KUMARAGURU
college of technology
character is life

Department of Electrical and Electronics Engineering

AY: 2018-19 **date: 11-12-2018**

Action taken report -Teachers Feedback

S.No	Analysis	Action taken report
1.	Anna University Academic expert Suggested to include ETAP, PSCAD based experiments in Power system lab.	ETAP and Matlab experiments are included in U17EEI7202- Power System Analysis Course .
2.	Electric vehicles course could be included as Elective course	Electric Vehicle Technology course is included as elective in R17 & R18 regulations.
3.	Suggested to convert PLC automation course into 3- credit course in R-17	In R17 & R18 regulations PLC Automation course has been assigned 3 credit with practical components.
4.	In U17EET6002 -Power system protection and switch gear course in unit -3 Review of fault analysis topic shall be removed and topic on relays can be included in Unit-1	In U17EET6002 -Power system protection and switch gear course the topic on fault analysis is removed and topic on relay is included in unit 4 in R17 & R18 regulations
5.	Suggested to include the topic Types of curves in Unit – 2, Semester 6, Protection and Switch Gear course,	The topic is Included R17 & R18 regulations.
6.	Suggested to discuss DSP applications in Unit – 5, Semester 4, Digital Signal Processing course	Topic on speed control of motor is included in unit 5 DSP course.
7.	To change the course title of U18EEI3203 as Analog and Linear Integrated Circuits	In R18 regulation title is changed in accordance to the members recommendations.
8.	Power Electronics – In DC-DC Converters module Isolated circuit topology to be included	Isolated circuit topology is included in U17EET5001-Power Electronics

9.	Electric Circuit Theory - Millman's theorem to be included.	The topic is included in U18EEI2201- Electric circuit analysis course module-3
10.	In DSP, Latest processor can be included	The latest processor TMS 320F281 is Included in the course U18EET5005 DSP
11.	True RMS Measurement can be included in Digital Measurements module – Measurements and Instrumentation	Topic True RMS Measurement is included in the course U18EET3004 Measurements and Instrumentation module-3.
12.	Power analyzer and harmonic analyzer can be given as Power quality analyzer – Measurements and Instrumentation	Topic is renamed as Power quality analyser in the course U18EET3004 Measurements and Instrumentation
13.	DSO & MSO can be included in Digital Measurements Module – Measurements and Instrumentation	The topic DSO &MSO is included in the course U18EET3004 Measurements and Instrumentation

Prepared By,

Dr,V.Kandasamy

BoS Coordinator

Approved By,

11/12/18

Dr.K.Malarvizhi

BoS Chairman

Proof for Action Taken: 1 - ETAP and Matlab experiments are included in U17EEI7202- Power System Analysis Course.

U17EEI7202 POWER SYSTEM ANALYSIS

L	T	P	J	C
2	1	2	0	4

COURSE OUTCOMES

After successful completion of this course, the students will be able to

CO1	Draw the reactance diagram for a given power system network and make load flow calculations.	**K2**
CO2	Model the sequence networks in terms of symmetrical components.	**K2**
CO3	Calculate the fault currents, voltages when symmetrical and unsymmetrical faults occur.	**K2**
CO4	Analyze the stability of power system network using various methods.	**K2**
CO5	Analyze load flow, fault and stability of power system network using simulation tool.	**K2**

PRE-REQUISITE

1. Partial Differential Equations and Transforms
2. Transmission and Distribution
3. AC Machines

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO 1	S	S		M										
CO 2	S	M	M	M										
CO 3	S	M		M										M
CO 4	S	M	M	W										
CO 5	S	M			S				W				M	

COURSE ASSESSMENT METHODS

Direct Tools
1. Continuous Assessment Test I, II 2. 3Assignment, Open book test; Cooperative learning report, Group Presentation, Problem based learning, Project based learning, Mini Projects, Project report, Quiz, Role play, Self-Explanatory videos, Prototype or Product Demonstration etc. (as applicable) 3. End Semester Examination
Indirect Tools
1. Course-end survey 2. Programme Exit survey 3. Placement/Higher education record 4. Feedback (Students, Employers, Parents, Professional body members, Alumni)

THEORETICAL COMPONENT CONTENTS:

Signature of the Chairman BOS EEE

PER UNIT REPRESENTATION OF POWER SYSTEM **9 Hours**

Basic components of a power system – Representation of Power System Components: Synchronous machines, Transformers, Transmission lines - Single line diagram- impedance and reactance diagrams, per unit quantities, changing the base of per unit quantities, advantages of per unit system.

POWER FLOW ANALYSIS **11 Hours**

Introduction – Bus Classification – Bus admittance matrix – Solution of load flow equations: Gauss Seidel method – Newton Raphson method – Fast decoupled Method – Introduction to (Electromagnetic Transient Analyser Programme) ETAP software for power system analysis.

SYMMETRICAL FAULT ANALYSIS **9 Hours**

Types of faults- Formation of Z_{bus} using building algorithm - Symmetrical faults -Transient in R-L series circuit, calculation of 3-phase short circuit current and reactance of synchronous machine, internal voltage of loaded machines under transient conditions.

UNSYMMETRICAL FAULT ANALYSIS **9 Hours**

Unsymmetrical faults- Symmetrical components- Sequence impedances and sequence networks - Analysis of single line to ground fault, line-to-line fault and double Line to ground fault.

POWER SYSTEM STABILITY **7 Hours**

Steady state and Transient stability–stability limits - swing equation – Equal area criterion-critical clearing angle and time – Multimachine stability analysis.

PRACTICAL COMPONENT CONTENTS:

LIST OF EXPERIMENTS

1. Bus admittance matrix formulation using MATLAB.
2. Load Flow Analysis – Gauss Seidel Method using MATLAB.
3. Load Flow Analysis – Newton-Raphson Method using ETAP.
4. Economic dispatch with and without losses using MATLAB.
5. Z-bus Formation using MATLAB.
6. Short circuit analysis on a power system using power world simulator.
7. Unsymmetrical Fault Analysis using ETAP.
8. Solution of swing equation using MATLAB.
9. Stability analysis using MATLAB.

