibration of the document

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H	H	M		H								H	
CO2	H	M	M		H								H	
CO3	H	M	M		H								H	
CO4	H	M	H		H								H	

OBJECTIVE:

This paper seeks to familiarize the students with their rights and responsibilities as a consumer, the social framework of consumer rights and legal framework of protecting consumer rights, provides understanding of the procedure of redress of consumer complaints, and the role of different agencies in establishing product and service standards.

UNIT 1: CONCEPTUAL FRAMEWORK

9

Consumer and Markets: Concept of Consumer, Nature of markets: Liberalization and Globalization of markets with special reference to Indian Consumer Markets, E-Commerce with reference to Indian Market. Concept of Price in Retail and Wholesale, Maximum Retail Price (MRP), Fair Price, GST, labelling and packaging along with relevant laws, Legal Metrology.

Experiencing and Voicing Dissatisfaction: Consumer buying process, Consumer Satisfaction/dissatisfaction-Grievances-complaint, Consumer Complaining Behaviour: Alternatives available to Dissatisfied Consumers; Complaint Handling Process: ISO 10000 suite

UNIT 2: THE CONSUMER PROTECTION LAW IN INDIA

9

Objectives and Basic Concepts: Consumer rights and UN Guidelines on consumer protection, Consumer goods, defect in goods, spurious goods and services, service, deficiency in service, unfair trade practice, restrictive trade practice.

Organizational set-up under the Consumer Protection Act: Advisory Bodies: Consumer Protection Councils at the Central, State and District Levels; Adjudicatory Bodies: District Forums, State Commissions, National Commission: Their Composition, Powers, and Jurisdiction (Pecuniary and Territorial), Role of Supreme Court under the CPA with important case law.

UNIT 3: GRIEVANCE RE-DRESSAL MECHANISM UNDER THE INDIAN CONSUMER PROTECTION LAW

9

Who can file a complaint? Grounds of filing a complaint; Limitation period; Procedure for filing and hearing of a complaint; Disposal of cases, Relief/Remedy available; Temporary Injunction, Enforcement of order, Appeal, frivolous and vexatious complaints; Offences and penalties.

Leading Cases decided under Consumer Protection law by Supreme Court/National Commission: Medical Negligence; Banking; Insurance; Housing & Real Estate; Electricity and Telecom Services; Education; Defective Products; Unfair Trade Practices.

UNIT 4: ROLE OF INDUSTRY REGULATORS IN CONSUMER PROTECTION

9

- I. Banking: RBI and Banking Ombudsman
- II. Insurance: IRDA and Insurance Ombudsman
- III. Telecommunication: TRAI
- IV. Food Products: FSSAI
- V. Electricity Supply: Electricity Regulatory Commission
- VI. Real Estate Regulatory Authority

UNIT 5: CONTEMPORARY ISSUES IN CONSUMER AFFAIRS

9

Consumer Movement in India: Evolution of Consumer Movement in India. Formation of consumer organizations and their role in consumer protection. Misleading Advertisements and sustainable consumption. National Consumer Helpline, Comparative Product testing, Sustainable consumption and energy ratings.

Quality and Standardization: Voluntary and Mandatory standards; Role of BIS, Indian Standards Mark (IS), Ag- mark, Hallmarking. Licensing and Surveillance; Role of International Standards: ISO an Overview

Note: Unit 2 and 3 refers to the Consumer Protection Act, 1986. Any change in law would be added appropriately after the new law is notified.

Total hours: 45

REFERENCES:

1. Khanna, Sri Ram, Savita Hanspal, Sheetal Kapoor, and H.K. Awasthi. (2007) *Consumer Affairs*, University Press.
2. Choudharv, Ram Naresh Prasad (2005). *Consumer Protection Law Provisions and Procedure*, Deep and Deep Publications Pvt. Ltd.
3. G. Ganesan and M. Sumathy. (2012). *Globalisation and Consumerism: Issues and Challenges*, Regal Publications
4. Suresh Misra and SapnaChadah (2012). *Consumer Protection in India: Issues and concerns*, IIPA, New Delhi
5. RajyalaxrniRao (2012), *Consumer is King*, Universal Law Publishing Company
6. Girimaji, Pushpa (2002). *Consumer Right for Everyone* Penguin Books.
7. E-books:- www.consumereducation.in
8. Empowering Consumers e-book,
9. *The Consumer Protection Act, 1986 and its later versions.*

ARTICLES:

- 1.Misra Suresh, (Aug 2017) "Is the Indian Consumer Protected? One India One People.
- 2.Raman Mittal, Sonkar Sumit and Parineet Kaur (2016) Regulating Unfair Trade Practices: An Analysis of the Past and Present Indian Legislative Models, Journal of Consumer Policy.
- 3.Chakravarthy, S. (2014). MRTP Act metamorphoses into Competition Act. CUTS Institute for Regulation and Competition position paper. Available online at www.cuts-international.org/doc01.doc
- 4.Kapoor Sheetal (2013) "Banking and the Consumer" Akademos (ISSN 2231-0584)
- 5.Bhatt K. N., Misra Suresh and Chadah Sapna (2010). Consumer, Consumerism and Consumer Protection, Abhijeet Publications.
- 6.KapoorSheetal (2010) "Advertising-An Essential Part of Consumer's Life-Its Legal and Ethical Aspects", Consumer Protection and Trade Practices Journal, October 2010.
- 7.Verma, D.P.S. (2002). Regulating Misleading Advertisements, Legal Provisions and Institutional Framework. Vikalpa. Vol. 26:No. 2. pp. 51-57.

PERIODICALS:

1. Consumer Protection Judgments (CPJ) (Relevant cases reported in various issues)
2. Recent issues of magazines: International Journal on consumer law and practice, National Law School of India University, Bengaluru
3. '*Consumer Voice*', Published by VOICE Society, New Delhi.

WEBSITES:

www.ncdrc.nic.in
www.consumeraffairs.nic.in
www.iso.org
www.bis.org.in
www.consumereducation.in
www.consumervoice.in
www.fssai.gov.in
www.cercindia.org

COMPUTER AIDED NUMERICAL METHODS

Semester IV
18BESM07

Instruction Hours/ week: 3T+1Tu
No. credits: 4

OBJECTIVE:

- To understand the fundamental mathematical concepts and mastering problem solving skills using numerical methods with the help of MATLAB.

UNIT I: NUMERICAL METHODS FOR ALGEBRAIC EQUATIONS (9+3)

Linear simultaneous equations, Gauss elimination method, Gauss Jordan method, Crout’s method, Gauss Seidel iterative method, Relaxation method.

UNIT II: INTERPOLATION (9+3)

Introduction, Gregory-Newton forward Interpolation formula, Gregory-Newton backward interpolation formula, Equidistant terms with one or more missing values, Gauss forward interpolation formula, Gauss backward interpolation formula, Bessel’s formula, Laplace Everett formula. Interpolation with Unequal intervals, Divided differences.

UNIT III: NUMERICAL METHODS FOR ORDINARY DIFFERENTIAL EQUATIONS (9+3)

Ordinary differential equations: Initial value problems, Taylor series, Picard’s method, Fourth order Runge - Kutta methods, Predictor Corrector methods, Milne’s and Adams Bashforth Method.

UNIT IV: NUMERICAL METHODS FOR PARTIAL DIFFERENTIAL EQUATIONS (9+3)

Finite difference approximations to ordinary and partial derivatives, Solution of two point boundary value problems in linear differential equations using finite difference method, difference method for parabolic equations, One dimensional heat flow, Bender Schmidt recurrence relation, Crank Nicholson method, Liebmann procedure for Laplace and Poisson equations.

UNIT V: NUMERICAL SOLUTIONS USING COMPUTER SOFTWARE (9+3)

MATLAB applied to linear simultaneous equations, Ordinary differential equations, Partial differential equations.

Total Hours : 60

COURSE OUTCOME:

At the end of the course the students can be able to

- CO1:** Find solution for any number of equations with more unknowns satisfying the system of equations
- CO2:** Have an exposure in solving problems using Interpolation Techniques
- CO3:** Solve Ordinary Differential equations using Numerical Methods
- CO4:** Solve Partial Differential equations using Numerical Methods
- CO5:** Have an exposure of solving problems using MATLAB

REFERENCES:

- P.Kandasamy, K.Thilagavathy and K.Gunavathy, Numerical Methods*, S.Chand&Co.Ltd, Delhi (2008).
- Won Young Yang, Wenwu Cao, Tae-Sang Chung and John Marris. Applied Numerical Methods using Matlab*.Wiley India (p) Ltd, New Delhi (2007).
- RudraPratap, Getting Started with MATLAB 7*, Oxford University press, New Delhi (2007).
- T.Veerarajan.Numerical methods with programs in C and C++* .Tata McGraw Hill publishing company Ltd, New Delhi (2004).

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H	H										M		
CO2	H	H										M		
CO3	H	H										M		
CO4	H	H										M		
CO5	L	L										M		

SEMESTER IV
18BEES19

Instruction Hours/ week: 3T
No. Of credits : 3

OBJECTIVES:

- To familiarize the various steps involved in the Design Process
- To understand the principles involved in evaluating the shape and dimensions of a components to satisfy functional and strength requirements
- To learn to use standard practices and standard data
- To learn to use catalogues and standard printing machine components

UNIT I : STRESS ANALYSIS

9

Type of stresses-stress strain diagram in tension-mechanical properties of materials, static stress equation in axial, bending and torsion loadings, criteria for failure, actor of safety-combination of normal and shear stresses, principal stresses, theories of failure, variable loads, fatigue strength, sobererg and Goodman equations, factors affecting fatigue limit.

UNIT II : DESIGN OF SHAFTS

9

Forces on shafts due to gears and belts - subjected to Twisting moment, bending moment and combined moment. Estimation of shaft size based on strength and critical speed, selection of material

UNIT III : DESIGN OF SPRINGS

9

Stresses and deflection in round wire helical springs-accounting for variable stresses, design of helical and leaf springs.

UNIT IV: DESIGN OF GEARS & SELECTION OF V-BELTS AND CHAINS

9

Classification of gears, gear tooth terminology, base circle and pressure angle design procedure for spur, helical and bevel gears. Selection procedure for V belts and chains for given power and velocity ratio.

UNIT V : PRINTING MACHINE MECHANISM

9

Feeding unit – Types of feeder and mechanism, Forwarding unit mechanism, Inking Unit - types of Inking units and its mechanism, dampening unit- Types of dampening unit and its mechanism, Printing Unit- types of Printing cylinder, sheet transfer mechanism, power transfer mechanism, types of dryers, Deliver unit mechanism

Total Hours : 45

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- CO1: Understand the basic concept of mechanical properties and types of stress of constructional material.
- CO2: Illustrate the design preceding of basic shaft.
- CO3: Practice the design procedure for sample springs.
- CO4: Explain the design procedure for gears, V belts and Chains.
- CO5: Demonstrate the design mechanism for printing machines.

REFERENCES:

1. Khurmi, R.S. & Gupta, J.K. A text,book of Machine Design, Euresia Publishing House (Pvt.) Ltd. New Delhi (2005)
2. Bhandari V, “Design of Machine Elements”, 3rd Edition, Tata McGraw-Hill Book Co, 2010.
3. Joseph Shigley, Charles Mischke, Richard Budynas and Keith Nisbett “Mechanical Engineering Design”, 8th Edition, Tata McGraw-Hill, 2008.
4. Sundararamoorthy T. V. Shanmugam .N, “Machine Design”, Anuradha Publications, Chennai, 2003.
5. Robert C. Juvinall and Kurt M. Marshek, “Fundamentals of Machine Design”, 4 th Edition, Wiley, 2005
6. Alfred Hall, Halowenko, A and Laughlin, H., “Machine Design”, Tata McGraw-Hill Book Co.(Schaum’s Outline), 2010
7. Bernard Hamrock, Steven Schmid,Bo Jacobson, “Fundamentals of Machine Elements”,2nd Edition, Tata McGraw-Hill Book Co., 2006.
8. John MacPhee, “Fundamentals of Lithographic Printing: Vol.I - Mechanics of Printing”, GATF, 1998.

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H	H	M		H								H	
CO2	H	M	M		H								H	
CO3	H	M	M		H								H	
CO4	H	M	H		H								H	
CO5	H	H	M		H								H	

BASIC ELECTRONICS FOR PRINTERS

Semester IV
18BEES20

Instruction Hours/week: 3T
No. of credits: 3

OBJECTIVE:

- To study the basic concepts of electronics and their application in printing technology.

Unit I DIGITAL LOGIC

9

Number systems – Logic gates – Boolean algebra - Simplification of logical expressions – Combinational circuits – Half adder – Full adder – Multiplexer (1:4) – Demultiplexer (4:1) – Sequential circuits – Flip-flops – Counters (Synchronous).

Unit II PROGRAMMABLE LOGIC DEVICES

9

Read only memory – Programmable array logic – Programmable logic array – Introduction to CPLD, FPGA and ASIC.

Unit III SENSORS

9

Basic requirements of sensors – classification of sensors – Static and dynamic characteristics – Displacement sensors – Linear and rotary displacement sensors (LVDT and RVDT) – Capacitive and inductive displacement sensors – Position sensors.

Unit IV EMBEDDED SYSTEMS

9

The concept of embedded systems design - Examples of embedded system - Design challenges in embedded system Design - Introduction to real, time operating systems.

Unit V CASE STUDIES

9

Case studies in printing machines, packaging machines, finishing machines. Electronics sub modules at feeder unit, delivery unit, inking unit and inspection system.

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the student will be able to:

- CO1** : Understand the concept of basic combinational and sequential digital circuits.
- CO2** : Describe the functioning of Programmable Logic Devices.
- CO3** : Understand the concept of displacement and position sensors.
- CO4**: Discuss the components and design process of a embedded system.
- CO5**: Identify the applications of embedded systems in printing technology

REFERENCES:

1. *Stephen Brown and Zvonko Vranesic, Fundamentals of Digital Logic Design with VHDL*, 2nd Edition, Tata Mcgraw Hill Education Private Limited, 2011.
2. *David E Simon , An Embedded Software Primer*, Pearson Education Asia, 2006.
3. *AnandKumar.A, Fundamentals of Digital Circuits*, PHI Learning Pvt. Ltd, 2006.
4. *Rajkamal, Embedded Systems: Architecture, Programming and Design*, Tata McGraw Hill, 2003.

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H	M							M					
CO2	L								L					
CO3	H	L							L	L				
CO4	H								L					
CO5	H								M	H				

PRINTING SUBSTRATES

Semester IV
18BEPC04

Instruction Hours/ week:3T
No. of credits: 3

OBJECTIVE:

- To impart knowledge on manufacturing processes, properties and testing of paper and board used for different printing processes and paper related problems in printing.

UNIT I RAW MATERIALS AND SUBSTRATES

Sources and kinds of cellulose fibers Thermal-mechanical, mechanical and chemical pulping, bleaching. 9

- Exercises:** 1. Study of plants suitable for manufacturing paper
2. Preparing a document on local plants that can be used as raw materials

UNIT II PAPER AND BOARD MANUFACTURE

Beating, Refining, Non-fibrous additives, papermaking machines-different sections-finishing operations, coating. Board making-furnish, manufacture and finishing. 9

- Exercises:** 1. Preparation of handmade paper by paper recycling process
2. Testing the properties of the prepared paper.

UNIT III PAPER AND BOARD CLASSIFICATION

Main classes of papers and board, paper and board sizes, paper requirements for different printing processes, paper handling. Other substrates: Property requirement for printing-plastics-Thermo sets, polyolefin, polyvinylchloride related polymers. Polyethylene terephthalates (PET), and Regenerated cellulose. Metals-Aluminium and Tin ceramics and Glass. 9

- Exercises:** 1. Study of various samples of substrates from different vendors and commercial products.
2. Preparing a table of substrate properties and their job suitability

UNIT IV PAPER PROPERTIES AFFECTING RUNABILITY AND PRINTABILITY

Structural : Formation, 2-sidedness, grain direction. Physical: GSM, Calliper, Bulk Porosity, Smoothness. Dimensional stability,9
Curl, Moisture content and RH Optical: Gloss, Brightness, Colour, Opacity. Chemical-PH, Ash content, Mechanical-Tensile, Burst, Tear, Internal bonding, folds endurance, stiffness, Pick resistance.

- Exercises:** 1. Testing for Runnability and Printability characteristics.
2. Testing the effects of temperature and humidity variation in printed sample

UNIT V PAPER RELATED PROBLEMS DURING PRINTING

Fluff, Hickey, Picking, Piling, Stirring and Doubling, Curl, Chalking, Mottle, set off, Poor ink drying, Show through, Mis-registration, Static electricity, Blistering and Web break. 9

- Exercises:** 1. Identification of paper and printing faults in the given samples
2. Discussing the causes and remedial actions for faults

Total Hours:45

COURSE OUTCOMES:

At the end of the course, the student will be able to:

- CO1: Gain fundamental knowledge on paper and board.
- CO2: Understand the various sources processing and manufacturing of paper and paper board.
- CO3: Learn the classification of various paper substrate and other substrates
- CO4: Understand the paper properties and factor effecting paper properties and evaluate the runnability list and printability.
- CO5: Learn and analyse paper related problems during printing, standard and remedial.

REFERENCES:

1. *Bureau, W.H., "What the Printer should know about paper"* Graphic Arts Tech Foundation, 1982.
2. *Casey, J.P., "Pulp & Paper-Chemistry & Chemical Technology"* I & II Vols. Wiley Interscience, 1983.
3. *Britt, K.W., (Ed) "Handbook of Pulp and Paper Technology"*. CBA Publishers, 1984.
4. *Mc Hill, R.J., "Measurements & Control in Papermaking"*. Adam Hilger Ltd., 1980.
5. *"Small-Scale paper making"*, International Labour Office, Geneva, 1985.
6. *Venkates Waralu, B., "Paper for Printing & Packaging"*, S.S. Graphics, 1997.
7. *John Peacock, Michael Bernard, "Handbook of Printing and Production"*

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	M												M	
CO2	L						M						M	
CO3	M						M							
CO4	H	M	M				M							
CO5	H	H	M	M										

OBJECTIVE

- To introduce the basic principal of offset technology process (Sheet fed and Web offset)and handling of machines

UNIT I PRINCIPLES OF OFFSET AND SHEET FEEDING (9+3)

Principles of lithography, three important phenomena, basic configuration of offset machine. Sheet feeding and controls: Types of feeders, sheet control, drives, suction head mechanism, double sheet and no sheet detectors. side lays and front lays. Non-stop feeders. Sheet insertion and transfer systems, working principle, relative merits and problems. Sheet transfer and reversal systems, perfecting, delivery grippers. Settings, quick delivery mechanisms. Anti set-off spray device. Feeders, delivery and other system components for metal printing.

UNIT II PRINTING UNIT CONFIGURATION (9+3)

Cylinders: Various configurations, design, requirements, plate and blanket clamping mechanisms. pressure setting, packing, print length variation, equal diameter, true rolling principles. Cylinder drives. Blanket types, requirements, manufacture, performance attributes and problems. Rollers, types, properties, behaviour. Inking system : requirements, design concepts, fountain types, requirements, metering, roller train design. form rollers. Heat generation, ghosting. Roller setting. Dampening system: requirements, types, metering methods, column control. Fountain solution requirements, composition, re-circulation system and dosing units, Ink/water balance. Print problems

UNIT III WEB PRESSES AND PRINTING UNIT CONFIGURATION (9+3)

Development, Classification: Blanket to Blanket, In-line, CIC, Full sizes and narrow presses, Presses for producing continuous stationary. Job suitability and factors to be considered for selection. Printing Unit - Plate & Blanket Cylinder, its types, performance requirements, Hysteries and lock-up mechanisms. Plate bending machines, cylinder pressure and timing. Cylinder drives. Circumferential and lateral movement of plate cylinder. Automatic register controls.

UNIT IV INFEED, INKING & DAMPENING SYSTEM DRYING AND CHILLING UNITS (9+3)

Roll stands, Automatic pasters - Zero speed and flying paster. Web pre-conditioners, in feed units, tension control, Automatic webbing - up device, control of fan our using puzzle wheels, web allingers, web break detectors. Reel handling and storage. Requirements of paper-roll and web. Inks-Ink agitators, Automatic ink loading systems, fountain solution - recirculation systems. Dryers - The need for drying, types of dryers, its construction and working. chilling unit - its construction. Care to be taken at the time of operation, maintenance.

UNIT V FOLDING, SHEETING UNITS (9+3)

Press description based on number of folders and delivery. Turner bars, bay windows, side and cut-off margin controls : Former and its adjustments. R.T.F., nip rollers, type of folders, kickers, Markers, Perfectors, Slitters, Operation and maintenance. Sheeting device and mechanism. Mail room operations.

Total Hours: 60

COURSE OUTCOMES:

At the end of the course, the student will be able to:

- CO1:** Understand the concepts of offset and sheet feeding unit
- CO2:** Learn the concept and analyse the printing unit
- CO3:** Learn the concept and analyse the Web press printing unit .
- CO4:** Understand and design the infeed, inking , dampening , drying and Chilling unit.
- CO5:** Learn and analyse folding and sheeting units.

REFERENCES:

- A.S. Porter. "A Manual of Lithographic Press Operation", Lithographic Training Services. 1979
- LloydP. Dejidas, Thomas M. Destree "Sheetfed offset press operating" 3rd Edition GATF, 2000
- W.R. Durrant. R.E. Witeworth and C.W. Meacock, "Machine Printing", Focal Press, London.
- John MacPhee, "Fundamentals of Lithographic Printing", Vol. I Mechanics of Printing", GATF, 1998.
- Daniel G. Wilson and GATF Staff, Web Offset Press Operating, Fifth edition, GATF
- Durrant, W.R., "Web Control: A handbook for the Web Printer", 1977.
- Edward J. Kelly, David B.C. Rouse And Robert R. Supansic, "Web offset Press Operating", 1982.
- David B. Crouse, "Web Offset Press Troubles", 1984.

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H												H	
CO2	H	H	M										M	
CO3	H	M	M		L								M	
CO4	H	M	M		L								M	
CO5	H				L									

COLOUR MANAGEMENT

Semester IV
18BEPC06

Instruction Hours/ week: 3T+1Tu
No. of credits: 4

OBJECTIVES

- To give an insight into the advanced concepts of Colour management and an overview of various color management workflows.

UNIT I COLOUR MANAGEMENT (9+3)

Need for colour management, device characteristics, closed and open loop colour control, Steps in CMS - calibration, characterization, conversion; International colour consortium –standards, profiles, profile types, profile structure, Color measurement, viewing conditions.

UNIT II PROFILES (9+3)

Test targets, Devices Profile Structure, Creating scanner, digital camera, computer monitor, printer (Press and Proofer profiles, calibration, gamut, fluorescence, Profile quality, Profile editing, Issues Profiling software

UNIT III CONVERSION (9+3)

CMM, Gamut boundaries, Rendering Intent, Gamut mapping, influencing factors, algorithms

UNIT IV WORKFLOW (9+3)

Colour Management workflows – RGB workflow, CMYK workflow, embedded workflow, assumed workflow, Internet workflow, Soft proofing, Hardcopy proofing, Colour management in applications(Photoshop), Operating System

UNIT V ADVANCES IN COLOUR MANAGEMENT (9+3)

Dynamic Device link profiles, Profile editing, profile quality, ECI, Colour appearance modeling, Case studies.

Total Hours: 60

COURSE OUTCOMES:

At the end of the course, the student will be able to:

- CO1: Learn and evaluate the colour, colour measurement and its laminations
- CO2: Understand and obtain / apply the concepts of colour management
- CO3: Learn and create the profiles for input, output and printing machines
- CO4: Learn, create and design color management conversion
- CO5: Understand and apply colour management workflow in various application.

REFERENCES:

1. *AbhaySharma, "Understanding Colour Management"*, Thomson Delmar, 2004
2. *Adams R.M. & Weisberg J.B., "GATF Practical Guide to Colour Management"*, 2nd. Ed. GATF Press, 2000.
3. *Green P., "Understanding Digital Colour"*, 2nd. Ed. GATF Press, 1999.
4. *BernsR.S., "Billimeyer&Saltzman's Principles of Colour Technology"*, 3rd Ed. Wiley, 2000.'
5. *Bruce Fraser, Chris Murphy, & Fred Bunting, "Real World Color Management"*, 2nd Edition, Peachpit Press
6. *Mark D.Fairchild, "Color Appearance Models"*, Second Edition, John Wiley & Sons Ltd., 2005
7. *Phil Green, Lindsay MacDonald, "Colour Engineering"*, John Wiley & Sons Ltd.
8. *Colour Management For Packaging By Drew(John.T)Barcode: 32441 Publication: SwiterlandRotovision 2013*
9. *Colourmanagement & Quality Output By Ashe(Tom.P)Barcode: 32445 Publication:Newyork Focal Press 2013*
10. *Phil Green, Michael Kriss, "Color Management: Understanding and Using ICC profiles"*, The Wiley-IS&T Series in Imaging Science and Technology, 2010

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H	M	M		H							M	H	
CO2	H	H	M	M	H							M	H	
CO3	H	M	H	M	H							M	H	
CO4	H	M	M	M	H							H	H	
CO5	H	H	H	M	H							H	H	

BOOK PUBLISHING PRACTICALS

Semester IV
18BEPC07

Instruction Hours/ week: 3P
No. of credits: 1.5

OBJECTIVES

- To understand the concept of book designing and printing

LIST OF EXPERIMENT:

1. Identifying the content and collection of multiple media
2. Preparation of manuscript
3. Preparation of Layout
4. Image design and editing for various page
5. Creation of text
6. Preparation of pagination
7. Preparation of header, footer and TOC
8. Creation of cover page
9. Preparation of Acknowledgement, Bibliography, Copyright
10. Creation of Publisher details and bar code
11. Design and Printing 4page flyer, Boucher, and booklet

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the student will be able to:

CO1: Creation of manuscript

CO2: Designing of inner and outer pages

CO3: Understanding of Copy right

CO4: Creating and Printing of booklet

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H	M		H	H								H	
CO2	H	M		H	H								H	
CO3	H	M		H	H								H	
CO4	H	M		H	H								H	

OFFSET PRACTICALS

Semester V
18BEPC08

Instruction Hours/ week: 3P
No. of credits: 1.5

OBJECTIVE

- To learn offset printing techniques and machine operation

LIST OF EXPERIMENTS

1. Study of film planning and layout preparation.
2. Flat preparation for a job
3. Half sheet work Film Assembly
4. Planning for irregular images
5. Film Assembly for Colour Work
6. Standardising the exposure time on Plate
7. Study of protocol machine & punching system.
8. Study of controls and operations of sheetfed offset printing machinery.
9. Obtaining a single colour print sheetfed offset machine
10. Obtaining two and four cut colour printing in a sheetfed offset machine.
11. Obtaining two and four colour printing in a sheetfed offset machine.
12. Study of web offset machines.

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Operate a sheetfed offset press and take print
- CO2: Understand process control parameters
- CO3: Understand machine mechanisms
- CO4: Standardize the machine and evaluate print quality

REFERENCE:

1. *W.R. Durrant, R.E. Witworth and C.W. Meacock, "Machine Printing"*, Focal Press, London.
2. *Lloyd P. Dejidas, Thomas M. Destree "Sheetfed offset press operating" 3rd Edition GATF, 2000.*
3. *A.S. Porter. "A Manual of Lithographic Press Operation"*, Lithographic Training Services.1979.
4. *John MacPhee, "Fundamentals of Lithographic Printing", Vol. I Mechanics of Printing", GATF, 1998.*
5. *Edward J. Kelly, David B.C. Rouse And Robert R. Supansic, "Web offset Press Operating", 1982.*
6. *David B. Crouse, "Web Offset Press Troubles", 1984*

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H	H	H	H	M	M						H	H	
CO2	H	H	H	M	M	M						H	H	
CO3	H	H	H	H	M	H						M	H	
CO4	H	H	H	M	M	M						M	H	

QUALITY CONTROL TECHNOLOGY

Semester V
18BEPC09

Instruction Hours/ week: 3T
No. of credits: 3

OBJECTIVES:

- To impart knowledge about principles of quality
- To understand statistical process control tools and quality standards
- To implement quality control in various stages of printing

UNIT I : INTRODUCTION

9

Definition of quality, Quality control, its meaning and purpose. Setting up quality control program and establishing necessary procedures, economic consideration. Management responsibility. Quality systems and ISO 9000.

UNIT II : STATISTICAL QUALITY CONTROL

9

Fundamental statistical methods, tools such as control charts and sampling methods, control chart techniques and interpretation, selection and collection of data, Interpretation of data and statistical inference.

UNIT III : MATERIALS CONTROL

9

Establishing clear specifications and standardization of materials to be purchased. Inspection and testing of incoming materials as part of quality control, importance of proper handling and maintenance of records-performance-materials, sampling.

UNIT IV : PROCESS CONTROL

9

Need for establishing clearly meaningful job specifications and acceptable tolerance limits, process variability and measures of variability, establishing in process inspection and control procedures for every production department, developing of quality monitoring checklists for all processes, checklists of definable and measurable attributes of products, waste and spoilage reduction as part of quality control.

UNIT V : QUALITY CONTROL INSTRUMENTATION

9

Paper and board testing instruments, Ink testing instruments, Process control instruments, Device and aids used in camera darkroom, stripping department, plate room and press room. Press sheet control devices for colour printing. Minimum instrumentation necessary to produce a product consistent with the appropriate quality level.

Total Hours :45

COURSE OUTCOMES:

At the end of the course, the student should be able to:

- CO1:** Understand quality, quality control, quality systems and standards.
- CO2:** Understand, apply and analyse statistical quality systems and standards.
- CO3:** Learn, design and apply the standard testing and record militance
- CO4:** Learn and apply the specification inspection and control and wastage control of waste of process control
- CO5:** Study the various quality control instrumentation and apply the quality testing and standard from prepress forests to post press

REFERENCES:

1. FRANK COST, "Pocket guide to digital printing" Delmar publishers,1997.
2. SCHILDGEN,T.E., "Pocket guide to colour with digital application", Delmar Publishers, 1998.
3. DAVID BERGSLAND, "Printing in a digital world", Delmar Publishers,1997.
4. MICHAEL LIMBURG, "Gutenberg goes digital", Blue print, 1995.
5. ANTONY PETER KAMMERMEIER, "Scanning & Printing", Focal Press,1992.
6. ROBIN MOALLISTER, "Scanning & Image manipulation", Delmar Publishers, 1997.
7. PHIL GREEN, "Understanding digital colour", Blueprint, 1995.
8. ROBIN MCALLISTER, "Trapping", Delmar Publishers, 1997.

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H	M	M	M								H	H	
CO2	H	H	H	H	H							M	H	
CO3	H	H	H	H	H							M	H	
CO4	H	H	H	H			H					M	H	
CO5	H	H	H	H	H		M					H	H	

FLEXOGRAPHIC AND GRAVURE PRINTING

Semester V
18BEPC10

Instruction Periods/ week: 4T
No. of credits: 4

OBJECTIVES

- To introduce the basic principles of flexographic printing process, plate preparation & mounting methods, parts of a flexographic press and maintenance & quality control in flexo press.

UNIT I INTRODUCTION AND IMAGE CARRIER PREPARATION

12

Basic principles – design considerations, plate preparation, plate mounting, press, ink, substrates; Basic Press construction, Press types, Printing station, fountain rollers, anilox rollers, doctor blades, plate cylinders, impression rollers. Image carrier Preparation- Molded rubber plates; Photopolymer plates, Sheet photopolymer, liquid photopolymer, Direct Imaged Plates, Plate considerations, plate handling, storage, wrap distortion, Ink & solvent compatibility.

UNIT II PRINTING PRESS MOUNTING AND PROOFING

12

Roll mechanics, unwind equipment, infeed, substrate treatment, web tension control, inking systems, drying systems, cooling rolls, in line laminating, rewind equipment, rotary die cutting/sheeting, Pressroom Practices

Plate mounting procedures, plate staggering, plate make ready; Manual Mounting, Video mounting, Sleeve mounting, Pin mounting, Proofing procedure.

UNIT III GRAVURE PROCESS AND IMAGE CARRIER PREPARATION

12

Process characteristics, cylinder construction – design, balancing, copper plating and polishing; reuse of cylinder; well formation; film positives; cylinder layout and film assembly; cross line screen, image carrier preparation techniques – diffusion etch process, direct transfer process, electromechanical, laser and electron beam engraving process.

UNIT IV GRAVURE PRINTING MACHINE

12

Doctor blade assembly – conventional, reverse angle, holder, loading, doctor and back-up blades; oscillation, positioning; impression rollers – types, loading, deflection; electrostatic assist impression system; inking system – types; dryer – types; Press design – types; in feed and out feed coating; lamination, inline solvent less lamination; inline converting operations; power transmission system.

UNIT V MAINTENANCE AND QUALITY CONTROL

12

Maintenance, press, mounting and proofing machines; Printing Problems; quality control at press side, control of incoming materials, Wastage control, Troubleshooting.

Total Hours: 60

COURSE OUTCOMES:

At the end of the course, the student will be able to:

- CO1:** Learn the principle and image carrier preparation of flexographic press
- CO2:** Understand and analyse printing press.
- CO3:** Learn, apply and analyse Gravure process and Image Carrier preparation.
- CO4:** Understand and analyse the parts and working principles of the gravure printing press
- CO5:** Learn and implement the QC in waste control in flexographic and gravure printing workflow

REFERENCES:

- The complete book in printing technology, Delhi Asia Pacific Press, 2012
- Handbook of printing technology, Delhi Elseveir, 2011.
- Complete book in printing technology, Delhi PHI Learning, 2011.
- Modern printing technology, New Delhi NIIR, 2004.
- Handbook Of Printing Technology: Off Set Screen ,Flexo ,Gravure,Inkjet, Digital, New Delhi Eiri 2004*
- Gravure Journal
- Singh(Mohan), Printing Machine Operator Coursebook, NewdelhiAnmol 2013
- Indian journal of printing technology, New Delhi AAR VEE Printers, 2014.

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H	H	H									H	H	
CO2	H	H	H									H	H	
CO3	H	H	H									H	H	
CO4	H	H	H				M					H	H	
CO5	H	H	H	M								H	M	

PRINTING INKS AND CHEMICALS

Semester V
18BEPC11

Instruction Periods/ week: 3T+1Tu
No. of credits: 4

OBJECTIVE:

- To study the manufacturing process of printing inks and its problems during the printing with various testing methods

UNIT I INGREDIENTS OF PRINTING INKS (9+3)

- Colorants** : Pigments, Toners, Classification, Preparation and Properties.
Inorganic : White and coloured, Carbon black, Metallic, Ultramarine and Fluorescent.
Organic : Derailed yellow, Hansa yellow, Rhodamine, Lithol, Rubin, Rubin Toner, Phthalocyanine blue and green, Alkali blue, Ultramarine, Benzidine orange, Toluedene red and Lake red C.
Dyestuffs : Classification, Preparation, Properties and uses of drying. Semi Drying & non drying oils.
Resins : Natural, Rosin and its derivatives and Gum Arabic.
Synthetic : Rosin modified fumaric and maleic acid, phenolic, pure phenolic, Alkyds hydro carbons, polyamides, Polyvinyl, Kenton, Nitro Cellulose, ethyl cellulose, epoxy resins, acrylic resins and varnishes.
Solvents : Aliphatic and aromatic hydrocarbons, alcohols, esters, glycols and ketones.
Additives : Properties and applications: Driers, waxes, anti-oxidants, plasticizers, wetting agents, deforming agents and anti skinning agents.