TEXT BOOKS

1. HadiSaadat "Power system analysis", Tata McGraw Hill, New Delhi, 2010
2. D P Kothari, I J Nagrath 'Modern Power System Analysis', 3rd Edition, 2011.

REFERENCES

1. John .J. Grainger &Stevenson.W.D., 'Power System Analysis', McGraw Hill, 1 st Edition, 2003
2. P. Kundur, "Power System Stability and Control", 1st Edition, McGraw Hill Publishing, 2006.
3. B. R. Gupta "Power System Analysis and Design", 5th Edition, S.Chand& Company, 2005.

Signature of the Chairman BOS EEE

Proof for Action Taken: 2 – Electric Vehicle Technology course is included as elective in R17 & R18 regulations.

PROFESSIONAL ELECTIVES									
S.No	**Course code**	**Course Title**	**Course Mode**	**CT**	**L**	**T**	**P**	**J**	**C**
1	U17EEE0001	Power System Operation and Control	Theory	PE	3	0	0	0	3
2	U17EEE0002	Electrical Energy Utilization and Conservation	Theory	PE	3	0	0	0	3
3	U17EEE0003	High Voltage Engineering	Theory	PE	3	0	0	0	3
4	U17EEE0004	Restructured Power System	Theory	PE	3	0	0	0	3
5	U17EEE0005	VLSI Design	Theory	PE	3	0	0	0	3
6	U17EEE0006	Modern Control Systems	Theory	PE	3	0	0	0	3
7	U17EEE0007	Smart Grid Engineering	Theory	PE	3	0	0	0	3
8	U17EEE0008	Internet of Things	Theory	PE	3	0	0	0	3
9	U17EEE0009	Automotive Electronics	Theory	PE	3	0	0	0	3
10	U17EEE0010	Energy Storage Technology	Theory	PE	3	0	0	0	3
11	U17EEE0011	Switched Mode Power Converters	Theory	PE	3	0	0	0	3
12	U17EEE0012	Power Electronics for Renewable Energy System	Theory	PE	3	0	0	0	3
13	U17EEE0013	Electric Vehicle Technology	Theory	PE	3	0	0	0	3
14	U17EEE0014	Electrical safety and Management	Theory	PE	3	0	0	0	3

ONE CREDIT COURSES			
S. No.	**Course code**	**Course Title**	**Industry that will offer the course**
1	U17EEC0001	Automotive Embedded Systems	TVS MOTORS, HOSUR
2	U17EEC0002	Embedded System Arm Cortex M3 MCU	UTL TECHNOLOGIES, BANGALORE
3	U17EEC0003	Case Study Using Arm Cortex M3 MCU – Automation Of Linear Weighing Machine	TECHNOPAC AUTOMATION & CONTROLS, COIMBATORE
4	U17EEC0004	Substation Design	BALFOUR BEATY INFRASTRUCTURE, BANGALORE
5	U17EEC0005	Industrial Embedded Systems And Communication Protocols	TECHNOPAC AUTOMATION & CONTROLS, COIMBATORE

Signature of the Chairman BOS EEE

PROFESSIONAL ELECTIVES									
S. No	**Course code**	**Course Title**	**Course Mode**	**CT**	**L**	**T**	**P**	**J**	**C**
1	U18EEE0001	Power System Operation and Control	Theory	PE	3	0	0	0	3
2	U18EEE0002	Electrical Energy Utilization and conservation	Theory	PE	3	0	0	0	3
3	U18EEE0003	High Voltage Engineering	Theory	PE	3	0	0	0	3
4	U18EEE0004	Restructured Power System	Theory	PE	3	0	0	0	3
5	U18EEE0005	VLSI Design	Theory	PE	3	0	0	0	3
6	U18EEE0006	Modern Control Systems	Theory	PE	3	0	0	0	3
7	U18EEE0007	Smart Grid Engineering	Theory	PE	3	0	0	0	3
8	U18EEE0008	Internet of Things	Embedded-Theory & Lab	PE	2	0	2	0	3
9	U18EEE0009	Automotive Electronics	Theory	PE	3	0	0	0	3
10	U18EEE0010	Energy Storage Technology	Theory	PE	3	0	0	0	3
11	U18EEE0011	Switched Mode Power Converters	Theory	PE	3	0	0	0	3
12	U18EEE0012	Power Electronics for Renewable Energy System	Theory	PE	3	0	0	0	3
13	U18EEE0013	Electric Vehicle Technology	Theory	PE	3	0	0	0	3
14	U18EEE0014	Electrical safety and energy Management	Theory	PE	3	0	0	0	3
15	U18EEE0015	Drives for Electric Vehicle	Theory	PE	3	0	0	0	3
16	U18EEE0016	Sensing Techniques and Sensor Systems	Theory	PE	3	0	0	0	3
17	U18EEE0017	Biomedical Instrumentation	Theory	PE	3	0	0	0	3
18	U18EEE0018	Industry 4.0	Theory	PE	3	0	0	0	3

ONE CREDIT COURSES			
S.No	**Course code**	**Course Title**	**Industry that will offer the course**
1	U18EEC0001	Automotive Embedded Systems	TVS MOTORS, HOSUR

Signature of the Chairman BOS EEE

Proof for Action Taken: 3 – In R17 & R18 regulations PLC Automation course has been assigned 3 credits with practical components.