UNIT II MANUFACTURE: OUTLINE AND EQUIPMENT USED (9+3)

- Paste inks** : Single roll mill, Ball mill, Triple roll mill, Twin horizontal Mixer, Z arm stirrer.
Liquid Inks : Ball mill, Bread mill and attritor. Flow chart for ink manufacturing, weighing, mixing grinding, testing and packing.

UNIT III PROPERTIES AND TESTING

Viscosity, Tack, Colour, Gloss, Rub resistance, length, drying characteristic, and fitness of pigment, grind gauge. (9+3)

UNIT IV SPECIAL INKS AND DRYING MECHANISMS

Heat set, quick set, gloss, magnetic, water based inks, cold set, moisture set and Radiation curable inks, IR, UV & EB, Raw materials to constitute the inks and the equipment used for drying. Different types of ink drying mechanisms. (9+3)

UNIT V INK PROBLEMS

Related to major printing processes, causes and remedies. (9+3)

Total Hours: 60

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Know the basic raw materials in inks
- CO2: Prepare the inks for different process
- CO3: Knowledge on types of printing process inks
- CO4: Knowledge on print problems and remedial measures based on types of inks

REFERENCES:

- LEACH, R.H., "The Printing Ink Manual", Fifth Edition, Chapman & Hall, London, 1993.
- RONALD ET "Printing inks formulaton principles, manufacturing and quality control procedures", PIRA international, UK
- ROBERT, F. REED, "What the Printer Should Know About Inks", GATF, 1984.
- CLIFF WOOF, "A Manual for Flexographic Inks", Fishburn Printing Ink Co. Ltd., Watford 1979.
- FONALD, E. TOOD, "Printing Inks", Pira International, United Kingdom, 1994.
- Bob Thompson-PIRA "Printing materials science & technology"
- J. Anthony Bristow "Advances in printing science & technology" Vol.24

Course Outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	CO1	H												
CO2	CO2	H											H	H
CO3	CO3	H												
CO4	CO4	H												
CO5	CO5	H	H		H									

DIGITAL PRINTING

Semester V
18BEPC12

Instruction Hours/ week: 2T+1Tu
No. of credits: 3

OBJECTIVES:

- To understand the components of digital workflow and acquire knowledge on digital printing techniques

UNIT I DIGITAL DATA HANDLING

(6+3)

File formats – EPS, JPEG, GIF, TIFF, PNG, PDF, Comparison of file formats, Overview of Compression techniques - Lossy & lossless compression; Image quality evaluation; Content Management Systems - DBMS, Data Warehousing, Cloud based systems; Computer networks - Principle, components, security.

UNIT II DIGITAL PRINTING WORKFLOW

(6+3)

Digital Printing - Principle, Features, Applications; Data Preparation - Layout components & compatibility, Trapping; Postscript, PDF - standards, features; Workflow - Data Preflight, PDF/X Creation and Output, Colour Management, Proofing, Digital Screening, Ripping, CIP4, JDF;

UNIT III COMPUTER TO PRESS/DIRECT IMAGING

(6+3)

Direct imaging - principle, features, applications; Once Imageable Masters - Principle, types, Press configurations; Re-imageable Masters - Principle, types, Press configurations;.

UNIT IV DIGITAL PRINT TECHNOLOGIES

(6+3)

Inkjet presses - Principle, types, press configuration, ink types, ink properties; Electrophotographic - Principle, Imaging Systems, Inking Unit, Fixing and Cleaning, Toner types, toner properties; Thermography - Direct Thermography, Thermal Sublimation Printing Systems, Thermal Transfer Printing Systems

UNIT V APPLICATION AND ADVANCES

(6+3)

Proofing, VDP (variable data printing), POD (print on demand), Inline post press and finishing operations, Size factor considerations, Costing of digital print jobs, Wastages, Toner recycling, Substrate variety and limitations, Quality Standards, Setup of a digital print house, Case study

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Understand the basics of handling digital data
- CO2: Describe the preflight process and produce proof
- CO3: Illustrate the process of create film to print jobs
- CO4: Categorize the Digital Print Technologies
- CO5: Organize the Various Applications of Digital Printing

REFERENCE:

- Mitchell Rosen, Noboru Ohta, Color Desktop Printer Technology, CRC Press, 2006
- Harald Johnson, Mastering Digital Printing, Cengage Learning PTR; 2 edition, 2004
- Helmut Kipphan, Handbook of Print Media, Springer Verlag, 2001

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H		L	L	L			L		M		M	M	
CO2	H				M					L		M	M	
CO3	H	M			M						M	M		L
CO4	M	M		L										
CO5	M			L	M		L	M		M		L	L	

PACKAGING TECHNOLOGY

Semester V
18BEPC13

Instruction Hours/ week: 2T+1Tu
No. of credits: 3

OBJECTIVES:

- To understand the purpose of packaging design
- To study the different types of packaging process
- To understand the packaging testing methods

UNIT I FUNDAMENTALS OF PACKAGING AND DESIGN (6+3)

Definition, historical background, functions of packaging, types and selection of package, odour and flavour contaminations, interaction of package and contents, materials and machine interface, life cycle assessment. Consumer research and sales promotion, through package design; factors influencing design, function of graphics, color in package design.

UNIT II MANUFACTURE PROCESS (6+3)

Cutting; creasing; punching, punch selection; die making; cartooning system, lined cartons, form fill seal, selection of cartooning system; CFB, manufacture, closure, case styles, rigid boxes board cutting, corner cutting, corner staying, paper slotting, box covering, handmade boxes, wire stitched boxes; problems of rigid box making; fibre drums, spiral and straight winding, drum ends and lids; uses, moulded pulp containers; can, can ends, base decorative system, container ends three piece and two piece can; types of seam treatment, metal drums, types of drums; collapsible tube; metal foil packaging; bag making machinery, multiwall, tube forming; robots used in packaging.

Unit III SPECIALITY PACKAGING (6+3)

Aerosol packaging, shrink and stretch wrapping. strip packaging, blister packaging, antistatic packaging, aseptic packaging, oven able package; Cosmetic packaging, confectionery packaging, hardware packaging, textile packaging, food packaging; child resistant and health care packaging, chub packaging, electrostatic discharge protective packaging, export packaging, holographic packaging, lidding, medical packaging, modified atmospheric packaging.

UNIT IV PACKAGE TESTING (6+3)

Testing, bursting, tear, tensile; drop test, incline impact, horizontal impact, bridge impact, other handling test; vibration test, stacking and compression test, corrugated board testing, migration test, storage tests, hot track method, layer gauge method;

UNIT V PRODUCT CODING AND IDENTIFICATION (6+3)

Bar-coding, Tags, Labelling, Holographic packaging, RFID.

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the student will be able to:

- CO1: Gaining knowledge about fundamentals of packaging and design
- CO2: Create design and evaluate the various packages and understand their manufacturing process.
- CO3: Describe and identifying the various types of speciality packages
- CO4: Learn, apply and Evaluate the various package testing methods
- CO5: Analyse and apply the product coding and identification in package labelling

REFERENCE:

1. Walter Soroka, "Fundamentals of packaging technology", 3rd Edition, Institute of packaging professionals, Naperville, Illinois, USA, 2002.
2. Joseph F. Hanlon, "Handbook of Package Engineering", McGraw Hill Co., 1984.
3. F.A. Paine, "Fundamentals of Packaging". Brookside Press Ltd., London, 1990.
4. "Handbook of Package Design Research", Water stem Wiley Intrascience. 1981.
5. Paine, "Packaging Development". PIRA International, 1990.
6. Chakravarty B. (1997) "A Hand Book for Printing and Packaging Technology" Galgotia Publications,
7. Dr.B.Kumar, Dr.S.Natarajan&Dr.M.Govindarajan, "Fundamentals of Packaging", Published by PHI Learning Pvt Ltd, 2009
8. Frank Paine "Packaging design and performance"
9. Packaging Technology - Volume I & II, IIP

Course Outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H												M	
CO2	H											H	M	
CO3	H											H	M	
CO4	H	M	H									H	M	
CO5	H											H	M	

FMCG PRACTICALS

Semester V
18BEPC14

Instruction Hours/ week: 3P
No. of credits: 1.5

OBJECTIVES:

LIST OF EXPERIMENTS:

1. Prepare a layout design for Package
2. Prepare a digital imposition/ups
3. Design a FMCG package for Cartons
4. Design a FMCG package for Glassware
5. Design a FMCG package for Hardware
6. Design a FMCG package for Plastic
7. Design Labelling FMCG package
8. Barcoding for FMCG package
9. Obtain Process Colour Print
10. Obtain Quality check for the Print and Package

Total Hours: 45

COURSE OUTCOMES:

1. Learn layout design and Digital Imposition
2. Create a design for various Packages
3. Create a design for barcode and labelling
4. Analyse the quality for package

Course Outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H												M	
CO2	H													
CO3	H													
CO4	H	M	H										M	
CO5	H												M	

QUALITY CONTROL PRACTICALS

Semester V
18BEPC15

Instruction Hours/ week:3P
No. of credits: 1.5

OBJECTIVE

- To do the paper and ink testing for the different types of printing inks under various environment

LIST OF EXPERIMENTS

I. Ink Testing

1. Study of pigment properties
2. Measurement of viscosity
3. Measurement of tack
4. Measurement of rub proofness
5. Measurement of gloss
6. Measurement of ink drying time
7. Resistance testing of prints

II. Paper testing

1. Determination of Tensile strength
2. Determination of Burst strength
3. Determination of Substance
4. Determination of Caliper
5. Determination of Absorbency
6. Determination of Pick strength
7. Determination of Stiffness
8. Determination of Porosity
9. Determination of pH

III. Printing Parameters Testing

1. Measurement of pH of fountain solution
2. Measurement of Conductivity
3. Measurement of Contact angle
4. Measurement of Relative humidity
5. Analysing the quality of printed products

IV. Visit to Quality Control labs in industries

V. Visit to two ink factories and paper mills

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

CO1: Know the various testing methods for paper

CO2: Know the various testing methods for ink

CO3: Understanding and knowledge on print parameter testing

CO4: Adding knowledge about ink, paper manufacturing by visiting the quality labs in industry

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H	H		M	H							M	H	
CO2	H	H	M	M	H							M	H	
CO3	H	H		M	H							H	H	
CO4	H	H			H							H	H	

PRINT AND PUBLISHING

Semester VI
18BEPC16

Instruction Periods/ week: 4T
No. of credits: 4

OBJECTIVE:

- To explore knowledge in various Printing and Publishing domain
- To understand legal aspects in publishing

UNIT I PUBLISHING ORGANISATION

12

Areas of publishing – General publishing, Educational publishing, Professional publishing, Reference publishing, Publishing textbooks for children, Digital library, Electronic Publishing, Web Publishing; Publishing house role – Commissioning editor, Desk editor, Designer, Production manager, Sales/Marketing manager, Publishing manager.

UNIT II EDITORIAL PROCESS AND DEVELOPMENT

12

Copy editing, Page makeup, Proofs; Book editor – Multipurpose functions; Discussion with author, Editing educational material, Decision making role; Editorial technique – Style sheet, Reference aids; Author and his manuscript – Unsolicited manuscripts; Author – Publisher relationship, Professional guides and Societies, Literary agency. Designing for Newspapers, Booklets, Magazines, Business publications, Banners & Posters, Advertising, Transit, Interactive, Web and Maps. Case studies.

UNIT III PERIODICAL PUBLISHING & BOOK PUBLISHING

12

Types of magazines, Difference between writing for a magazine & newspaper, structure of a magazine’s editorial department & roles, Designing a layout for magazine, story design, page design, web design; Redesigning. Publishing organisation, editorial process and development production& estimating in book publishing, promotion channels, distribution outlets and sales techniques, digital publishing and legal aspects of book publishing

UNIT IV ELECTRONIC PUBLISHING

12

Areas of publishing – Legal, STM, Book Publishing – Manuscript, Anatomy of a book, Layout& Design, Journal Publishing – Layout & Design, Web Publishing – Layout & Design, Accessibility, usability, standards, Publishing on Handheld devices – Layout & Design , -Reference database – PUBMED etc. Index – author, volume, keyword. Workflow- Authors, Publishers, e Publishing Companies; Workflow – Receiving Jobs (FTP), Pre-editing, Copy editing, Proof reading, Graphics, Pagination, Quality Control, Output – Print, Proof, Web, Handheld devices(file formats) ;Workflow software, Publishing Management System: Publication representation; Publication environments; Publication node structure; Version management; Content objects & processing objects; Publication naming; Information sharing Hypertext and its principle.

UNIT V DIGITAL PUBLISHING AND LEGAL ASPECTS OF BOOK PUBLISHING

12

Software needs, manuscript formats and file management, editing tools, web design and publishing; copy right, types of agreement between author and publishers, agreement of sale of translation rights, illustration and artwork agreement, the outright sale of the copyright, profit sharing agreement, the royalty system, commission agreement.

Total Hours: 60

COURSE OUTCOMES:

- At the end of the course, the student will be able to:
- CO1: Learn and identify various print and publishing media
 - CO2: Know, apply and analyse the editorial process for newsprint, periodical, Book and digital publishing.
 - CO3: Create and design the periodical publishing and book publishing.
 - CO4: Create and design electronic publishing and its workflow
 - CO5: Create and design digital publishing and analyse the legal aspects in printing

REFERENCES:

- John Matt, Career In Adversting, Graphic & Web Designing, Printing & Publishing, ChandrighAbishek, 2003.
- Zappaterra Yolanda, Editorial Design For Print An Electronic Media, Rotovision (Switzerland)
- Peacock, John, Multilingual dictionary of printing and publishing terms, London Blueprint, 1996.
- Kinkoph,Sherry, The Print Shop Idea Book, Carmel Prentice Hall Computer Publishing 1994.
- Conover, Theodore.E, Graphic Design in Action: A Work Book, Newyork West Publishing 1998.
- Miletsky, Jason, Digital Publishing To Go, New Delhi Prentice Hall Of India 2006.
- Kleper(Michael), The Handbook Of Digital Publishing, Newdelhi Prentice Hall Of India 2005.
- White, Alex, Type In Use: Effective Typography For Electronic Publishing, Newyork Design Press 1994.
- Vanoirbeek C, Electronic and Publishing, New York Cam. Univ.Press 1998
- Helgerson, Linda.W, CD-Rom : Facilitating Electronic Publishing, London International Thomson Press 1999.

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H											H	H	
CO2	H	M	M	H								H	H	
CO3	H	H	H	H								H	H	
CO4	H	H	H	H								H	H	
CO5	H	H	H	H								H	H	

PRINT FINISHING AND CONVERTING

Semester VI
18BEPC17

Instruction Hours/ week: 3T+2P
No. of credits: 4

OBJECTIVE:

- To impart knowledge on various finishing operations, machines and materials used for print finishing

UNIT I BINDING MATERIALS (9+6)

Overview of binding and finishing; Print finishing – classification; materials; JDF and MIS in book binding and print finishing, trends and developments in finishing operations; adhesives – types, manufacturing, theory of adhesion; prevention of deterioration; Production control, Network analysis and Quality control.

UNIT II GUILLOTINES (9+6)

Joggers; cutting – overview, work preparation; cutting machine – parts, types of motion; Principles of single knife guillotines, semi-automatic and automatic programming systems, three knife trimmers; operation, mechanism and maintenance of guillotines; various adjustments; operational procedure of sensors and hydraulic systems; problems and remedies during cutting.

UNIT III FOLDING (9+6)

Principles of folding, types of folding for sheet and web, methods of feeding and delivery; folding production line, folding terminology, folding diagram, folding scheme; problems involving folding; mechanism, operation and adjustment of folding machines; additional features – fold gluing, perforators, creasers and slitters. 62

UNIT IV GATHERING AND SECURING OPERATION (9+6)

Principles of gathering, types of machines, feeders, delivery, inline production; Securing – types, characterization; stitching – wire and thread; adhesive binding; sewing – types, feeders and delivery; mechanical and loose leaf binding; materials, styles, purpose of each method.

UNIT V MISCELLANEOUS FINISHING OPERATION AND AUTOMATION IN BINDING (9+6)

Edge treatment – characterization, edge staining, bookmark, rounding, backing, headband, edge treatment operation in production lines; case making – characterization, producing book covers, case making, casing in, inserting jackets; principles and operation of embossing, foil stamping - hot and cold, die-cutting, coating, indexing, round cornering, poly-bagging, preventing transit marking; lamination – types; In-Line Gluing Equipment, Off-Line Scoring, Shrink Wrapping, Automated Off-Line Kit Fulfillment, Integrated Off-Line Card and Label, Hybrid finishing formats and equipments, materials handling and mailing.

Total Hours: 75

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Understand the various materials operations and recent trends of print finishing
- CO2: Learn and apply the operation working principle problems and remedies of paper cutting mechanics.
- CO3: Knowledge analyse and apply the types mechanism and operation of folding
- CO4: Describe and analyse the gaining and security operation
- CO5: Analyse and apply various finishing operation and binding.