U17EEI4205 **PLC AUTOMATION**

L	T	P	J	C
2	0	2	0	3

COURSE OUTCOMES

After successful completion of this course, the students would be able to

CO1	Describe the architecture of PLC.	**K2**
CO2	Understand the working of PLC analog input and output devices.	**K2**
CO3	Program on basic ladder logic diagram using timer and counters.	**K2**
CO4	Understand the interface of PC with PLC and hardware implementation	**K2**

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO 1	S													
CO 2	S		S											
CO 3	S				S						M			
CO 4	S			S									S	S

COURSE ASSESSMENT METHODS

Direct
1. Continuous Assessment Test I, II 2. Model Examination (For Practical Courses & Embedded Courses) 3. Assignment, Open Book Test, Cooperative Learning Report, Group Presentation, Problem based Learning, Project based Learning, Mini Projects, Project Report, Quiz, Role Play, Self-Explanatory Videos, Prototype or Product Demonstration etc. (as applicable) 4. End Semester Examination
Indirect
1. Course End Survey 2. Programme Exit Survey 3. Placement/Higher Education Record 4. Feedback (Students, Employers, Parents, Professional Body members, Alumni)

THEORETICAL COMPONENT CONTENTS:

INTRODUCTION TO PLC **10 hours**

Definition and history of PLC, Overall PLC system, PLC Input and output modules, central processing unit, processor, input modules (Interfaces), power supplies , PLC advantages and disadvantages, selection criteria for PLC, Input ON/OFF switching devices, Input analog devices, Output ON/OFF devices, output analog devices.

PROGRAMMING OF PLC **10 hours**

Methods of Programming - construction of PLC ladder diagram, Basic components & their symbols in ladder diagram, Fundamental of ladder diagram, Boolean logic &relay logic, and analysis of rungs. Timers and counters, programming with timers and counters.

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APPLICATION OF PLC **10 hours**

Instructions in PLC , program control instruction ,math instruction, sequencer instruction , use of PC as PLC , application of PLC, case studies of bottle filling system.

PRACTICAL COMPONENT CONTENTS:

LIST OF EXPERIMENTS

1. Develop a Boolean logic to flash Lamp
2. Implementation of simple combination logic using PLC
3. Sequential Logic using PLC
4. Timer – On Delay and Off Delay
5. Counter – Up and Down
6. Design of Alarms and Interlocks
7. Water Level Control System
8. Temperature control system
9. Implementation of motor control forward and Reverse control using PLC

REFERENCES

1. Frank D. Petruzella, "Programmable Logic Controllers", McGraw-Hill Companies, 3rdEdition, March 2013.
2. Ian G.Warnock, "Programmable Controllers Operation and Application", Prentice Hall International, UK, 1992.
3. John W. Webb and Ronald A.Reis, "Programmable Logic Controllers – Principles and Applications", Prentice Hall Inc., New Jersey, 3rdEdition, 1995.
4. Krishnakant , "Computer Based Industrial Control", Prentice Hall of India, 1997.

Theory: 30 **Tutorial: 0** **Practical:15** **Project: 0** **Total: 45 Hours**

Signature of the Chairman BOS EEE

U18EEI4205 **PLC AUTOMATION**

L	T	P	J	C
2	0	2	0	3

COURSE OUTCOMES

After successful completion of this course, the students would be able to

CO1	Describe the architecture of PLC.	K2
CO2	Understand the working of PLC analog input and output devices.	K2
CO3	Program on basic ladder logic diagram using timer and counters.	K2
CO4	Understand the interface of PC with PLC and hardware implementation	K2

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S													
CO2	S		S											
CO3	S				S						M			
CO4	S			S										
CO5	S													

COURSE ASSESSMENT METHODS

Direct

1. Continuous Assessment Test I, II
2. Model Examination (For Practical Courses & Embedded Courses)
3. Assignment, Open Book Test, Cooperative Learning Report, Group Presentation, Problem based Learning, Project based Learning, Mini Projects, Project Report, Quiz, Role Play, Self-Explanatory Videos, Prototype or Product Demonstration etc. (as applicable)
4. End Semester Examination

Indirect

1. Course End Survey
2. Programme Exit Survey
3. Placement/Higher Education Record
4. Feedback (Students, Employers, Parents, Professional Body members, Alumni)

THEORETICAL COMPONENT CONTENTS

INTRODUCTION TO PLC **10 hours**

Definition and history of PLC, Overall PLC system, PLC Input and output modules, central processing unit, processor, input modules (Interfaces), power supplies , PLC advantages and disadvantages, selection criteria for PLC, Input ON/OFF switching devices, Input analog devices, Output ON/OFF devices, output analog devices.

PROGRAMMING OF PLC **10 hours**

Methods of Programming - construction of PLC ladder diagram, Basic components & their symbols in ladder diagram, Fundamental of ladder diagram, Boolean logic &relay logic, and analysis of rungs. Timers and counters, programming with timers and counters.

Signature of the Chairman BOS EEE

APPLICATION OF PLC **10 hours**

Instructions in PLC , program control instruction ,math instruction, sequencer instruction , use of PC as PLC , application of PLC, case studies of bottle filling system.

LABORATORY COMPONENT CONTENTS:

LIST OF EXPERIMENTS

1. Develop a Boolean logic to flash Lamp
2. Implementation of simple combination logic using PLC
3. Sequential Logic using PLC
4. Timer – On Delay and Off Delay
5. Counter – Up and Down
6. Design of Alarms and Interlocks
7. Water Level Control System
8. Temperature control system
9. Implementation of motor control forward and Reverse control using PLC

REFERENCES

1. Frank D. Petruzella, "Programmable Logic Controllers", McGraw-Hill Companies, 3rdEdition, March 2013.
2. Ian G.Warnock, "Programmable Controllers Operation and Application", Prentice Hall International, UK, 1992.
3. John W. Webb and Ronald A.Reis, "Programmable Logic Controllers – Principles and Applications", Prentice Hall Inc., New Jersey, 3rdEdition, 1995.
4. Krishnakant , "Computer Based Industrial Control", Prentice Hall of India, 1997.

Theory: 30 **Tutorial: 0** **Practical:30** **Project: 0** **Total: 60 Hours**

Signature of the Chairman BOS EEE

Proof for Action Taken: 4 – In U17EET6002 -Power system protection and switch gear course the topic on fault analysis is removed and topic on relay is included in unit 4 in R17 & R18 regulations.