REFERENCES:

- T. J. Tedesco, Binding, Finishing and Mailing: The Final World, GATF press, Pittsburgh, 2005.
- A. G. Martin, Finishing Process in Printing, Focal press Ltd., Britain, 1980.
- Ralph Lyman, Binding and finishing, GATF, 1993
- Arthur W. Johnson, The practical guide to Craft Book Binding, Thames and Hudson, 1985
- Arthur W. Johnson, Book Binding, Thames and Hudson, 1984
- T. M. Adams, D.D. Faux and L. T. Ricber, Printing Technology, Delmar Publications Inc., 1996
- Helmut Kipphan, Handbook of Print Media, Springer, Heidelberg, 2001

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H	M	M	M								M	M	
CO2	H	M	H	M								M	M	
CO3	H	M	H	M								M	M	
CO4	H	M	H	M								M	M	
CO5	H	M	H	M								M	M	

PACKAGE DESIGNING

Semester VI
18BEPC18

Instruction Hours/ week: 3T+1Tu
No. of credits: 4

OBJECTIVES:

- To provide information on basic concepts in package designing, design considerations and design workflow.
- To learn about the package design and performance simulation software's

UNIT I INTRODUCTION

(9+3)

Packaging and Modern Merchandising, Marketing Requirements, Brand Management, Product Lifecycle, Planning for change, Design considerations – structural development, packaging coordination, graphics, packaging line engineering, cost of development; Economic considerations: package cost vs. product cost, Environmental Considerations, Life cycle Assessment, Legal issues, Recent trends

UNIT II PACKAGE DEVELOPMENT

(9+3)

Managing the Packaging Function, Project Scope, Consumer Research, Behavioural Measures, Eye Tracking and the features of a package, Optimizing Package Design, Package Design Process, Specifications, Benchmarks, Package Designer's Checklist, Package Design Evaluation – ocular tests, questionnaires.

UNIT III GRAPHIC DESIGN

(9+3)

Demographics and Psychographics, The Retail Environment, Fundamental Messages, Equity and Brand Names, Typography, Color, Illustration, Graphic Design Basics, Package Design and Marketing Studies, Package Aesthetics, Decoration Aspects, Layout and Feature Selection.

UNIT IV STRUCTURAL DESIGN

(9+3)

Predicting package performance, Role of Structure, Structural Design – folding cartons, cans, glass containers, plastic containers, bags and pouches; Die-making, Drawing, Moulds, Prototypes, Samples, etc., Package Optimization

UNIT V CLOSURES

(9+3)

Function, Types, Selection considerations, Container and closure dimensioning, Metal closures, Closure Seals, Plastic closures, Injection moulds and closure design, tamper evident closures, child resistant closures. Special closures and functions, Case study and Mini Project for package design

Total Hours : 60

COURSE OUTCOMES:

At the end of the course, the students should be able to:

CO1: Understand the fundamental knowledge about the products, legal aspects and latest trends.

CO2: Analyse, optimize, evaluate and apply for pack design process

CO3: Create, apply evaluate and design graphics layout for package design.

CO4: Learn, analyse and apply the structural design to optimize the package.

CO5: Analyse various types of closure and create and apply the package design for the given products.

REFERENCES:

- Aaron L. Brody and Kenneth S. Marsh, "The Wiley Encyclopedia of Packaging Technology", 1997
- Giles Calver, "What is Packaging Design?: Essential design handbook", Rotovision, 2004
- Steven DuPuis, John Silva, "Package Design Workbook: The Art and Science of Successful Packaging", Rockport Publishers, 2008
- Marianne R. Klimchuk and Sandra A. Krasovec, "Packaging Design: Successful Product Branding from Concept to Shelf", Wiley, 2006,
- Walter Soroka, "Fundamentals of packaging technology", 3rd Edition, Institute of packaging professionals, Naperville, Illinois, USA, 2002

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H	M	M		M							M	H	
CO2	H	H	H		H							M	H	
CO3	H	H	H	M	H							M	H	
CO4	H	H	H	M	H							M	H	
CO5	H	H	H	M	H							M	H	

PUBLISHING PRACTICALS

Semester V
18BEPC19

Instruction Hours/ week: 3P
No. of credits: 1.5

OBJECTIVE:

The students should be made to:

- To understand various technologies in creating a website and
- Explore various style sheets to adapt for various gadgets
- Learn to include different media in websites.

LIST OF EXPERIMENTS:

1. HTML – Simple web page design
2. Scripting – Simple applet design
3. Introduction to XML and XSLT
4. Style sheet creation
5. Creating Data base & link
6. 2D animation
7. 3D animation
8. Audio & Video editing
9. Cross media designing
10. Tablet Publishing
11. Mini project

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Design simple and dynamic web pages .
- CO2: Create complete website with database on back end.
- CO3: Create and embed the web page with many media
- CO4: Create style sheet for different gadgets.

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H	M	H		H							H	H	
CO2	H	M	H		H							H	H	
CO3	H	M	H		H							H	H	
CO4	H	M	H		H							H	H	

PACKAGE DESIGN PRACTICALS

Semester VI
18BEPC20

Instruction Hours/ week: 3P
No. of credits: 1.5

OBJECTIVES:

Become acquainted with the nature and impact of visual communications in packaging design

- To familiarize with the various graphic design and 3D Modeling software

EXERCISES:

- Graphic design for packaging applications
- Structural design for packaging applications
- Integration and visualization of structural and graphic designs
- Designing for labels and folding cartons
- Designing Straight Tuck End (STE)
- Reverse Tuck End (RTE) style cartons.
- Designing Full Seal End (FSE), Tray and Tube style cartons.
- Designing for flexible pouches and metal cans
- Designing for multiple-ups
- Working with Package Designing Software.
- Concepts and tools in 3D using package designing software

Total Hours : 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

CO1: Knowledge about design software,

CO2: Creating innovative designs

CO3: Using design concepts for package production for various products

CO4: Design and prepare a package with suitable functions for given product

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H	M	M	M	H							H	M	
CO2	H	H	M	M	H							H	H	
CO3	H	H	H	H	H							H	H	
CO4	H	H	H	H	H							H	H	

INDUSTRIAL ENGINEERING

Semester VII
18BEHS13

Instruction Hours/ week: 3T
No. of credits: 3

OBJECTIVE :

To study the industry psychology and economics with professional ethics at work place

UNIT I INDUSTRIAL ECONOMICS

Introduction : Nature and scope of Industrial economics, The factors of production, Land, Labour, Capital ,Resources, Technical Efficiency and economic efficiency ,Mixed economy. Forms of Business Enterprises Sole Proprietor, Partnership, Limited Company, Co-operative movement, Taxation and its effects, On business enterprises, Industrial financing, Capital market. 9

UNIT II BUSINESS ECONOMICS

Markets,Market Mechanism, Demand and Supply, Equilibrium concept, Elasticity, Price and Price Mechanism, Cost and cost control. National Income, Components of National Income ,Economics fluctuations, Business Cycle. 9

UNIT III INTERNATIONAL ECONOMICS

International Trade, Exports and Imports, Balance of payments, Policies. 9

UNIT IV INDUSTRIAL PSYCHOLOGY

Definition,Aim and scope, Concept of Intelligence and measurement, Personality and character,Job,7Job character, Job evaluation, Job performance and counselling -Adopting of individuals to task, Attitude to work and work environments, Motivations, Fatigue and Accidents, Causes and prevention, Safety. 9

UNIT V INDUSTRIAL SAFETY

The objective of safety, health & environment; Cost of safety; Accident investigation report; Safety promotional activity; Environmental pollution and its control. Indian Factories Act on safety; HACCP; Desirable safety features of some food processing equipment; Personal protective equipment 9

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Knowledge on industrial economics and business economics
- CO2: Knowledge on business economics
- CO3: Understand the import and export policies
- CO4: Impart the psychology of printing industrial personals
- CO5: Cognize various safety measures of printing industries

REFERENCE

- 1.Paul, A. Samuelson, "Economics", McGraw Hill.
2. Barathwal, R., "Business Economics", Vikas Publishing House Pvt. Ltd.
- 3.Varshney, R.L. And Maheswari, K.L, "Managerial Economics", Sultan Chand.
- 4.Joseph Tiffin And Ernest, J.M. Carmick, "Industrial Psychology", Prentice Hall of India Pvt. Ltd.,
- 5.Keith Davis, "Human Behaviour at work", McGraw Hill.

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	M	L				H		H	M	M		M	H	
CO2	M	H				M	H	M		M	M	M	M	
CO3	M					M	H	M		M		M	M	
CO4							M	H	H	H				
CO5						M	M	H		H				

CROSS MEDIA PUBLISHING

Semester VII
18BEPC22

Instruction Hours/ week: 3T+2P
No. of credits: 4

OBJECTIVE:

To integrate and connect the various media for publishing

UNIT I INTRODUCTION

(9+6)

Introduction to cross media publication, Print media , Web media , work flow, implementation plan Authors, Publishers, e Publishing Companies; Workflow – Receiving Jobs (FTP), Pre-editing, Copy editing, Proof reading, Graphics, Pagination, Quality Control, Output – Print, Proof, Web, Handheld devices(file formats) ; Workflow software.

Experiments:

1. HTML web page design using tables and links
2. Web page design using frames and forms

UNIT II PUBLISHING & PUBLICATION MEDIA

(9+6)

Publishing Process, Standards, Publishers' and Metadata. Offline, Online and hybrid publication Media. Content and content formats: types, text, formats. E-publishing Models. The e-book: E-book content, delivery formats, components, producing e books, e-books and metadata, e-books and encryption, managing e-book content

Experiments:

1. Creating stylesheets
2. Introducing XML and DHTML

UNIT III MULTIMEDIA

(9+6)

Design and Layout for Electronic Media, understanding of the principles of layout and composition including the use of the grid system, Use web editing packages, HTML mark-up and style sheets(CSS) to compose and layout web pages, understanding of the principles of typography, Indexing, Types of PDFs (editable and non-editable) , teletext.

Experiments:

1. 2D animation
2. 3D animation

UNIT IV PUBLICATION & E-COMMERCE

(9+6)

Information regarding E-publications formats like e-pubs. Also E-pub readers like Adobe Digital Editions, mobile readers etc in brief (since this is a worldwide used e-publishing solution used on a large scale), rules and regulations for e-publishing use of business models in the development and evaluation of an e-commerce application, Style-sheets, XSL, XSLT, CSS Layout and workflow for cross media devices, POD, Mobile, Tablets, CD, Websites, File extension and Compatibility

Experiments:

1. Audio & Video editing
2. Cross media designing

UNIT V WEB APPLICATION DEVELOPMENT

(9+6)

Use of Flash (Basic concepts), Introduction to dot net technology, Web Applications Development, CMS (content Management System) and ECM suites (Enterprise Content Management), methodology, need and use

Experiments

1. Tablet Publishing
2. Mini project

Total Hours: 75

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Understand the Principle of cross media
- CO2: Analyse the property of e-books
- CO3: Develop the Multimedia Concepts
- CO4: Use the advertising knowledge to create advertising
- CO5: Develop web planning solutions

REFERENCES:

1. Michal' L Kleper, The Handbook of Digital Publishing
2. Harold Henke, (2001), Electronic Books and ePublishing: A Practical Guide for Authors, 1st edition, Springer.
3. William E Kasdorf, (2003), The Columbia Guide to Digital Publishing, Columbia University Press.
4. Cady & McGregor, (1996), Mastering the Internet, 2nd edition, Business Promotion Bureau Publications.
5. Deitel&Deitel, Neito, Sadhu, (2001), XML How to Program, Pearson Education Publishers.
6. Eric Ladd, Jim O' Donnel, (1999) Using HTML 4, XML and Java, Prentice Hall of India – QUE.
7. Scot Johnson, Keith Ballinger, Davis Chapman, (1999), Using Active Server Pages, Prentice Hall of India.
8. H. Kipphan, (2001), Handbook of Print Media, ISBN: 3-540-67326-1Springer-Verlag Berlin Heidelberg
9. Begin.C, I.BaTIS in action, Creating & Manipulating PDF 10. Multimedia making it work by Infra Suite.

Course Outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	M				L	L						L	L	
CO2	M	M			M	M							M	
CO3	H	H	H		H	M						L	L	
CO4	H	H	H		H	H							H	
CO5	H	H	H		M	M							M	

OBJECTIVE:

- To provide students an exposure to disasters, their significance and types and to gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)

UNIT I: INTRODUCTION TO DISASTERS

9

Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire etc. – Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability – Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don'ts during various types of Disasters.

UNIT II: APPROACHES TO DISASTER RISK REDUCTION (DRR)

9

Disaster cycle – Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- non-structural measures, Roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stakeholders- Institutional Processes and Framework at State and Central Level- State Disaster Management Authority(SDMA) – Early Warning System – Advisories from Appropriate Agencies.

UNIT III: INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT

9

Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc.- Climate Change Adaptation- IPCC Scenario and Scenarios in the context of India – Relevance of indigenous knowledge, appropriate technology and local resources.

UNIT IV : DISASTER RISK MANAGEMENT IN INDIA

9

Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy – Other related policies, plans, programmes and legislation – Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment.

UNIT V: DISASTER MANAGEMENT: APPLICATIONS AND CASE STUDIES AND FIELD WORKS

9

Landslide Hazard Zonation: Case Studies, Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.

Total Hours: 45**COURSE OUTCOMES:**

At the end of the course, the student will be able to

- CO1 : Differentiate the types of disasters, causes and their impact on environment and society.
- CO2 : Assess vulnerability and various methods of risk reduction measures as well as mitigation.
- CO3 : Discuss inter-relationship between disaster and development
- CO4 : Draw the hazard and vulnerability profile of India
- CO5 : Evaluate disaster damage assessment and implement disaster management measures

Text Books:

- Singhal J.P. "Disaster Management", Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13: 978-9380386423
- Tushar Bhattacharya, "Disaster Science and Management", McGraw Hill India Education Pvt. Ltd., 2012. ISBN-10: 1259007367, ISBN-13: 978-1259007361
- Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011
- KapurAnu Vulnerable India: A Geographical Study of Disasters, IIAS and Sage Publishers, New Delhi, 2010.

References:

- Govt. of India: Disaster Management Act , Government of India, New Delhi, 2005
- Government of India, National Disaster Management Policy, 2009.

PROFESSIONAL ELECTIVES (PE1) PRINTNG TECHNOLOGY DOMAIN

SCREEN AND TEXTILE PRINTING

18BEPE01

**Instruction Hours/ week:3T
No. of credits: 3**

OBJECTIVE:

- To impart knowledge on the basic principles of Screen printing process, stencil preparation methods & types of presses, print problems & quality control in screen and textile printing process.

9

UNIT I SCREEN PREPARATION AND STENCIL MAKING

Mesh materials, Characteristics and selection, types of frames, screen Tensioning Devices, screen pre-treatment, Degreasing of a screen, hand cut stencils, photomechanical stencil making, direct & indirect process, Equipment used.

UNIT II MACHINE PRINTING

Flatbed hinged frames, vertical lift, cylinder bed, Container Printing & Rotary machines, squeegee: Types and maintenance.

9

UNIT III INK AND SOLVENTS - DRYING METHODS

General properties, Basic constituents of screen ink, Major classes of solvents, safety in the handling and storage of ink & solvents. Oxidation drying, solvent Evaporation, Infra- red & Ultraviolet curing.

9

UNIT IV TEXTILE PRINTING

Design : Gouache, Bottled water colors, Painting and Blotches, Resist Techniques, Surfaces, Transfer Techniques. Materials, Dyeing, Single stage dyeing and polychromatic dyeing, Synthetic fabrics, blended fiber fabric, natural fabrics, Paper, paints, Brushes, Pens and Inks, palettes, Pencils, Adhesives.

9

UNIT V PRACTICAL SESSION

Direct and indirect Stencil making, Screen producing, Producing single color and multi color images. Producing half tone images, Study of automatic, semi automaticscreen printing Machines, Industrial Visit.

Total Hours : 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Know the basic principles of screen printing and preparation of image carrier
- CO2: Learn and analyse screen printing machines
- CO3: Understand and apply the ink and software and drying process of screen-printing process.
- CO4: Learn and apply the textile materials and printing process
- CO5: Design, create, analyse print and evaluate the screen printing

REFERENCES:

- John Stephens(1994), *Screen process printing*; Blueprint publishing Ltd.,
- Albert Koslof (1900), *Screen printing techniques*; the signs of the Times Publishing Co.,
- Chawan, R.B(1981), “*Advances in textile chemical processing Ed.*”, IIT, Delhi,
- Joyce Storey, *The Thanes & Hudson Manual of Textile Printing*, Thames &Hudson Ltd., London, 1984.
- Mary Paul Yates(1996), *Textile, A Handbook for Designers*, W.W. Norton & Company, London.
- Susan Bosence(1985), *Handbook Printing & Resist Dyers*, David &Charies, London.

Course Outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H		M									H	H	
CO2	H		H									H	H	
CO3	H		H									H	H	
CO4	H		H									H	H	
CO5	H		H									H	H	

FINANCIAL MANAGEMENT FOR PRINTING

Instruction Periods/ week: 3T

18BEPE02

No. of credits: 3

OBJECTIVE:

To impart knowledge on

- Basic concepts of costing, pricing, estimating and investment analysis
- Estimating cost of printing materials and different processes for various print jobs

UNIT I COSTING AND PRICING

Costing systems-cost; profit; price; functions of costing; costing models; types of costing – marginal costing, job costing, budgeting costing; types of budgets; budgetary control; sales forecasts and budgets for printing and allied industries; relationship between cost control and budgetary control.

UNIT II ESTIMATING

Cost estimating, price estimating, estimator needs; procedure for selling, estimating, pricing and quoting for printing; estimating methods; production planning; computerized estimating.

UNIT III ESTIMATING PRINTING MATERIALS FOR PROCESSES

Paper-sheet and web; ink; toners ;pre-press; machine printing–sheet-fed offset, web offset, flexography, gravure, screen printing, digital printing; post press; e-publishing.

UNIT IV COST ANALYSIS

Classification of cost; elements of cost; costing of direct materials; costing of machine operations; costing of manual operations; costing –typesetting, scanning, plate-making, printing, binding and finishing operations.