U17EET6002 POWER SYSTEM PROTECTION AND SWITCHGEAR

L	T	P	J	C
3	0	0	0	3

COURSE OUTCOMES

After successful completion of this course, the students will be able to

CO1	Understand the principles of protection schemes and relays against faults.	**K2**
CO2	Classify the various types of circuit breakers and their working	**K2**
CO3	Understand the protection schemes for different power system components.	**K2**
CO4	Describe and demonstrate the basic principles of digital protection.	**K2**
CO5	Understand system protection schemes, and the use of wide-area measurements.	**K2**

PRE-REQUISITE

1. Transmission and Distribution
2. Electrical Machines

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO 1	M					M								
CO 2	S													
CO 3	M													
CO 4	M				M								W	
CO 5	M	M				M								

COURSE ASSESSMENT METHODS

Direct
1. Continuous Assessment Test I, II 2. Assignment, Open Book Test, Cooperative Learning Report, Group Presentation, Problem based Learning, Project based Learning, Mini Projects, Project Report, Quiz, Role Play, Self-Explanatory Videos, Prototype or Product Demonstration etc. (as applicable) 3. End Semester Examination
Indirect
1. Course End Survey 2. Programme Exit Survey 3. Placement/Higher Education Record 4. Feedback (Students, Employers, Parents, Professional Body members, Alumni)

PROTECTION SCHEMES **9 Hours**

Principles and need for protective schemes – Methods of Neutral grounding – Zones of protection and essential qualities of protection – Protection schemes-Operating principles of relays–Classification of relays- Electromagnetic Relays –Directional, Differential relays.

CIRCUIT BREAKERS **9 Hours**

Signature of the Chairman BOS EEE

Physics of arcing phenomenon and arc interruption - DC and AC circuit breaking – re-striking voltage and recovery voltage - rate of rise of recovery voltage - resistance switching - current chopping - interruption of capacitive current - Types of circuit breakers –air break, oil, SF6 and vacuum circuit breakers –Rating and selection of Circuit breakers- Types of MCB curves (B,C,D).

APPARATUSPROTECTION **9 Hours**

Current transformers and Potential transformers and their applications in protection schemes- Transformer and Generator protection. Bus Bar arrangement schemes and its Protection.

DIGITAL PROTECTION **9 Hours**

Computer-aided protection- Block diagram of Numerical relays –distant protection of transmission lines-Demonstration of time based over-current Relays, Overload Relays.

SYSTEM PROTECTION **9 Hours**

System Protection Schemes. Under-frequency, under- voltage and df/dt relays, Synchro-phasors, Phasor Measurement Units and Wide-Area Measurement Systems (WAMS). Application of WAMS for improving protection systems.

TEXTBOOK

1. Sunil S. Rao, "Switchgear and Protection and Power System", 13th Edition, Khanna publishers, New Delhi, 2008.
2. M.L. Soni, P.V. Gupta, V.S. Bhatnagar, A. Chakrabarti, "A Text Book on Power System Engineering", 2nd Edition, DhanpatRai& Co., 2009.

REFERENCES

1. Y.G. Paithankar and S.R. Bhide, "Fundamentals of Power System Protection", 2nd Edition, Prentice Hall of India, New Delhi, 2010.
2. Badri Ram, Vishwakarma, "Power System Protection and Switchgear", 2nd Edition, Tata McGraw Hill, New Delhi, 2012.
3. G. Phadke and J. S. Thorp, "Computer Relaying for Power Systems", John Wiley & Sons, 1988.
4. G. Phadke and J. S. Thorp, "Synchronized Phasor Measurements and their Applications", Springer, 2008.

Theory: 45 **Tutorial: 0** **Practical:0** **Project: 0** **Total: 45 Hours**

Signature of the Chairman BOS EEE

U18EET6002 POWER SYSTEM PROTECTION AND SWITCHGEAR

L	T	P	J	C
3	0	0	0	3

COURSE OUTCOMES

After successful completion of this course, the students will be able to

CO1	Understand the principles of protection schemes and relays against faults.	**K2**
CO2	Classify the various types of circuit breakers and their working	**K2**
CO3	Understand the protection schemes for different power system components.	**K2**
CO4	Describe and demonstrate the basic principles of digital protection.	**K2**
CO5	Understand system protection schemes, and the use of wide-area measurements.	**K2**

PRE-REQUISITE

1. Transmission and Distribution
2. Electrical Machines

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	M					M								
CO2	S													
CO3	M													
CO4	M				M								W	
CO5	M	M				M								

COURSE ASSESSMENT METHODS

Direct

1. Continuous Assessment Test I, II
2. Assignment, Open Book Test, Cooperative Learning Report, Group Presentation, Problem based Learning, Project based Learning, Mini Projects, Project Report, Quiz, Role Play, Self-Explanatory Videos, Prototype or Product Demonstration etc. (as applicable)
3. End Semester Examination

Indirect

1. Course End Survey
2. Programme Exit Survey
3. Placement/Higher Education Record
4. Feedback (Students, Employers, Parents, Professional Body members, Alumni)

PROTECTION SCHEMES **9 Hours**

Principles and need for protective schemes – Methods of Neutral grounding – Zones of protection and essential qualities of protection – Protection schemes-Operating principles of relays–Classification of relays- Electromagnetic Relays –Directional, Differential relays.

CIRCUIT BREAKERS **9 Hours**

Physics of arcing phenomenon and arc interruption - DC and AC circuit breaking – re-striking voltage and recovery voltage - rate of rise of recovery voltage - resistance switching - current chopping - interruption of capacitive current - Types of circuit breakers –air break, oil, SF6 and vacuum circuit breakers –Rating and selection of Circuit breakers- Types of MCB curves (B,C,D).

Signature of the Chairman BOS EEE

APPARATUS PROTECTION **9 Hours**

Current transformers and Potential transformers and their applications in protection schemes- Transformer and Generator protection. Bus Bar arrangement schemes and its Protection.

DIGITAL PROTECTION **9 Hours**

Computer-aided protection- Block diagram of Numerical relays –distant protection of transmission lines-Demonstration of time based over-current Relays, Overload Relays.