UNIT V INVESTMENT ANALYSIS

Time value of money, compound value, present value, annuities, pay back method ,average rate of return and internal rate of return method; Depreciation, Return on Investment, Return On Capital Expenditure; Break even analysis–analysis, calculation of break even point, margin of safety, sensitivity analysis and profit graphs, Basics of Credit Management–AR, AP

Total Hours : 45

COURSE OUTCOMES:

At the end of the course, the student should be able to:

CO1: Concepts on costing and pricing

CO2: Knowledge on estimating the cost of different materials used in printing

CO3: Calculate the composite machine hour rate (CMHR) for the machines used in printing•

CO4: Know the concepts on Investment analysis

CO5: Knowledge on break even analysis and calculate breakeven point

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H							H		H	H			
CO2	H							H			H			
CO3	H				H						H		H	
CO4	H				H			H			H			
CO5	H				H						H			

Objective

- To inculcate the technical knowledge in layout preparation and planning for the image production

UNIT I PLANNING LAYOUT AND FILM ASSEMBLY 9

Objective and purpose of layout, factors to be considered during planning and basic steps involved in planning a layout. Materials used for planning, book work margins. Impositions methods. Methods of Positive and negative film planning, planning of multicolor work, burnout mask, blue and red keys, punch and drill registration system. Step and repeat work. Page impositions using software.

UNIT II PLATE MAKING CHEMISTRY 9

Surface chemistry of oleophilic image areas; hydrophilic non-image areas; surface treatments; effects of chemical changes resulting from exposure and processing on dichromated colloids (diaz compounds and photopolymers); use of double exposure; combination exposure and multiple image techniques.

UNIT III IMAGE CARRIERS – I 9

Planography:Light sensitive coating, dichromate colloids, diazo compounds, photopolymers. Modern offset plates. Light sources used for plate-making and the action of light on sensitive coatings. Pre-sensitized plates- types of positive and negative working plates. Multi metal plates and their production. Quality control aids used in plate making. Computer to plate (CTP) systems- CTP technologies, types of CTP plates, CTP architecture and workflow, future trends. **Flexography:** Plate materials, production of moulded rubber plates, equipments used for making moulded rubber plates, qualities of good engraving, common problems in engraving, advantages and disadvantages of rubber plates. Laser engraved design rolls- Production, use and care of these. Recent developments and trends. Dry offset plates for waterless printing. Rolls, features and benefits. Photopolymer plates-types, production, advantages

UNIT IV IMAGE CARRIERS –II 9

Gravure: Methods of gravure cylinder making. Well formation, cylinder construction and design. Copper plating and polishing. Reuse of cylinders. Ballard shell cylinders. Electromechanical engraving. Electron beam and laser beam engraving. Recent developments and trends. **Screen Printing:** Fabric types- mono filament, multi filament, fabric materials- tension characteristics and specific applications. Fabric selection, Frames- types and size considerations. Fabric Stretching techniques and devices. Stencil making, Photographic stencils, direct, indirect, direct-indirect combination and capillary. Recent developments and trends.

UNIT V MODERN OFFSET PLATES 9

Direct image plates, direct photographic plates, electrostatic plates, diffusion transfer plates, projection plates, laser exposed plates, waterless litho plates and computer to plate.

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Learn create and design graphical layout and film assembly.
- CO2: Understanding and apply of plate chemistry and plate standardization
- CO3: Learn and apply plate making process for offset printing proses of flexographic and analyse and standardizing / Optimix the plate through quality control process
- CO4: Know the image carriers' preparation and apply for gravure printing process and screen-printing process.
- CO5: Apply and analyse the Recent offset plates.

REFERENCES:

1. IANFAUX, "Modern Lithography", Sita Ltd., 1982
2. GATEHOUSE, A.L. and ROPER, K.N., "Modern Film Planning andPlatemaking", Sita Ltd., 1983.
3. "The Lithographers Manual", GATF.
4. Babette Magee (1985) "Screen printing Primer", GATF, USA.
5. Ray Blair and Thomas M.D. (1991) "Flexography,Principle and Practices",Foundation of Flexographic Technical Association, USA.
6. Ray Blair and Thomas M.D. (1991) "Gravure Process and Technology", GAA,USA.
7. John Peacock, Michael Bernard,"Handbook of printing and production"

Course Outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H											M	M	
CO2	H													
CO3	H													
CO4	H	H					M							
CO5	H											M	M	

PACKAGING MATERIALS

Instruction Hours/ week: 3T

18BEPE04

No. of credits: 3

OBJECTIVES:

- To introduce the fundamental knowledge in the different types of packaging materials
- To impart knowledge in the selection of suitable material for various packaging applications.

UNIT I PLASTICS

9

Polymers, Plastics in packaging – types, advantages; Flexible and Rigid packaging – Properties, applications; Thermoplastic Materials, Thermoset Materials, Food grade plastics – properties, processing methods, applications; Recycling; Biodegradable and Eco friendly packaging - Advantages and disadvantages.

UNIT II WOOD, PAPER AND TEXTILE

9

Wood – Types, Materials, characteristic properties, application, Nature of wood, properties, wood treatment; Textile – Types of cloth, properties, application; Paper and Board – Types, Manufacturing, Properties, Specialty papers for Packaging, Folding board cartons and coated cartons, Corrugated Boards – Types, Applications, Specifications.

UNIT III GLASS AND METALS

9

Glass – Types, Properties, use, Chemistry, coatings, defects and application areas; Metals – Tin, Steel, Aluminium – Cans, drums, lacquers, sheet – Materials, properties, treatment, coatings, recycling process; Foil – Materials, characteristics, decoration, lamination and metallization methods.

UNIT IV ANCILLARY MATERIALS

9

Label – types, materials, Label adhesives –Types characteristic properties and uses, shrink wrapping, stretch wrapping, Collapsible tube – materials and properties. Closures and sealing – materials and properties. Cushioning Materials – properties and areas of application. Lacquers – properties, uses; Special additives for food grade films; Nano materials, Reinforcement – materials and properties.

UNIT V MATERIAL TESTING

9

Mechanical – Tensile, Tear burst, impact; barrier properties - WVTR test, OTR test, Adhesion test, Optical – Gloss, haze and clarity; Chemical Resistance test – solvents and chemicals, Migration test, Plastic material identification test, solvent retention; Hardness and corrosion test for metals; Clarity and brittleness test for glass.

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Understand the plastic and polymer, packages
- CO2: Learn about the properties of packaging materials.
- CO3: Learn and apply the glass of metal packaging.
- CO4: Analyse and discriminate other ancillary materials for packaging.
- CO5: Ensure the quality control standards used for costing of packaging materials.

REFERENCES:

1. Walter Soroka, Fundamentals of Packaging Technology, Institute of packaging Professionals, Fourth Edition, 2010.
2. S. Natarajan. M. Govindarajan, & B. Kumar Fundamental of Packaging Technology PHI, New Delhi, 14
3. A.S.Athayle, Handbook of Packaging Plastics, Multi-tech Publishing Co., First Edition, 1999.
4. Aaron L. Brody & Kenneth S. Marsh, Encyclopedia of Packaging Technology, John Wiley Publication, II Edition, 1997.
5. Gunilla Johnson, Corrugated Board Packaging, PIRA International, 1993.
6. A.S.Athayle, Plastics in Flexible Packaging, Multi-tech Publishing Co.,

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H		H									H	H	
CO2	H		H									H	H	
CO3	H		H									H	H	
CO4	H		H									H	H	
CO5	H		H									H	H	

CUSTOMIZED PRINTING

18BEPE05

Instruction Hours/ week: 3T

No. of credits: 3

OBJECTIVES:

- To impart personalised Print using Digital Technology.

UNIT I PRINT ON DEMAND PUBLISHING

9

Introduction, Book publishing, Digital Publishing, POD enablement, Layout design , Creating Print ready PDF, PDF file Saving, Print ready PDF cover Creating

UNIT II DIGITAL PHOTO ALBUM

9

Layout design, template, PDF, substrate, ink, Digital Printing machines, Decorative Printing, File formats, blog, digital advertising and marketing

UNIT III SELF PUBLICATION

9

Email, CD-ROM Publishing, Content creation, Manuscript, Peer review, Copy editing and typography, Database preparation, testing, Production and Publishing , Archiving.

UNIT IV DIGITAL MARKETING

9

Introduction, Social Media Networking, Google Analytical, Online Advertisements, Email Marketing,

UNIT V PERSONALISED COMMERCIAL JOBS

9

Self Book Publishing , Personalised Digital album, CD-ROM publication, Thermal dye sublimation Mugs, Photo gifts, Apparels, Bags & Packages, Invitation, Greeting cards, Labels and Tags.

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Understand the Print on Demand system
- CO2: Learn, Design and Digital Photo Book
- CO3: Learn and apply E-journal publication
- CO4: Analyse the digital marketing.
- CO5: Analyse, Create and apply customised publication

REFERENCES:

- 1.Snow, Danny "Print-on-Demand: The Best Bridge Between New Technologies and Established Markets". BookTech: The Magazine for Publishers. February 2001
- 2.Franks, J ,What is an electronic journal ? In Gopher: wiretap.spies.com/Library/Articles/Publishing. 1993

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H		H									H	H	
CO2	H		H									H	H	
CO3	H		H									H	H	
CO4	H		H									H	H	
CO5	H		H									H	H	

OBJECTIVES:

Understand the principle of working of components of digital workflow

UNIT I IMAGE ACQUISITION

9

Scanner types – Drum, flatbed. Dynamic range, Resolution, Storage, File formats. DigitalCamera – Principles, mechanisms, types, resolution, memory.

UNIT II DIGITAL WORKFLOW

9

Receiving jobs, Pre-flighting, Scanning, File formats, JDF, XML, AdsML, PDF. Electronictrapping and imposition software.

UNIT III DIGITAL PROOFING TECHNOLOGIES

9

Digital proofing – Need, Proofing technologies – Ink jet, Dye sublimation, Thermal Wax, Electrophotography. Inks, Dyes, Toners, Quality and relative merits.

UNIT IV IMAGE SETTERS AND PLATE SETTERS

9

Imagesetter – Types – Capstan, internal, external and virtual drum, light sources, rasterimage processors, screening technologies. Platesetters – Flat bed, internal, external drumgeometries, chemical, thermal plates, light sources.

UNIT V DIGITAL PRESSES

9

Direct imaging printing systems- once imageable, re-imageable masters, Comparison, inlinefinishing, applications, trends

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

CO1: Acquiring knowledge on image Capturing techniques.

CO2: Identify the digital workflow.

CO3: performs Pre-flight and produce proofs

CO4: Create films and plates

CO5: Print jobs in digital press

REFERENCE BOOKS:

1. Frank Cost, "Pocket guide to digital Printing", Delmar Publishers, 1997.
2. T.E. Schildgen, "Pocket guide to colour with digital application". Delmar Publishers,1998.
3. David Bergsland, "Printing in a digital world", Delmar Publishers, 1997.
4. Michael Limburg, "Gutenberg goes digital", Blue Print, 1955.
5. Anton & Peter Kammermeter, "Scanning & Printing, "Focal press, 1992.
6. Robin Mcallister, "Scanning & Image manipulation", Delmar Publishers, 1997.
7. Robin McAllister, "Colour", Delmar Publishers, 1997.
8. Phil Green, "Understanding digital colour", Blueprint, 1995.
9. Robin Mcallister, "Trapping", Delmar Publishers, 1997.
10. Helmut Kipphan (Ed.), "Handbook of Print Media", 2001.
11. Robert C.DurbeckFolsheer (Ed.), "Output Hardcopy Devices", Academic Press, Inc.1988.

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H				H		H	H		H			H	
CO2	H				H		M					M	H	
CO3	H				M		M	M		H		M	H	
CO4	H				H		H	H		H		M	H	L
CO5	H				H		M	M		H		M	H	

SCHEDULING AND PLANNING FOR PRINT PRODUCTION

18BEPE07

Instruction Hours/ week: 3T

No. of credits: 3

OBJECTIVE

- To introduce the various techniques for print production planning and scheduling the jobs for the machine

UNIT I FACILITY LOCATION AND LAYOUT

Facility Location Decision Making, Economic analysis, Qualitative factor analysis Layout of the factory-analysis & selection.⁹
Human factors in job, Design, Consideration of Man & Machine job-design, Economics-working environment-worker safety.

- Exercise:** 1. Visit a local printing / packaging industry and identify the facilities in each department.
2. Frame the factory layout for that industry

UNIT II SEQUENCING

Gantt chart, Algorithms for solving sequencing problems-processing of n jobs through 2 machines, n-jobs; through 3 machines,⁹
n-jobs on K machines. Assignment and Transportation Algorithms.

- Exercise:** 1. Solve transportation problems using *Excel Solver*
2. Solve assignment problems using *Excel Solver*

UNIT III INVENTORY MANAGEMENT

Definition & purpose, Factors affecting, Inventory classification, Determine models with & without shortage probabilistic models, EOQ. Materials handling and warehousing.⁹

- Exercise:** 1. Problem solving using EOQ formulae.
2. Study of inventory control operations at a printing press

UNIT IV MATERIALS REQUIREMENT PLANNING

An Introduction to MRP, CRP- Concepts & applications, Aggregate planning & Master scheduling, ERP-concepts and systems.⁹

- Exercise:** 1. Calculation of Capacity requirement for a real-time press
2. Study of ERP activity at a Printing unit

UNIT V PROJECT MANAGEMENT

Introduction, Network construction, Time estimates. Critical path Method, Program Evolution and Review Technique,⁹
Difference between CPM & PERT, Types of float, crashing Resource analysis levelling.

- Exercise:** 1. Solve Crashing problem using CPM method by MS Excel
2. Solve network problem using PERT method by MS Excel

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Understand the operations of a printing press along with its layout.
- CO2: Predict the sequencing algorithms for apt printing process.
- CO3: Apply various management concepts in managing a print establishment
- CO4: Critically analyse the functions of print organization and the print operations management concepts to solve Management problems in a printing press
- CO5: Analyse the problems and allocating the resources of firm

REFERENCES:

- 1.VOJRA, N.D., *“Quantitative techniques in Management”*, Tata McGraw Hill Publishing Co. Ltd, 1998.
2. JOSEPH, G. MONKS, *“Operations Managements”*, Theory and Problems, McGraw Hill International Ltd.,1998
3. SRIVASTAVE, U.K., SHENORY, G.V. & SHARMA. S.C., *“Quantitative Techniques for Managerial Decisions”*, New Age Intonations (P) Ltd. Publishers Formerly Wiley Eastern Ltd., 1998.
4. Systems software Association, [jtp://www.ssax.com](http://www.ssax.com)
5. Funkinform, Germany, <http://www.funkin form.De>
- 6.SAP, A.G., Germany, &<http://www.sao.com/media>

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H	M			H	H	H	H		H	L		H	
CO2	H	H	H	M	H		M					M	H	
CO3	H	H	M	M	M	M	M	M		H		M	H	
CO4	H	H			H	H	H	H		H		M	H	L
CO5	H	H	M	H	H	M	M	M	M	H		M	H	

ADVERTISING TECHNIQUES

SEMESTER IV
18BEPE08

Instruction Hours/ week:3T
No. of credits: 3

OBJECTIVE:

To Enable the student to understand the concepts of Advertising, Role of the media and Advertising Production and Business in detail

UNIT I INTRODUCTION

9

Advertising concept, development and scope of advertising, economic and Social roles of advertising, legal aspects of advertising, m. Consumer behaviour achieving desired responses, stimulating attention and facilitating retention, human needs as a basis for appeals. Role of printing presses in advertising.

UNIT II ADVERTISING PLANNING

9

Factors involved in advertising planning decision making, basis for advertising Objectives ,Methods of Measuring Advertising Effectiveness. Design layout for the for Newspaper Publication. advertisement

UNIT III ADVERTISING MEDIA AND MEDIA PLANNING

9

Media concept, structure of media, media characteristics, publication media, TV and Radio, direct mail and POP, out of home advertising. Media planning concept, media decision tools, media plan, media plan strategy, media buying and scheduling. Internet and Mobile Phone Advertising. case study for Media Advertising.

UNIT IV ADVERTISING PRODUCTION

9

Copy concept, copy structure, essentials of a copy, creative approaches and styles, copy testing criteria, types of copy testing, validity and reliability of copy test. Advertising design ,layout, visualization, principles of advertising design, contribution of visual elements, what to picture, how to choose colour, test of a good layout, production of print advertising, production of TV/Radio commercials.

UNIT V ADVERTISING BUSINESS AND COORDINATION

9

Advertising agencies, special service groups. Coordination with personal selling and distribution channels, cooperative advertising and public relation, advertising and product management. Advertising campaign concept, planning and execution of campaign, evaluation of the campaign.

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the student should be able to:

CO1: Able to understand the principle of advertising.

CO2: Analyze the functionary of an advertising agency

CO3: To use the advertising production knowledge to create advertisements

CO4: Develop media planning solutions

REFERENCE BOOKS:

1. David A.Aaker, Rajeev Batra, John G.Myers, "Advertising Management", Prentice Hall Inc., 1999.
2. Maurice I.Mandell, "Advertising", Prentice Hall Inc., 1999
- 3.. Leon G.Schiffman and Leslie LajarKonar, "Consumer Behaviour", Prentice Hall Inc.,1996.
4. Loudon, Della Bitta, "Consumer Behaviour concepts and Application", McGraw Hill,1996.
- 5.Wells, Burnett and Moriarty, "Advertising; Principles & Practice", Prentice Hall Inc., 2002.

SPECIALITY AND SECURITY PRINTING

18BEPE09

**Instruction Hours/ week:3T
No. of credits: 3**

OBJECTIVE

- To introduce the different types of speciality printing methods and security printing techniques

9

UNIT I INTRODUCTION TO SPECIALITY PRINTING

Different types of speciality printing and related printing process, Functions, Anti- counterfeiting features Currency printing, Stamp printing, Map printing, MICR, Hologram, PCB, Semiconductor lithography, Advance printing techniques.

UNIT II INTRODUCTION TO SECURITY PRINTING

Introduction to security printing, optical document security, Design of security documents. Inks used in security printing.

9

UNIT III SPECIALTY PRINTING

Smart Cards, club cards, credit/ debit cards, RFID technology.

9

UNIT IV SECURITY PRINTING

MICR/OCR/ cheque printing technology, counter felt foreign prevention cheque fraud prevention.

9

UNIT V MATERIALS

Substrates, Inks, Watermarks, Testing Deterrent measures, Hologram, Kinegram, invisible document security, brand protection.

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Understand and learn specifications in specialty printing
- CO2: Cognize the security features in printed products
- CO3: Classifying the techniques used in speciality printing
- CO4: Analyse the standards and specifications in security printing
- CO5: Develop security techniques as per the requirement with suitable materials

REFERENCES:

- Moreau Wayne, M., Semiconductor lithography: Principles, practices and materials, Plenum Press.*
- Saxby Graham, Practical Holography, Prentice-Hall.
- Boss Hart C. Walter, Printed Circuit Boards, Tata McGraw- Hill Publishing.
- Countering counterfeitingly.
- Rudolf Von Renessa; Optical Document security.
- Guide to Protectivity& Authenticating products and Documents
- Anti counterfeitiy technology guide.
- Kant Dabholkar; MICR cheques +other documents.

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H	M			H		M					M	H	
CO2	H				H		M	H				H	H	M
CO3	H				H		M	H				H	H	
CO4	H	H			H		M	H				M	H	
CO5	H	H	M	M			L	H	M	M	M	M	H	

PRINT PLANT AND LAYOUT DESIGN

18BEPE10

Instruction Hours/ week: 3T

No. of credits: 3

OBJECTIVE

- To introduce the different plant layout and press construction

UNIT I SITE SELECTION

9

Strategic issues of location. The supply-distribution system, dynamic nature of plant location. Location strategy-factors influencing choice of location. State regulations on location. Backward areas and industrial policy. Government policies for decentralization, industrial estates, comparison of locations-urban v/s rural areas advantages, sub-urban area. Economic survey of site selection. Case study.

UNIT 2 PLANT LAYOUT

9

Objectives of good plant layout, principles of plant layout, importance of plant layout, Types of plant layout -product layout or live layout -process layout or functional layout-combination layout -static layout or fixed position layout, situations problem, factors influencing plant layout, Methods of plant and factory layout-operation process chart, flow process chart, flow diagrams, string diagrams, machine data cards, templates three dimensional models, correlation chart, travel chart, load path matrix method. 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. 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.

UNIT III LAYOUT PROCEDURE

Basic data, analysis, equipment and machinery required, select the material handling system, sketch plan of the plot for making⁹ factory building. Determine a general flow pattern, design the individual workstation. Assemble the individual layout into the total layout, determination of storage space required, work-flow diagrams in work stations and allocation of areas on plot plan, plan and locate service areas, make master layout. Checking final layout, official approval of the final layout, installation. Case study.

UNIT IV PRESS BUILDING

9

Introduction, types of press building -single story building, high bay and monitor type buildings, multi-storey buildings, building of special types. Comparison between single storey and multi-story building. Types of construction of factory building Wood frame construction, brick construction, slow burning mill construction, steel frame construction, Reinforced concrete construction, precast concrete construction. Specific parts of factory building-roof, walls. Floor factors affecting press building-nature of manufacturing process-flexibility -expandability -service facilities -employee facilities-lighting-heating-ventilating-air conditioning-appearance-durable construction-security measures-noise control

UNIT V PROCESS ENGINEERING

9

An analytical approach: 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. **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. **Materials Handling methods:** Importance of material handling department. Receiving. Service roads and dock approaches. Dock doors. Dock levelers. Dock seals and shelters. Dock accessories. Dock platforms. Operational procedures. Load platforms: 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. 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 systems. Warehouse: Physical description. Waste and trash handling.

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Understand the site selection and layout procedure for print plant
- CO2: Analyse the print plant layout using appropriate flow charts.
- CO3: Understand the layout procedure for print plant
- CO4: Knowledge about layout procedure and press building
- CO5: Evaluating the resource materials and material handling methods to establish a press.

References:

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

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H	M		M		M	M	M					M	M
CO2	H	H	M					M				M	M	M
CO3	M	M	L					L				L		M
CO4	H					L		L					H	
CO5	H	H		M								L	H	H

PRINTING MACHINE MAINTENANCE

18BEPE11

Instruction Hours/week:3T

No. of Credits:3

OBJECTIVE:

- To provide an overview of the printing machinery maintenance and maintenance management.

UNIT I MAINTENANCE MANAGEMENT PERSPECTIVE

9

Objectives and functions, Problems and challenges, Organisation, Maintenance methods, Criticality determination, Categorization, Economic aspects of maintenance. Emerging trends.

UNIT II TOTAL PLANNED MAINTENANCE

9

System components, documentation, facility register, records, safety related issues. Spare parts management. Maintenance schedules and control system. Inspection and lubrication, purpose, lubricants, lubricating systems.

UNIT III TOTAL PRODUCTIVE MAINTENANCE

9

Six big losses, measuring the losses. Evaluating equipment effectiveness. Prepress maintenance, Press maintenance, Printing and allied equipment maintenance. Electrical components maintenance: Motors, Electric brakes. Mechanical components maintenance: Bearings, Clutches, Drives.

UNIT IV ERECTION AND TESTING

9

Foundation requirements, Condition based maintenance: Condition monitoring, Techniques, Vibration analysis, Thermography, Non-destructive testing methods and diagnostic instruments.

UNIT V RECONDITIONING AND REPLACEMENT THEORY

9

Repairs and reconditioning methods for various parts, roller copperising, re-rubberizing. Replacement models - Replacement policy, replacement of items, Determination of average life.

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Understand the basic concepts of maintenance management
- CO2: Learn about the fundamentals of machine erection and testing
- CO3: Create a maintenance schedule based on criticality and economics
- CO4: Evaluate equipment effectiveness

REFERENCES:

- Venkataraman.K, "Maintenance Engineering & Management", PHIndia Private Limited., 2007
- P.Goplakrishnan,A.K.Banerji, "Maintenance & Spare Parts Management", PrinticeHall of India, 1977.
- H.P.Garg, "Industrial Maintenance", S.Chand& Company Ltd., 1990.
- Kenneth E.Rizzo, "Total Production Management", Second Edn., GATF Press.
- N.D.Vohra, "Quantitative Techniques in Management", Tata McGraw – Hill Publishing Co. Ltd.
- Herschell L. Apfelberg, "Maintaining Printing Equipment", GATF Press.
- LidleyR.Higgins.P.E., L.C.Morrow, "Maintenance Engineering", Handbook, MGH Publishing Co. Ltd.

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H	H												
CO2	H	H										M		
CO3	H	H												
CO4	H	H										M		
CO5	H	H												

TQM FOR GRAPHIC ART INDUSTRY

18BEPE12

Instruction Periods/ week: 3T

No. of credits: 3

OBJECTIVE

- To introduce the management methods used to enhance quality and productivity in printing organizations

UNIT I TQM IN GRAPHIC INDUSTRY

9

Introduction of TQM, definition of quality and related terms, basic elements of TQM, characteristics, advantages, holistic features, application of quality concept, quality principles

UNIT II TQM MODELS

9

TQM models -Kaizen, European Quality Awards, MalcomBaldrige Award, Indian Quality Awards, Motorola 6 sigma concepts, zero defect quality, quality circles, quality function deployment, quality by design. Quality gurus and their contribution, Deming, Crosby, Taguchi, Ishikkava, Juran.

UNIT III STATISTICAL PROCESS CONTROL FOR TQM IN GRAPHIC ARTS INDUSTRY

9

Statistical process control (SPC), purpose of SPC, SPC tools -process maps, Ishikawa diagrams, check sheets, Pareto analysis, histograms, run charts, contact charts, correlation diagrams

UNIT IV PROCESS RE-ENGINEERING AND SUSTAINING TOTAL QUALITY

9

Process re-engineering, principles, requirements, steps in re-engineering, re-engineering and TQM, benefits and limitations self-assessment for total quality, total quality environment, implementation and sustaining quality.

UNIT V CERTIFICATION PROCESS

9

Fine tenets of continual process improvement, supplier certification process. Internal and external suppliers and customers, analysis of present supplier and preferred supplier situation, desired outcomes of the supplier certification process, services offered by the supplier, ISO:9000 (2000), ISO:14000, QS:8000 standards.

Total Periods: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Know the basic quality requirement in printing industry
- CO2: Knowledge on Quality system
- CO3: Knowledge Quality gurus and their contributions
- CO4: Knowledge on Quality certification process for printing industry

REFERENCES:

- 1.*Herschel L.A.(1995) "Implementing TQM in Graphic Art"* PiraandGATF , Pittsburg
- 2.*Arora S.C.(1996) "Applying ISO 9000 Quality Management System"* International Trade Centre,Switzerland
- 3.*Bhat K.S.(2005) "Total Quality Management"* Himalaya Publishing House,Bangalore

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H							M			M	M		H
CO2	H	H	H	M				L			M	L		
CO3	H	H	H	H	H			L	M	M	M	L		
CO4	H	H	M	M	M		H	M	L	L	L	L	M	
CO5							H	H	M	H	H	H	H	

COST ESTIMATION FOR PRINTERS

18BEPE13

Instruction Hours/ week:3T

No. of credits: 3

OBJECTIVE

- To study the costing principal and budgeting method for printing jobs and estimating the requirement for the job printing

UNIT I COST ACCOUNTANCY

A review of costing systems, Relationship between cost control & budgetary control, Marginal costing and profit analysis. 9

UNIT II BUDGETING

Types of budgets, Budgetary control, Budgetary control as an aid to management. Preparing sales forecasts and budgets for printing & allied organisations. 9

UNIT III ESTIMATION

Classification of costs in printing, Costing direct materials. Costing of machine operations, Costing of manual operations, procedures for preparing estimates & submitting quotations, conditions for print contracts. 9

UNIT IV INVESTMENT ANALYSIS

Time value of money, compound value, present value, calculations, Annuities, pay back method, Average rate of return method and internal rate of return method. 9

UNIT V BREAK EVEN ANALYSIS

Models used, calculation of Breakeven point, Margin of safety, Sensitivity Analysis and profit graphs. 9

TOTAL HOURS: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Understating the Concepts on costing and pricing
- CO2: Analyse the budgets and its control over sales.
- CO3: Knowledge on estimating the cost of different materials used in printing
- CO4: Identify a suitable technique for estimates the cost of a given print product
- CO5: Calculate breakeven point for a business to have its Margin of safety.

REFERENCES:

- “Cost Accounting for Printers”, Part I and II, British Printing Industries Federation, 1982.
- VOHRA, N.D., “Quantitative Techniques in Management”, Tata McGraw Hill Publishing Company Limited, 1990.
- BATTACHARYA, S.K. AND JOHN DEARDEN, “Accounting for Management, Text & Cases”, Vikas Publishing Home Pvt. Ltd., New Delhi, 1990.
- VENKATARAMAN, K.S. & BALARAMAN, K.S., “Estimating Method and Cost analysis for Printers”. Ramya Features & Publications, 1987.
- MENDIRATTA, B.D., “Printer’s Costing & Estimating”, Printing India Publications, Pvt. Ltd., 1999.
- HUGH, M. PEIRS, “Print Estimators, The Handbook”, BPIF, 1996 Vikas Publishing Home Pvt. Ltd., New Delhi (1990).

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H	M				M	M	M			H	M	H	M
CO2	M	H		M	M	M	M	M			H	M	H	H
CO3	H	H	H	H	M	M	M	M	L		H	M	H	
CO4	H	H	H	M	H	M	M	M	M	M	H	H	M	M
CO5	H	H	H	H	H	L		L	L		H	H		H

PROFESSIONAL ELECTIVES(PE2) ALLIED PRINTING TECHNOLOGY DOMAIN

VISUAL PROGRAMMING

Instruction Hours/ week: 3T

No. of credits: 3

18BEPE21

OBJECTIVES

- To inculcate programming skills that are oriented towards application development on a web based environment

UNIT I INTRODUCTION AND FORMS:

Visual Programming (VP) – features of VP: Object-based programming, ActiveX Data Objects (ADO) – Integrated Development Environment (IDE): Project, Controls, Help, Debug, Wizards – Form design using controls (custom, intrinsic), events and control arrays, Practical sessions on Form design and control structures.

UNIT II PROCEDURES AND DEBUGGING:

General procedures – event procedures – functions – arguments – Debugging tools –debugging window – watch expressions– call stack – error handler, Practical sessions on simple functions using various ADOs and debugging

UNIT III DATA MANAGER:

Data base creation – data control: DAO, Jet DB Engine, ODBC driver manager – Tables, fields, indexes – relation between tables – record manipulation – queries, Practical sessions on DB creation, edit, delete and display

UNIT IV REMOTE DB AND FRONT END:

Remote Data Control (RDC): Remote DB server driver, Remote DB engine – Remote Data Objects – Remote DB access and manipulation with ActiveX Data Objects, case study on real-time applications

UNIT V REPORTS AND DEPLOYMENT:

Data report – report designer – report creation and printing – Application packaging: steps, wizard – Application Deployment: steps, wizard, Practical session on reports.

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Understand & apply the concept of visual programming
- CO2: Understand the visual basic integrated development environment
- CO3: Develop simple visual basic applications
- CO4: Analyse Remote DB and Front End
- CO5:Analyse and Generate Reports for the data.

REFERENCES:

- Paul Sheriff, “Visual Basic 6.0”, Prentice Hall of India, 1999 Indian Reprint.
- Krishnan. N and Saravanan. N, “Visual Basic 6.0 in 30 days”, ScitechPub(India) Pvt. Ltd., 2001.
- Michael Mac Donald and Kurt Cagle, “Visual Basic 6.0 Client/Server and Database programming- Gold Book”, Pasupati Publishers, 1st Ed. 1999.
- VB Tutorial Website: <http://vbtutor.net>
- MS Access Tutorial Website: <http://www.officetutorials.com/accesstutorials.html>

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H		M		H							M	M	
CO2	M				H							M		
CO3	H	H	H	H	H									
CO4	H	H	M		M									
CO5	M							M		H		M		

OBJECTIVES

- To introduce microcontroller based systems and their operation so as to appreciate the control logics present in printing machines

UNIT I INTRODUCTION

Introduction to embedded systems, Embedded processor families, Microprocessor v/s microcontroller, A micro controller 9 survey , development systems and Microcontrollers, Application of Microcontroller and microprocessor in Printing Industry.

8086 Microprocessor: Architecture, Addressing modes, Instruction set and assembly language programming, Assembler and advanced programming. Signals, minimum and maximum modes of operation.

UNIT II THE 8051 ARCHITECTURE:

Introduction, 8051 Microcontroller hardware, input / output pins, ports and circuits External memory, counters and timers, 9 serial data input / output. **Data transfer Instructions:** Addressing modes, External data moves, push and pop op codes, data exchanges and example programs.

UNIT III ARITHMETIC AND LOGIC INSTRUCTIONS:

Unsigned addition and subtraction, multiplication and division. Compare, rotate and swap instructions and example programs. 9 **8051 timers, counters and Serial communication:**8051 timers, counter programming, Basics of serial communication, 8051 connection to RS 232, serial communication programming.

UNIT IV 8051 INTERFACING

Programming 8255 in I/O mode, Interfacing DAC , Seven Segment display, Logic Controller and other devices 9

Unit V PROGRAMMABLE PERIPHERALS AND MEMORY INTERFACING

Programmable DMA controller, 8251 USART, 8259 Interrupt controller , memory interfacing 9

Total Hours: 45

COURSE OUTCOME:

At the end of the course, the students should be able to:

- CO1: Understand the fundamental of microprocessors & microcontrollers
- CO2: Integrates the I/O with applications
- CO3: Compare the arithmetic and logic structure.
- CO4: Interfacing 8255 with devices
- CO5: Analyse the memory interfacing devices and peripherals.

REFERENCES:

- Muhammad Ali Mazidi, Janice GillispieMazidi, Rolin D. McKinlay, “The 8051 Microcontroller and Embedded Systems Using Assembly and C”, 2nd edition, Pearson Education India, 2008
- Kenneth J.Alaya, “The 8051 Microcontroller”, Thomson Delmar Learning, 3rd Edition, 2005.
- I.ScottMacKenzie 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
- Sunil K. Mathur “Microprocessor 8086: Architecture, Programming AndInterfacing”, Prentice Hall of India, 2010

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H				L							M	L	
CO2	H	H	L	L	L									
CO3	H	L												
CO4	H	H	M	M	M							M		
CO5	H	H	H	H	M							H		

18BEPE23

Instruction Hours/ week: 3T

No. of credits: 3

OBJECTIVES

- To expose multimedia concepts in e-publishing
- To learn the standards of planning and creating content in publishing

UNIT I INTRODUCTION

9

Introduction to types of digital media – Print Media, Web media, E-Pub, Cross Media Publishing, E-Publishing Workflow – Receiving Jobs (FTP), Pre-editing, Copy editing, Proof reading, Pagination, Quality control and cost estimation

UNIT II CONTENT PLANNING AND DESIGN

9

Layout , sourcing content, composing content , story board, drafting , proof approval

UNIT III CREATING CONTENT

9

Creating media - capturing audio, video - creating/ scanning images - creating gif images - Digitization and editing - combining audio, video - integrating images

UNIT IV PUBLISHING

9

Book publishing, , Tablet publishing, CD- ROM Publishing, Electronic publishing, E - book, E –Journal, E Magazine

Unit V SOFTWARES & TOOLS

9

Conventional workflow, Typesetting, Pagination ,Image manipulation, image editing, audio editing and video editing, Presentation technologies, Representation technologies Transformation technologies , Unicodes for non-English characters.