SYSTEM PROTECTION **9 Hours**

System Protection Schemes. Under-frequency, under- voltage and df/dt relays, Synchro-phasors, Phasor Measurement Units and Wide-Area Measurement Systems (WAMS). Application of WAMS for improving protection systems.

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1. Sunil S. Rao, "Switchgear and Protection and Power System", 13th Edition, Khanna publishers, New Delhi, 2008.
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3. G. Phadke and J. S. Thorp, "Computer Relaying for Power Systems", John Wiley & Sons, 1988.
4. G. Phadke and J. S. Thorp, "Synchronized Phasor Measurements and their Applications", Springer, 2008.

Theory: 45 **Tutorial: 0** **Practical:0** **Project: 0** **Total: 45 Hours**

Signature of the Chairman BOS EEE

Proof for Action Taken: 5 – The topic is Included R17 & R18 regulations.

U17EET6002 POWER SYSTEM PROTECTION AND SWITCHGEAR

L	T	P	J	C
3	0	0	0	3

COURSE OUTCOMES

After successful completion of this course, the students will be able to

CO1	Understand the principles of protection schemes and relays against faults.	**K2**
CO2	Classify the various types of circuit breakers and their working	**K2**
CO3	Understand the protection schemes for different power system components.	**K2**
CO4	Describe and demonstrate the basic principles of digital protection.	**K2**
CO5	Understand system protection schemes, and the use of wide-area measurements.	**K2**

PRE-REQUISITE

1. Transmission and Distribution
2. Electrical Machines

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO 1	M					M								
CO 2	S													
CO 3	M													
CO 4	M				M								W	
CO 5	M	M				M								

COURSE ASSESSMENT METHODS

Direct
1. Continuous Assessment Test I, II 2. Assignment, Open Book Test, Cooperative Learning Report, Group Presentation, Problem based Learning, Project based Learning, Mini Projects, Project Report, Quiz, Role Play, Self-Explanatory Videos, Prototype or Product Demonstration etc. (as applicable) 3. End Semester Examination
Indirect
1. Course End Survey 2. Programme Exit Survey 3. Placement/Higher Education Record 4. Feedback (Students, Employers, Parents, Professional Body members, Alumni)

PROTECTION SCHEMES **9 Hours**

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CIRCUIT BREAKERS **9 Hours**

Signature of the Chairman BOS EEE

Physics of arcing phenomenon and arc interruption - DC and AC circuit breaking – re-striking voltage and recovery voltage - rate of rise of recovery voltage - resistance switching - current chopping - interruption of capacitive current - Types of circuit breakers –air break, oil, SF6 and vacuum circuit breakers –Rating and selection of Circuit breakers- Types of MCB curves (B,C,D).

APPARATUSPROTECTION **9 Hours**

Current transformers and Potential transformers and their applications in protection schemes- Transformer and Generator protection. Bus Bar arrangement schemes and its Protection.

DIGITAL PROTECTION **9 Hours**

Computer-aided protection- Block diagram of Numerical relays –distant protection of transmission lines-Demonstration of time based over-current Relays, Overload Relays.

SYSTEM PROTECTION **9 Hours**

System Protection Schemes. Under-frequency, under- voltage and df/dt relays, Synchro-phasors, Phasor Measurement Units and Wide-Area Measurement Systems (WAMS). Application of WAMS for improving protection systems.

TEXTBOOK

1. Sunil S. Rao, "Switchgear and Protection and Power System", 13th Edition, Khanna publishers, New Delhi, 2008.
2. M.L. Soni, P.V. Gupta, V.S. Bhatnagar, A. Chakrabarti, "A Text Book on Power System Engineering", 2nd Edition, DhanpatRai& Co., 2009.

REFERENCES

1. Y.G. Paithankar and S.R. Bhide, "Fundamentals of Power System Protection", 2nd Edition, Prentice Hall of India, New Delhi, 2010.
2. Badri Ram, Vishwakarma, "Power System Protection and Switchgear", 2nd Edition, Tata McGraw Hill, New Delhi, 2012.
3. G. Phadke and J. S. Thorp, "Computer Relaying for Power Systems", John Wiley & Sons, 1988.
4. G. Phadke and J. S. Thorp, "Synchronized Phasor Measurements and their Applications", Springer, 2008.

Theory: 45 **Tutorial: 0** **Practical:0** **Project: 0** **Total: 45 Hours**

Signature of the Chairman BOS EEE

U18EET6002 **POWER SYSTEM PROTECTION AND SWITCHGEAR**

L	T	P	J	C
3	0	0	0	3

COURSE OUTCOMES

After successful completion of this course, the students will be able to

CO1	Understand the principles of protection schemes and relays against faults.	**K2**
CO2	Classify the various types of circuit breakers and their working	**K2**
CO3	Understand the protection schemes for different power system components.	**K2**
CO4	Describe and demonstrate the basic principles of digital protection.	**K2**
CO5	Understand system protection schemes, and the use of wide-area measurements.	**K2**

PRE-REQUISITE

1. Transmission and Distribution
2. Electrical Machines

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	M					M								
CO2	S													
CO3	M													
CO4	M				M								W	
CO5	M	M				M								

COURSE ASSESSMENT METHODS

Direct

1. Continuous Assessment Test I, II
2. Assignment, Open Book Test, Cooperative Learning Report, Group Presentation, Problem based Learning, Project based Learning, Mini Projects, Project Report, Quiz, Role Play, Self-Explanatory Videos, Prototype or Product Demonstration etc. (as applicable)
3. End Semester Examination

Indirect

1. Course End Survey
2. Programme Exit Survey
3. Placement/Higher Education Record
4. Feedback (Students, Employers, Parents, Professional Body members, Alumni)

PROTECTION SCHEMES **9 Hours**

Principles and need for protective schemes – Methods of Neutral grounding – Zones of protection and essential qualities of protection – Protection schemes-Operating principles of relays–Classification of relays- Electromagnetic Relays –Directional, Differential relays.