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Apply different layouts design for various digital gadgets.
- CO2: Choose proper software for web presentation and transformation language.
- CO3: Create and conceive different online publishing models.
- CO4: Know about use of multimedia software in e-publishing
- CO5:Analyse the Software and tools

REFERENCE BOOKS:

1. Harold Henke, “Electronic Books and ePublishing: A Practical Guide for Authors”, 1st edition, Springer, 2001.
2. William E Kasdorf, “The Columbia Guide to Digital Publishing”, Columbia University Press, 2003
3. Cady & McGregor, “Mastering the Internet” , 2nd edition, Business Promotion Bureau Publications, 1996
4. Deitel&Deitel, Neito, Sadhu, “XML How to Program”, Pearson Education Publishers,2001
5. Eric Ladd, Jim O’ Donnel, “Using HTML 4, XML and Java”, Prentice Hall of India – QUE, 1999
6. Scot Johnson, Keith Ballinger, Davis Chapman, “Using Active Server Pages”, Prentice Hall of India, 1999.
- 7.HelmutKiphhan, “Handbook of Print Media”, Springer Verlag, 2001
- 8.www.w3schools.com/media/default.asp
- 9.Adobe Flash Professional CS5.5: <http://help/adobe.com>
10. Adobe Director: www.adobe.com/support/director/tutorial_index.html

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H	H	M	L	H						M		H	
CO2	H				H						M		M	
CO3	H	H	M	M	M							L	M	
CO4	H				H								M	
CO5	H	H	H	H	H						M	L	H	

18BEPE24

OBJECTIVES:

To expose web technology for e-publishing and learn software for web page creations

UNIT I INTRODUCTION

Web , Internet, Web programming ,programming environment, server environment, web server architecture , 9
Introduction Mark up language HTML, DHTML and XML.

UNIT II HTML

HTML Scripting and Static web page creation, Frames, fonts, scrollbar, box creation 9
forms and table creation.

UNIT III XML FOR DATA

XML-Documents and Vocabularies-Versions and Declaration – XML Documentation in web browser, XML for E publishing - 9
Case Study.

UNIT IV CSS FOR STYLE SHEET

Style Sheets: CSS-Introduction to Cascading Style Sheets- Cascading and Inheritance-Text Properties-Box Model Attaching styles – 9
Inline and Embedding and Linking style.

UNIT V JAVA AND JAVA SCRIPT

Introduction to Java Script Programming, Role of Java script in web page creation, Javascript and HTML, operators, event, forms. 9

Total Hours:45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1:** Apply the knowledge about the fundamentals of HTML XML.
- CO2:** Design a simple HTML page, XML documents.
- CO3:**Analyse the XML Documentation.
- CO4:** Create a CSS in web pages.
- CO5:**Design their own web services.

REFERENCES

1. Jeffrey C.Jackson, "Web Technologies--A Computer Science Perspective", Pearson Education, 2006.
2. Robert. W. Sebesta, "Programming the World Wide Web", 4th Edition, PearsonEducation, 2007.
3. Deitel, Deitel, Goldberg, "Internet & World Wide Web How To Program", ThirdEdition, Pearson Education, 2006.
4. Marty Hall and Larry Brown,"Core Web Programming" Second Edition, Volume Iand II, Pearson Education, 2001.
5. Bates, "Developing Web Applications", Wiley, 2006.

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H				L				L	M		M	M	
CO2	H	H	M		M				L	L		L	M	
CO3	H	H	M		M				L	L			M	
CO4	H	H	H		H				L	L		L	M	
CO5	H	H	H							M				L

IMAGE PROCESSING

18BEPE25

Instruction Hours/ week: 3T

No. of credits: 3

OBJECTIVES:

To learn and implement the image processing techniques

UNIT 1: IMAGE PROCESSING

9

Basic imaging processing system - image source, characteristics, image representation, hardware and software requirements.

UNIT 2: 2D TRANSFORMS AND SIMULATION TOOLS

9

Properties of 2D sequences and systems - basics of 2D transforms – Study of Simulation tools - demonstration of algorithms using simulation software

UNIT 3: IMAGE COMPRESSION AND SEGMENTATION

9

Basics of Image compression techniques - coding, interface coding, standards for image compression, Jpeg, Mpeg – study of image compression using tools and compression ratio -Basics of Image segmentation techniques – use of simulation tools for segmentation such as Feature extraction, edge detection, boundary extraction, region representation

UNIT 4: IMAGE ENHANCEMENT AND RESTORATION

9

Basics of Image enhancement and restoration – use of tools for enhancement operations and restoration operations

UNIT 5: IMAGE EDITING TOOLS AND IMAGE PROCESSING APPLICATIONS

9

Digital Photo processing – digital map processing – scanned documents – scanned images – medical images

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

CO1: Evaluate and Implement 1-D and 2-D filter design methods

CO2: Design and apply edge detection, image restoration, image segmentation methods

CO3: Design and apply image compression and image matching methods

CO4: Design and Apply image enhancement and restoration

CO5: Apply various image processing techniques appropriate for practical applications

REFERENCES:

1. Jain Anil K(2005) “Fundamentals of digital image processing” Prentice hall of India Pvt. Ltd., New Delhi
2. Gonzalez R.C. and Woods R.E. (2004) “Digital image processing” Pearson Education, New Delhi
3. Simulation Tools –Scilab and Matlab
4. Editing tools – Gimp, Inkscape

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H				L	L			L	L		M	L	
CO2	H	H	H		M	H			L	L	L	L	L	
CO3	H	H	M		M	M				L		L		
CO4	H	H	H		H	M			L	L	L		M	
CO5	H	H				M			L				M	

MIS FOR GRAPHIC ART INDUSTRY

18BEPE26

Instruction Hours/ week: 3T

No. of credits: 3

OBJECTIVES:

To study the organisation system concept with its functional management and managing the database

UNIT I THE ORGANISATION & SYSTEM CONCEPT

9

Management concepts - Environment of organisations -Information and data - management decisions –concept of System - Input, output, process, feedback control and boundary - meaning and role of MIS.

UNIT II SYSTEM ANALYSIS AND DESIGN

9

System analyst – System life cycle – MIS stages - investigation, feasibility study, system design ,Data collection and preparation ,Detailed system Design, Implementation, Evaluation and maintenance of MIS

UNIT III COMPUTERS AND NETWORKING

9

Computers – configuration – uses – computer Networking concepts – networking elements and functions - Sourcing and selection of Computers and network for specific purposes – installation, up-gradation and condemnation

UNIT IV DBMS

Data base management systems – architecture – functions – characteristics – applications – types – DB Administrator – role and functions 9

UNITV MIS - CASE STUDIES

Production information system, Marketing information system, Accounting information system, Financial Information System, Personnel Information System 9

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Observe the concept of an organisation and its operation
- CO2: Understand the system analysis and design concept
- CO3: Define and recognize the computer networking concepts
- CO4: Apply the concepts of DBMS in various application
- CO5: Analyse the information system through case studies

REFERENCES:

- 1.SCOTT, G.M., Principles of Management Information systems, McGraw-Hill Education (1995).
- 2.DAVIS AND OLSON,Management Information System, McGraw Hill Education (1998).
- 3.LUCAS,The Analysis, Design and Implementation of information System, McGraw Hill Book Company (1998).
- 4.M.J. Systems, USA, <http://www/kjsi.com>.
- 5.IBM, USA, <http://www/ibm.com>.
- 6.MRInformatic, Germany, www.mr.informatik.de.

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	M					M	M		M		M	M		
CO2	H	H	H			M	M					M		
CO3	H	H			H	H						M	M	
CO4	H	H	H		H							M		
CO5	H	H	H		M	M	M							

DIGITAL MEDIA MANAGEMENT

18BEPE27

Instruction Hours/ week: 3T

No. of credits: 3

OBJECTIVE:

The students should be made to:

- Understand the basic concepts of managing digital content.

UNIT I DIGITAL MEDIA

9

Overview of multimedia contents, Content acquisition & development, Product development & design- Designing Publications, Designing content Components, Digital Media Storage, Marketing Circulation management, Single copy sales), Pricing, Distribution – crossmedia, file download security and sharing.

UNIT II DIGITAL ASSET MANAGEMENT

9

DAM Components, Functions, Relationships with other systems, including ERP, DCM, ECM, DMM,WCM, CMS, CRM and DRM, Metadata, cataloguing, indexing and retrieval- standards for production and content description, Accounting for Authors, Accounting for Acquisition sources.

UNIT III CONTENT PROTECTION TECHNIQUES

9

Encryption, steganography, watermarking, robustness and implementation, considerations, examples of media protection schemes, CCS, CGMS, HDCP, Type of contents, copyrights, patents, trade marks, trade secrets, licensing agreements, web posting policies, copyright and patent laws, fair uses, privacy regulations, piracy, DMCA, ISP obligations and liabilities,

UNIT IV DIGITAL RIGHT MANAGEMENT

9

Digital right models, transactions, types of rights and licenses, DRM system architecture, content server, license server, secure platform. Digital Millennium Copyright Act

UNIT V CURRENT ISSUES AND DEVELOPMENT

9

Copyright laws, balance between rights enforcement and fair uses, changing landscape in content distributions, recent enforcement cases. Security Applications-OS, Network , Web page, Online transactions.

TOTAL HOURS: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Define the principles of digital media dissemination and distribution process.
- CO2: Analyse the DAM System
- CO3: Infer different content protection techniques.
- CO4: Reproduces the Digital Rights and Laws
- CO5: Analyse the Recent Security Development

REFERENCE BOOKS :

1. Mark Hedges, "Digital Asset Management in Theory and Practice", Facet Publishing, 2014.
2. Bill Rosenblatt, Bill Trippe, "Digital Rights Management: Business and Technology", HungryMindsInc, 2001
3. David Austerberry, "Digital Asset Management", Focal Press; 2 edition, 2006.
4. Dr. Andreas Mauthe, Dr. Peter Thomas, "Professional Content Management Systems: Handling Digital Media Assets", Wiley, 2004.
5. Joan Van Tassel, "Digital Rights Management by Protecting and Monetizing Content", FocalPress, 2006.
6. WenjunZeng, Heather Yu, Ching-Yung Lin, "Multimedia Security Technologies for Digital Rightsanagement", Academic Press Inc, 2006.

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	M				L	L					M	M		L
CO2	M	M			L						M		M	L
CO3	M	M	M		M									
CO4	M	M					M	H		M			H	
CO5	H	H			H		H						L	

Objectives:

- At the end of this course the students are expected to understand the general issues relating to nanotechnology
- Methods for production of Nanoparticles
- Characteristic techniques of Nanomaterials

UNIT I INTRODUCTION TO NANOSCIENCE AND NANOTECHNOLOGY

9

Definition – Scientific revolutions –Time and length scale in structures – Definition of a nanosystem –Dimensionality and size dependent phenomena – Surface to volume ratio -Fraction of surface atoms – fundamental concepts – positional assembly and self-replication

UNIT II ETHICAL AND ENVIRONMENTAL ISSUES AND NANOMATERIALS

9

Ethical issues –environmental issues – pollution – green-house effect – control measures – determination of BOD , COD, TDS and trace metals.Types of nano materials – classification based on dimensionality - material characterisation – issues in characterisation – properties of nanomaterials –uses of nanomaterials

UNIT IIINANOSYNTHESIS, NANO FABRICATION AND SIMULATION

9

Synthesis – chemical and physical methods - types of fabrication techniques – photolithography - Electron-beam lithography(EBL)- Nanoimprint – Softlithography patterning – study of nano simulator for study of nano structure

UNIT IV APPLICATIONS OF NANOMATERIALS

9

Applications in Mechanical, Electronics engineering industries – Use of nanomaterials in automobiles, aerospace, defence and medical applications, fabrics – Metallic, polymeric, organic and ceramic nanomaterials.

UNIT V APPLICATIONS IN PRINTING AND PACKAGING

9

Printing substrates - Coating paper and paper boards – inks and chemicals –3D nano printer – printed electronics

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Understand the concept of nanotechnology
- CO2: Realise the ethical issues caused by nano science
- CO3: Understand the types of fabrication techniques
- CO4: Identify applications based on material properties
- CO5: Analyse various Nano substrates

REFERENCE:

1. Bhushan B., “Handbook of Nanotechnology”, Springer, Germany, 2004.
2. Ashby M.F., Ferreira P.J. and Schodek D.L., “Nanomaterials, Nanotechnologies and Design”, Elsevier Ltd., 2009.
3. Ratner M. and Ratner D., “Nano Technology”, Pearson Education, New Delhi, 2003.
4. Timp G., “Nanotechnology”, Springer, India, 2005.
5. Busnaina A., “Nanomanufacturing Handbook”, CRC Press, London, 2006
6. Lakhtakia A., “Nanometer Structures – Theory, Modeling and Simulation”, PHI Learning Private Limited, NewDelhi, 2009.
7. <http://www.understandingnano.com/introduction.html>
8. Atomistixtoolkit : [www. Quantomwise.com](http://www.Quantomwise.com)
9. Kamaraj.P&Arthanareeswari.M, “Environmental Science – Challenges and Changes”, 4th Edition, Sudhandhira Publications, 2010

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H											H		
CO2	H					M	M	H				M		
CO3	H	M	L									M	M	
CO4	H	M	M									M		
CO5	H	H				M	M	M						

3D PRINTING

18BEPE29

Instruction Hours/ week: 3T
No. of credits: 3

OBJECTIVE:

- Understand the basic concepts and nuances of 3D Printing Technology

UNIT I : INTRODUCTION

9

3D printing history – techniques for 3D printing – advantages & limitation – scope – research perspectives – applications.

UNIT II : 3D PRINTING WORK FLOW

9

3D printing product manufactures cycle – prototype making stages – precautions – material choice – techniques choice.

UNIT III : 3D MODELLING SOFTWARE

9

3D modelling software – modelling primitives – modelling composite objects – modelling based on material consumption.

UNIT IV : 3D PRINTER

9

3D printing study – components – working – software tools – configuration – material and size setting.

UNIT V : CASE STUDIES

9

Designing and modelling 3D prototype for printing and packaging applications.

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Understand 3D printing concepts.
- CO2: Understand the basic types of 3D Printing, materials used and their applications
- CO3: Select appropriate method for designing and modelling applications
- CO4: Analyse the 3D Printers working and its configuration.
- CO5: Design 3D Proto type for various applications

REFERENCES

1. Ian M. Hutchings, Graham D. Martin, “Inkjet Technology for Digital Fabrication”, John Wiley& Sons, 2013.
2. Christopher Barnatt, “3D Printing: The Next Industrial Revolution”, Create Space Independent Publishing Platform, 2013.
3. Ibrahim Zeid, “Mastering CAD CAM” Tata McGraw-Hill Publishing Co.2007
4. Joan Horvath, “Mastering 3D Printing”, APress, 2014
5. Chua, C.K., Leong K.F. and Lim C.S., “Rapid prototyping: Principles and applications”, second edition, World Scientific Publishers, 2010.

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H				H							H	H	
CO2	H	H			H	M						H	H	
CO3	H	H	H	M	H	M		M				H	H	
CO4	H	H	H		H							H	H	
CO5	H	H	H	H	H	H	M					H	H	

PRINTED ELECTRONICS

Instruction Hours/ week: 3T

18BEPE30

No. of Credits: 3

OBJECTIVE:

- To study the electronic devices for various print applications and 3D printing techniques

UNIT I INTRODUCTION

9

Importance of Printed Electronics – manufacturers – non-printed electronics vs printed electronics – conventional silicon chips vs smart devices for printed electronics – 3D printed electronics.

UNIT II APPLICATIONS

9

Basic functionality, characteristics, manufacturers and practical applications of printed electronic products : Printed memory, printed sensors, printed and chipless RFID tags, printed transistors, printed batteries, printed displays – applications: product promotions – library book tracking – stamps, parcel tracking – smart packaging – electrical skin patch – inflatable products – smart skins in books – toy industry – healthcare.

Unit III MATERIALS

Materials, Substrates and their functionality: polymers, metallic inks, plastics and paper, conductive nano particles –9 functionality and operation of devices: organic photovoltaics, OLEDs, solar cells,– Printing Techniques and Processes: Ink jet, Transfer Printing, aerosol jet technology, 3D printing, flexography.

UNIT IV FUTURE DEVELOPMENTS

9

Research trends, market scope, Smart substrates – contact lens, bio hybrids: hybrid muscular thin films (MTFs), invisible electronics – 3D printed electronics products.

UNIT V ENVIRONMENT FRIENDLY MEASURES

Energy harvesting – hazards in production, usage and disposal of printed electronics products – reducing, reusing, recycling9 printed electronics products.

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

CO1:AcquireKnowledge about importance of printed electronics and scope of the industry

CO2Understand various printed electronics products and their printing methods used in printed electronics

CO3: Analysis various printing technology for printing electronics

CO4: Understand the opportunities and advancements in printed electronics

CO5: Identify effects of Printed Electronics on society and environment and find alternate approaches

REFERENCES:

1. *Daniel Gamota, Printed Organic And Molecular Electronics*, New York, Springer Verlag, 1402077076.
2. *Johansson, K.; Lundberg, P.; Ryberg, R, A Guide to Graphic Print Production*, New Jersey, JOHN WILEY & SONS, 2:aupplagan, ISBN: 0471761389
3. *JolkePerelaeret. Al. “Printed electronics: the challenges involved in printing devices, interconnects, and contacts based on inorganic materials”*, Journal of Material Chemistry, 2010,20, 8446-8453, DOI: 10.1039/C0JM00264J

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H				M	M	M	M					H	H
CO2	H				M	M							H	H
CO3	H	H	M		M	M							M	M
CO4						H	H							H
CO5	H	H				H	H	H						H

AUGMENTED REALITY

18BEPE31

Instruction Hours/ week: 3T
No. of Credit:3

OBJECTIVES:

- Learn what augmented reality is
- Discover it's possible uses in various domains
- Learn to create an augmented reality for a given scenario

UNIT I: INTRODUCTION

9

History of Augmented Reality (AR), Virtual reality Vs Augmented Reality, Mixed Reality (MR), QR codes, Experience AR with samples such as talkingdogsstudios.com, Toronto Museum Project by York University, Multinational Training Simulation

UNIT II: AR TOOLS, DEVICES, IMAGES AND VIDEOS

9

AR browsers - Layar, Junaio, Wikitude, Aurasma, Blipper, Creating AR images and videos for specific scenarios – kids story book, guide for a tourist spot, physiology or anatomy, internal architecture of a machine

UNIT III: BUILDING AN AR

9

AR system architecture, creating images, creating interactive videos, mapping them to form AR, installing on hand-held devices such as smart phones and tablets, installing in browser or as application.