CIRCUIT BREAKERS **9 Hours**

Physics of arcing phenomenon and arc interruption - DC and AC circuit breaking – re-striking voltage and recovery voltage - rate of rise of recovery voltage - resistance switching - current chopping - interruption of capacitive current - Types of circuit breakers –air break, oil, SF6 and vacuum circuit breakers –Rating and selection of Circuit breakers- Types of MCB curves (B,C,D).

Signature of the Chairman BOS EEE

APPARATUS PROTECTION **9 Hours**

Current transformers and Potential transformers and their applications in protection schemes- Transformer and Generator protection. Bus Bar arrangement schemes and its Protection.

DIGITAL PROTECTION **9 Hours**

Computer-aided protection- Block diagram of Numerical relays –distant protection of transmission lines-Demonstration of time based over-current Relays, Overload Relays.

SYSTEM PROTECTION **9 Hours**

System Protection Schemes. Under-frequency, under- voltage and df/dt relays, Synchro-phasors, Phasor Measurement Units and Wide-Area Measurement Systems (WAMS). Application of WAMS for improving protection systems.

TEXTBOOK

1. Sunil S. Rao, "Switchgear and Protection and Power System", 13th Edition, Khanna publishers, New Delhi, 2008.
2. M.L. Soni, P.V. Gupta, V.S. Bhatnagar, A. Chakrabarti, "A Text Book on Power System Engineering", 2nd Edition, DhanpatRai& Co., 2009.

REFERENCES

1. Y.G. Paithankar and S.R. Bhide, "Fundamentals of Power System Protection", 2nd Edition, Prentice Hall of India, New Delhi, 2010.
2. Badri Ram, Vishwakarma, "Power System Protection and Switchgear", 2nd Edition, Tata McGraw Hill, New Delhi, 2012.
3. G. Phadke and J. S. Thorp, "Computer Relaying for Power Systems", John Wiley & Sons, 1988.
4. G. Phadke and J. S. Thorp, "Synchronized Phasor Measurements and their Applications", Springer, 2008.

Theory: 45 **Tutorial: 0** **Practical:0** **Project: 0** **Total: 45 Hours**

Signature of the Chairman BOS EEE

Proof for Action Taken: 6 – Topic on speed control of motor is included in unit 5 DSP course.

U17EET4004	DIGITAL SIGNAL PROCESSING	L	T	P	J	C
		3	0	0	0	3

COURSE OUTCOMES

After successful completion of this course, the students will be able to

CO1	Understand the different types of signals and systems and its applications.	**K2**
CO2	Apply various methods of transformation techniques and analyze the systems.	**K3**
CO3	Compute, simulate and analyze the DFT using FFT algorithms.	**K3**
CO4	Design and realize digital IIR and FIR filters.	**K3**
CO5	Understand the architecture and programming aspects of DSP processor.	**K2**

PRE-REQUISITE

1. Partial Differential Equations and Transforms

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
CO 1	S	S												
CO 2	S	S												
CO 3	S	S												
CO 4	S	S	M											
CO 5	M		M		M						M		S	M

COURSE ASSESSMENT METHODS

Direct Tools
1. Continuous Assessment Test I, II 2. Assignment, Open book test; Cooperative learning report, Group Presentation, Problem based learning, Project based learning, Mini Projects, Project report, Quiz, Role play, Self-Explanatory videos, Prototype or Product Demonstration etc. (as applicable) 3. End Semester Examination
Indirect Tools
1. Course-end survey 2. Programme Exit survey 3. Placement/Higher education record 4. Feedback (Students, Employers, Parents, Professional body members, Alumni)

SIGNALS AND REPRESENTATION **7 Hours**

Classification of signals: One Dimensional, Two-Dimensional, Three Dimensional Signal. Various Classification of Systems and signals - Basic Elements of DSP, Sampling Theorem - Applications of Digital Signal Processing - ECG.

DISCRETE TIME SYSTEM ANALYSIS **9**

Signature of the Chairman BOS EEE

Hours

Z-transform and its properties, ROC, Inverse z-transforms; difference equation – Solution by z-transform, Stability analysis, Linear and Circular Convolution.

DISCRETE FOURIER TRANSFORM & COMPUTATION 9

Hours

DFT, magnitude and phase representation - Computation of DFT using FFT algorithm radix 2 – DIT and DIF –MATLAB Programming for FFT Computation.

DESIGN OF DIGITAL FILTERS 11

Hours

FIR Filter – Linear phase characteristics - Windowing Techniques. IIR design - Analog filter design - Butterworth approximations - digital design using impulse invariant and bilinear transformation - Warping, pre-warping, Frequency transformation. FIR & IIR filter realization.

DSP PROCESSOR 9

Hours

Introduction to DSP processors - Architecture and features of TMS 320F281 Processor – General purpose timer - PWM generation unit - capture control units- Introduction to code composer studio - DSP based speed control of PMSM motor.

REFERENCES

1. J.G. Proakis and D.G. Manolakis, 'Digital Signal Processing Principles, Algorithms and Applications', Pearson Education, New Delhi, 2003 / PHI.
2. D.H. Hayes, "Digital Signal Processing", Schaum's Outline Series, Tata McGraw Hill, New Delhi, 2007.
3. B. Venkataramani, M. Bhaskar, "Digital Signal Processors, Architecture, Programming and Applications", Tata McGraw Hill, New Delhi, 2003.
4. Alan V. Oppenheim, Ronald W. Schafer and John R. Buck, "Discrete – Time Signal Processing", Pearson Education, New Delhi, 2003.
5. Ramesh Babu, "Digital Signal Processing", 4th Edition, SciTech Publications (India) Pvt.Ltd.,2012.
6. "TMS320F281 data sheet and application notes", www.ti.com.

Theory:45 Tutorial: 0 Practical: 0 Project: 0 Total: 45 Hours

Signature of the Chairman BOS EEE

Proof for Action Taken: 7 – In R18 regulation title is changed in accordance to the member recommendations.

U18EEI3203 **ANALOG ELECTRONICS AND LINEAR INTEGRATED CIRCUITS**

L	T	P	J	C
3	0	2	0	4

COURSE OUTCOMES

After successful completion of this course, the students will be able to

CO1	Understand the characteristics and applications of various semiconductor devices.	**K1**
CO2	Gain knowledge about small signal analysis of BJT and FET amplifiers.	**K2**
CO3	Analyze large signal amplifier and oscillator circuits.	**K2**
CO4	Design and analyze the linear applications of Op-amp and Familiarize with the concept of IC based voltage regulator and signal conversion circuits	**K3**
CO5	Apply the knowledge of semiconductor devices to design analog circuits for various applications using simulation software tools and hardware.	**K3**

PRE-REQUISITE

Physics/ Material science

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	M		W						W				W	
CO2	M		M						M				W	
CO3	M		M						M				M	M
CO4	S	M	M						M				M	M
CO5			S		M				S				S	W

COURSE ASSESSMENT METHODS

Direct
1. Continuous Assessment Test I, II 2. Model Examination (For Practical Courses & Embedded Courses) 3. Assignment, Open Book Test, Cooperative Learning Report, Group Presentation, Problem based Learning, Project based Learning, Mini Projects, Project Report, Quiz, Role Play, Self-Explanatory Videos, Prototype or Product Demonstration etc. (as applicable) 4. End Semester Examination
Indirect
1. Course End Survey 2. Programme Exit Survey 3. Placement/Higher Education Record 4. Feedback (Students, Employers, Parents, Professional Body members, Alumni)

THEORETICAL COMPONENT CONTENTS:

SEMICONDUCTOR DEVICES **9 Hours**

PN junction Diode – Zener Diode – BJT –JFET- MOSFET- Structure, Operation and VI Characteristics - Applications of Diode: Half Wave & Full Wave Rectifier – Zener voltage regulator.

SMALL SIGNAL AMPLIFIERS USING BJT AND FET **9 Hours**

Need for Biasing, Q point, DC and AC Load line, Biasing Circuits – Base bias, Voltage divider bias, emitter bias, CE, CB Amplifiers –Frequency response and hybrid model of CE amplifier– FET amplifier: CS Amplifier, Multistage Amplifier: RC coupled amplifier, Darlington Amplifier, Differential Amplifier using BJT.

Signature of the Chairman BOS EEE

LARGE SIGNAL, FEEDBACK AMPLIFIERS AND OSCILLATORS **9 Hours**

Classification of Amplifiers - Push-pull Amplifiers: A, B & AB Amplifiers — Tuned Amplifiers: Single Tuned Amplifiers-Advantages of Negative Feedback – Topologies of Voltage/Current: Series & Shunt Feedback Amplifiers – Positive Feedback – Barkhausen Criteria – Operation of RC phase shift, Wien Bridge, Crystal Oscillators.

OPERATIONAL AMPLIFIER CIRCUITS **9 Hours**

Introduction– internal circuit- Basic operations of Op-Amp-Inverting, Non inverting, Differentiator, Integrator- Differential Amplifier: Common mode and Differential mode Analysis - Op-Amp Based Instrumentation Amplifier – Comparator – Multi vibrators – Schmitt trigger

SPECIAL ICs AND SIGNAL CONVERSION CIRCUITS **9 Hours**

V/I and I/V conversion – V/F and F/V conversion – IC 555 Timer circuit: Functional block, characteristics & applications, Astable and monostable operation, IC 566 - voltage controlled oscillator, IC565-phase locked loop circuit, IC voltage regulators - LM317, IC723- Simple applications using simulation software tool.

PRACTICAL COMPONENT CONTENTS:

LIST OF EXPERIMENTS

1. Characteristics of BJT - CE configurations.
2. Characteristics of JFET.
3. Voltage regulator using Zener diode
4. Frequency response of common emitter amplifier.
5. Half wave and full wave rectifiers with filter.
6. Inverting &Non inverting amplifiers using op-amp
7. Integrator and differentiator circuits using op-amp
8. Wien bridge oscillator using op-amp.
9. Astable operation using IC 555.
10. Simulation of op-amp circuits using simulation software tools

TEXT BOOKS

1. S. Salivahanan, N. Suresh Kumar, “Electronic Devices and Circuits”, 4thEdition, McGraw-Hill Education, 2016.
2. Thomas L. Floyd, “Electronic Devices (Conventional Current Version)”, 10th Edition, Pearson education, 2017.
3. D. Roy Choudhary, Sheil B. Jani, “Linear Integrated Circuits”, 4th Edition, New Age International, New Delhi, 2010.

REFERENCES

1. JacobMillman, Christos C. Halkias, SatyabrataJit, “Electronic Devices and Circuits”, Tata McGraw Hill Publishing Limited, New Delhi, 2015.
2. B. P. Singh, Rekha Singh, “Electronic Devices and Circuits”, 2nd Edition, Pearson Education, 2013.
3. David A. Bell, “Electronic Devices and Circuits”, 5th Edition, Oxford University Press, 2008.
4. J. B. Gupta, “Electronic Devices and Circuits”, 2nd Edition, JPA Publications, 2009.
5. Adel S. Sedra, Kenneth C. Smith&Arun N. Chandorkar, “Microelectronic Circuits”, 6th Edition, Oxford University Press, 2013.
6. Donald A Neamen, “Microelectronics Circuit Analysis and Design”, 4th Edition, Tata McGraw Hill Publishing Limited, 2009.
7. Ramakant A. Gayakward, “Op-amps and Linear Integrated Circuits”, 4th Edition, Pearson Education, New Delhi, 2009.

Theory: 45 **Tutorial: 0** **Practical: 30** **Project: 0** **Total: 75 Hours**

Signature of the Chairman BOS EEE

Proof for Action Taken: 8 – Isolated circuit topology is included in U17EET5001-Power Electronics.

U17EET5001	POWER ELECTRONICS	L	T	P	J	C
		3	0	0	0	3

COURSE OUTCOMES

After successful completion of this course, the students will be able to

CO1	Distinguish the operation, capabilities, characteristics of various power semiconductor devices and driver circuits.	**K1**
CO2	Analyze the performance of AC-DC converter for different loads	**K2**
CO3	Utilize the principle of DC-DC converters with various control techniques for renewable energy application.	**K2**
CO4	Apply the Voltage and frequency control of inverters and AC-AC converters	**K3**
CO5	Design a simulation model for power electronic converter	**K2**

PRE-REQUISITE

1. Analog Electronics
2. Circuit Theory

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO 1	S													W
CO 2	S	M	W										W	
CO 3	S	M	M										M	M
CO 4	S	M	W										M	M
CO 5	M	W			M								M	W

COURSE ASSESSMENT METHODS

Direct Tools
1. Continuous Assessment Test I, II 2. Assignment, Open book test, Group Presentation, Mini Projects, Prototype or Product Demonstration etc. (as applicable) 3. End Semester Examination
Indirect Tools
1. Course End Survey 2. Programme Exit Survey 3. Placement/Higher Education Record 4. Feedback (Students, Employers, Parents, Professional Body members, Alumni)

POWER SEMI-CONDUCTOR DEVICES **9 Hours**

Power diode, power BJT, SCR, Power MOSFET and IGBT – Structure and operation, Static and switching characteristics- Structure and V-I characteristics of GTO and TRIAC- Driver and snubber circuits.

Signature of the Chairman BOS EEE

AC TO DC CONVERTERS **9 Hours**

Single phase and three phase half and fully controlled converters – Effect of source inductance – Analysis of converters with R and RL loads - Performance parameters - Dual converters.

DC TO DC CONVERTERS **9 Hours**

Step-down chopper - Time ratio control and current limit control – Step-up chopper- Two quadrant and four quadrant choppers - Switching mode regulator - Buck, boost, buck-boost converters- Isolated converter: forward and flyback topology-DC-DC Converters for PV systems.

DC TO AC CONVERTERS **9 Hours**

Single phase and three phase bridge voltage source inverters –Voltage control and harmonic reduction (waveform improvement) - Current source inverter- Inverters application for Induction Heating and UPS.

AC TO AC CONVERTERS **9 Hours**

Single phase and Three phase AC voltage controllers – Phase control – PWM control- single and three phase cyclo converters – On load Transformer Tap Changers-Simulation of Power Electronic Circuits (Quantitative)

TEXT BOOKS

1. M.H. Rashid, "Power Electronics: Circuits, Devices and Applications", 3rd Edition, Pearson Education, 2014, New Delhi.
2. M.D. Singh, K. B. Khanchandani, "Power Electronics", 2nd Edition, Tata McGraw Hill, 2006, New Delhi.John B Peatman, "Designing with PIC Micro Controller", McGraw-Hill, 2013.

REFERENCES

1. Ned Mohan, Tore. M. Undeland, William. P. Robbins, "Power Electronics: Converters, Applications and Design", 3rd Edition, Wiley, 2010, India.
2. Vidhyathil Joseph, "Power Electronics Principles and Applications",McGraw Hill Education (India), 2010.
3. Williams, B. W., "Power Electronics: Devices, Drivers, Applications, and Passive Components" 3rd Edition, McGraw Hill, 2006.
4. Andrzej M. Trzynadlowski, "Introduction to Modern Power Electronics", 2nd Edition, Wiley India Pvt. Ltd., 2011.
5. P.S. Bimbra, "Power Electronics", Khanna Publishers, 2012, New Delhi.

Theory: 45 **Tutorial: 0** **Practical: 0** **Project: 0** **Total: 45 Hours**

Signature of the Chairman BOS EEE

Proof for Action Taken: 9 – The topic is included in U18EEI2201- Electric circuit analysis course module-3.

U18EEI2201 ELECTRIC CIRCUIT ANALYSIS

L	T	P	J	C
3	0	2	0	4

COURSE OUTCOMES

After successful completion of this course, the students will be able to

CO1	Reduce the complex circuits using reduction techniques and source transformations.	**K3**
CO2	Analyse and measure the response of AC circuits.	**K2**
CO3	Apply network theorem to compute the electrical parameters of circuit and demonstrate in hardware.	**K3**
CO4	Familiarize with the concepts of magnetic circuits and analyse its parameters.	**K2**
CO5	Understand the 3 phase circuit concepts with balanced and unbalanced loads.	**K2**

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO 1	S	S		S					M	W			M	M
CO 2	S	S		S					M	W			M	M
CO 3	S	S		S	M				M	W			M	M
CO 4	S	M												W
CO 5	S	M												M

COURSE ASSESSMENT METHODS

Direct Tools

1. Continuous Assessment Test I, II
2. Pre-or Post-experiment Test/Viva; Experimental Report for each experiment; Comprehensive report / Model Examination
3. Assignment, Open book test; Cooperative learning report, Group Presentation, Problem based learning, Project based learning, Mini Projects, Project report, Quiz, Role play, Self-Explanatory videos, Prototype or Product Demonstration etc. (as applicable)
4. End Semester Examination

Indirect Tools

1. Course-end survey
2. Programme Exit survey
3. Placement/Higher education record
4. Feedback (Students, Employers, Parents, Professional body members, Alumni)

THEORETICAL COMPONENT CONTENTS:

BASIC CIRCUIT CONCEPTS **9 Hours**

Introduction to Electrical Circuits: Voltage, Current, Power and Energy - Circuit Elements : R,L,C Parameters – Energy Sources – Kirchhoff's Laws –Series and Parallel DC circuits-Voltage Division and Current Division-Power in DCSeries and Parallel Circuits-Network Reduction Techniques – Source Transformation- Star-to-Delta and Delta-to-Star Transformation.

AC CIRCUIT CONCEPTS **9 Hours**

Signature of the Chairman BOS EEE

Angular Relation of a Sine Wave- Sine Wave Equation- RMS and Average Values of Voltage and