UNIT IV: DESIGN AR FOR SPECIFIC SCENARIOS

9

Augment a book, a city map, a book wrapper, a package for a commercial product, a postal cover, movie poster, and newspaper advertisement

UNIT V: APPLICATIONS OF AR

9

AR in education, advertising, Packaging, news, marketing, gaming, movies, sports, and travel. Recent trends and research perspective of AR

Total Hour : 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Understand the AR Concepts.
- CO2: Handle the AR tool
- CO3: Building and designing of AR
- CO4: Apply augmented reality on various application
- CO5: Create augmented reality on their own.

REFERENCES

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/>

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H				H	H						H	H	
CO2	H	H			H	H						H	M	
CO3	H	H	H											
CO4	H	H			H							M	M	
CO5	H	H	H		H	H						M		

EMPLOYABILITY SKILLS

18BEPE32

Instruction Hours/ week: 3T

No. of Credits:3

OBJECTIVES:

- To enhance the employability skills of students with a special focus on Presentation skills, Group discussion skills and Interview skills

UNIT I MAKING PRESENTATIONS

9

Introducing oneself–introducing a topic–answering questions–individual presentation practice - Creating effective PPTs–presenting the visuals effectively

UNIT II USING APPROPRIATE BODY LANGUAGE IN PROFESSIONAL CONTEXTS

9

Gestures, facial expressions, etc. Preparing job applications -writing covering letter and résumé

UNIT III APPLYING FOR JOBS ONLINE

9

Email etiquette - Participating in group discussions–understanding group dynamics-brainstorming the topic

UNIT IV TRAINING IN SOFTSKILLS

9

Persuasive skills–People skills-questioning and clarifying skills–mock GD- Writing Project proposals–collecting, analysing and interpreting data/drafting the final report

UNIT V ATTENDING JOB INTERVIEWS

9

Answering questions confidently - Interview etiquette –dress code –body language –mock interview

Total Hour : 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

CO1: Define their ideas using PowerPoint presentations

CO2: Present themselves with confidence in interviews

CO3: Fill applications for the Jobs online

CO4: Develop the skills for interacting with the group members

CO5: Attend the interview confidentially

REFERENCES

1. Dhanavel, S.P. 2010. English and Soft Skills. Hyderabad: Orient BlackSwan Ltd.71
2. Corneilissen, Joep. How to Prepare for Group Discussion and Interview. New Delhi: Tata-McGraw-Hill, 2009.
3. D'Abreo, Desmond A. Group Discussion and Team Building. Mumbai: Better Yourself Books, 2004.
4. Ramesh, Gopal swamy, and Mahadevan Ramesh. The ACE of Soft Skills. New Delhi: Pearson, 2010.
5. Gulati, Sarvesh. Corporate Soft Skills. New Delhi: Rupa and Co. 2006.
6. Van Emden, Joan, and Lucinda Becker. Presentation Skills for Students. New York: Palgrave Macmillan, 2004

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H					H		H		H			H	
CO2	M					H		H		H			H	
CO3	M					H		H		H			H	
CO4	H					H		H		H			H	
CO5	H					H		H		H			H	

OBJECTIVE:

Study of this subject provides an understanding of the scope of an entrepreneur, key areas of development, financial assistance by the institutions, methods of taxation and tax benefits, etc.

UNIT I ENTREPRENEURSHIP

9

Entrepreneur–Types of Entrepreneurs Difference between Entrepreneur and Intrapreneur–Entrepreneurship in Economic Growth, Factors Affecting Entrepreneurial Growth.

UNIT II MOTIVATION

9

Major Motives Influencing an Entrepreneur–Achievement Motivation Training, self-Rating, Business Game, Apperception Test–Stress management ,Entrepreneurship Development Programs –Need, Objectives.

UNIT III BUSINESS

9

Small Enterprises –Definition, Classification –Characteristics, Ownership Structures –Project Formulation –Steps involved in setting up a Business –identifying, selecting a Good Business opportunity, Market Survey and Research, Techno Economic Feasibility Assessment –Preparation of Preliminary Project Reports –Project Appraisal –Sources of Information –Classification of Needs and Agencies.

UNIT IV FINANCING AND ACCOUNTING

9

Need Sources of Finance, Term Loans, Capital Structure, Financial Institution, management of working Capital, Costing, Break Even Analysis ,Network Analysis Techniques of PERT/ CPM –Taxation –Income Tax, Excise Duty –Sales Tax.

UNIT V SUPPORT TO ENTREPRENEURS

9

Sickness in small Business –Concept, Magnitude, causes and consequences, Corrective Measures Government Policy for Small Scale Enterprises –Growth Strategies in small industry –Expansion, Diversification, Joint Venture, Merger and Sub Contracting.

Total Hours: 45

COURSE OUTCOMES:

- At the end of the course, the students should be able to:
 CO1: Gain a knowledge about the entrepreneurial aspects
 CO2: Understand the essence of entrepreneurship
 CO3: Formulate a business plan
 CO4: Calculate the financial plan for a business
 CO5: Run a business successfully.

REFERENCE:

1. S.S. Khanka “Entrepreneurial Development” S. Chand & Co. Ltd. Ram Nagar New Delhi, 1999.
 2. Kuratko & Hodgetts, “Entrepreneurship –Theory, process and practices”, Thomson learning 6th edition.

REFERENCES:

1. Hisrich R D and Peters M P, “Entrepreneurship” 5th Edition Tata McGraw-Hill, 2002.
 2. Mathew J Manimala, “Entrepreneurship theory at crossroads: paradigms and praxis” Dream tech 2nd edition 2006.
 3. Rabindra N. Kanungo “Entrepreneurship and innovation”, Sage Publications, New Delhi, 1998.
 4. EDII “Faulty and External Experts –Hand Book for New Entrepreneurs Publishers: Entrepreneurship Development” Institute of India, Ahmadabad, 1986

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H						H	H		H		H	H	
CO2	M						M	H		H		H	H	
CO3	M						H	M		H		M	M	
CO4	H						H	M		H		H	H	
CO5	H						H	H		H		H	H	

**Value Added Course
Screen Printing**

**Semester II-V
18BEPV01**

**Instruction Hours: 40
No. of credits: 1**

Objectives

- To impart knowledge on the basic principles of Screen printing process, stencil preparation methods & types of presses, print problems & quality control in screen and textile printing process.

Unit I Screen Preparation and Stencil Making

Mesh materials, Characteristics and selection, types of frames, screen Tensioning Devices, screen pre-treatment, Degreasing of a screen, hand cut stencils, photomechanical stencil making, direct & indirect process, Equipment used. **8**

Unit II Machine Printing

Flatbed hinged frames, vertical lift, cylinder bed, Container Printing & Rotary machines, squeegee: Types and maintenance.

Unit III Ink and Solvents - Drying Methods

General properties, Basic constituents of screen ink, Major classes of solvents, safety in the handling and storage of ink & solvents. Oxidation drying, solvent Evaporation, Infra- red & Ultraviolet curing. **8**

Unit IV Textile Printing

Design : Gouache, Bottled water colors, Painting and Blotches, Resist Techniques, Surfaces, Transfer Techniques. Materials, Dyeing, Single stage dyeing and polychromatic dyeing, Synthetic fabrics, blended fiber fabric, natural fabrics, Paper, paints, Brushes, Pens and Inks, palettes, Pencils, Adhesives. **8**

Unit V Practical Session

Direct and indirect Stencil making, Screen producing, Producing single color and multi-color images. Producing half tone images, Study of automatic, semi-automatic screen printing Machines, Industrial Visit. **8**

Total Hours: 40

Course Outcomes:

At the end of the course, the students should be able to:

CO1: Understand the concept and implement screen printing practically

CO2: Knowledge about drying inks and solvents

CO3: Design and print on various substrates

CO4: Establish a small scale industries

References:

- John Stephens(1994), Screen process printing*; Blueprint publishing Ltd.,
- Albert Koslof (1900), Screen printing techniques*; the signs of the Times Publishing Co.,
- Chawan, R.B(1981), "Advances in textile chemical processing Ed."*, IIT, Delhi,
- Joyce Storey, The Thames & Hudson Manual of Textile Printing*, Thames &Hudson Ltd., London, 1984.
- Mary Paul Yates(1996), Textile, A Handbook for Designers*, W.W. Norton & Company, London.

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H						H	H		H		H	H	H
CO2	M						M	H		H		H	H	M
CO3	M						H	M		H		M	M	M
CO4	H						H	M		H		H	H	H

**Open Elective I
MULTIMEDIA DEVELOPMENT**

**Semester VII
18BEPO01**

**Instruction Hours/ week: 3T
No. of credits: 3**

OBJECTIVES:

- To expose multimedia concepts in e-publishing
- To learn the standards of planning and creating content in publishing

UNIT I INTRODUCTION **9**

Nature of text, image, audio, video, graphic and animation files - Capturing the various media - creating, editing and storing the various media - digitization and compression - authoring tools for packaging multimedia systems - web-based multimedia and issues of content delivery over the web.

UNIT II SOFTWARE PACKAGES **9**

Study – animation software – authoring software – audio/video capturing

UNIT III CREATING MEDIA, DIGITIZATION AND EDITING **9**

Creating media - capturing audio, video - creating/ scanning images - creating gif images - Digitization and editing - combining audio, video - integrating images

UNIT IV COMPOSING CONTENT AND INCLUDING INTERACTIVITY **9**

Composing content - Story board - Slide and Theatre Metaphase - Including interactivity - User input - Response to users

UNIT V PROJECTS **9**

Designing a virtual museum - Designing a multimedia web page for announcing a party, advertising a product, etc.

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Understand the principles of multimedia in various media
- CO2: Cognize the audio/video capturing
- CO3: Create Design using multimedia software
- CO4: Composing content and creating interactivity with the user
- CO5: Apply multimedia communication in day to day life

REFERENCES

1. www.w3schools.com/media/default.asp
2. Adobe Flash Professional CS5.5: <http://help/adobe.com>
3. Adobe Director: www.adobe.com/support/director/tutorial_index.htm

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1					M	M				M		H	H	
CO2	H	H	H		H	M						H	H	
CO3	H	H	H		H	M						H	H	
CO4	H	H	H		H					H				
CO5	H	H	H							H				

AUGMENTED REALITY CONCEPTS

18BEPO02

Instruction Hours/week: 3T

No. of Credits: 3

OBJECTIVES:

- Learn what augmented reality is
- Discover it's possible uses in various domains
- Learn to create an augmented reality for a given scenario

UNIT I: INTRODUCTION

9

History of Augmented Reality (AR), Virtual reality Vs Augmented Reality, Mixed Reality (MR), QR codes, Experience AR with samples.

UNIT II: AR TOOLS

9

AR browsers, Creating AR images and videos for specific scenarios – kids story book, guide for a tourist spot, physiology or anatomy, internal architecture of a machine.

UNIT III: AR SYSTEM ARCHITECTURE

9

AR system architecture, creating images, creating interactive videos, mapping them to form AR, installing on hand-held devices such as smart phones and tablets, installing in browser or as application.

UNIT IV: DESIGN

9

Augment a book, a city map, a book wrapper, a package for a commercial product, a postal cover, movie poster, and newspaper advertisement

UNIT V: APPLICATIONS

9

AR in education, advertising, Packaging, news, marketing, gaming, movies, sports, and travel. Recent trends and research perspective of AR

Total Hour : 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Understand the AR Concepts.
- CO2: Handle the AR tool
- CO3: Building and designing of AR
- CO4: Apply augmented reality on various application
- CO5: Create augmented reality on their own.

REFERENCES

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/>

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H				H							H	H	
CO2	H	H	H		H								H	
CO3	H	H	H		H	H							M	
CO4	H	H	H		H	H					H		H	
CO5	H	H	H	H	H	H						H	M	

3D PRINTING METHODS

18BEPO03

Instruction Hours/ week: 3T
No. of credits: 3

OBJECTIVE:

- Understand the basic concepts of 3D Printing Technology

UNIT – I INTRODUCTION

9

3D printing history – techniques for 3D printing – advantages 4 limitation – scope – research perspectives.

UNIT – II PROCESS FLOW

9

3D printing product manufactures cycle – prototype making stages – precautions – material choice – techniques choice.

Unit – III 3D Modelling

9

3D modelling software – modelling primitives – modelling composite objects – modelling based on material consumption.

Unit – IV 3D Printer

9

3D printing study – components – working – software tools – configuration – material and size setting.

Unit- V Application

9

Basic Sciences-Engineering domains-social cause – environment protection- entertainment- commercial applications

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Understand 3D printing concepts
- CO2: Understand the basic types of 3D Printing, materials used and their applications
- CO3: Select appropriate method for designing and modelling applications
- CO4: Analyse the 3D Printers working and its configuration
- CO5: Design 3D Prototype for various applications

TEXT BOOK

1. Ian M. Hutchings, Graham D. Martin, “Inkjet Technology for Digital Fabrication”, John Wiley& Sons, 2013.
2. Christopher Barnatt, “3D Printing: The Next Industrial Revolution”, Create Space 7Independent Publishing Platform, 2013.

REFERENCES

3. Ibrahim Zeid, “Mastering CAD CAM” Tata McGraw-Hill Publishing Co.2007
4. Joan Horvath, “Mastering 3D Printing”, A Press Publishers, 2014
5. Chua, C.K., Leong K.F. and Lim C.S., “Rapid prototyping: Principles and applications”, Second Edition, World Scientific Publishers, 2010.

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	H				H	M						H	H	
CO2	H				H	H						H		
CO3	H	H	H		H									
CO4	H	H	H		H	H						H		
CO5	H	H	H	H	H	H						H	H	

OBJECTIVE:

To integrate and connect the various media for publishing

UNIT I INTRODUCTION

9

Introduction to cross media publication, Print media , Web media , work flow, implementation plan Authors, Publishers, e Publishing Companies; Workflow – Receiving Jobs (FTP), Pre-editing, Copy editing, Proof reading, Graphics, Pagination, Quality Control, Output – Print, Proof, Web, Handheld devices(file formats) ; Workflow software.

UNIT II PUBLISHING & PUBLICATION MEDIA

9

Publishing Process, Standards, Publishers' and Metadata. Offline, Online and hybrid publication Media. Content and content formats: types, text, formats. E-publishing Models. The e-book: E-book content, delivery formats, components, producing e books, e-books and metadata, e-books and encryption, managing e-book content

UNIT III MULTIMEDIA

9

Design and Layout for Electronic Media, understanding of the principles of layout and composition including the use of the grid system, Use web editing packages, HTML mark-up and style sheets(CSS) to compose and layout web pages, understanding of the principles of typography, Indexing, Types of PDFs (editable and non-editable) , teletext.

UNIT IV PUBLICATION & E-COMMERCE

9

Information regarding E-publications formats like e-pubs. Also E-pub readers like Adobe Digital Editions, mobile readers etc in brief (since this is a worldwide used e-publishing solution used on a large scale), rules and regulations for e-publishing use of business models in the development and evaluation of an e-commerce application, Style-sheets, XSL, XSLT, CSS Layout and workflow for cross media devices, POD, Mobile, Tablets, CD, Websites, File extension and Compatibility

UNIT V:WEB APPLICATION DEVELOPMENT

9

Use of Flash (Basic concepts), Introduction to dot net technology, Web Applications Development, CMS (content Management System) and ECM suites (Enterprise Content Management), methodology, need and use

Total Hours: 45

COURSE OUTCOMES:

At the end of the course, the students should be able to:

- CO1: Understand the Principle of cross media
- CO2: Analyse the property of e-books
- CO3: Develop the Multimedia Concepts
- CO4: Use the advertising knowledge to create advertising
- CO5:Develop web planning solutions

REFERENCE BOOKS:

1. Michal' L Kleper, The Handbook of Digital Publishing
2. Harold Henke, (2001), Electronic Books and ePublishing: A Practical Guide for Authors, 1st edition, Springer.
3. William E Kasdorf, (2003), The Columbia Guide to Digital Publishing, Columbia University Press.
4. Cady & McGregor, (1996), Mastering the Internet, 2nd edition, Business Promotion Bureau Publications.
5. Deitel & Deitel, Neito, Sadhu, (2001), XML How to Program, Pearson Education Publishers. 6. Eric Ladd, Jim O' Donnel, (1999) Using HTML 4, XML and Java, Prentice Hall of India – QUE.
7. Scot Johnson, Keith Ballinger, Davis Chapman, (1999), Using Active Server Pages, Prentice Hall of India.
8. H. Kipphan, (2001), Handbook of Print Media, ISBN: 3-540-67326-1Springer-Verlag Berlin Heidelberg
9. Begin.C, I.BaTIS in action, Creating & Manipulating PDF 10. Multimedia making it work by Infra Suite.

Course outcome	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	M				M							M	M	
CO2	M	H	H		H							H		
CO3	H	H	H	H	H									
CO4	H				H	H		H	H	H				
CO5	H	H	H	H	H								H	

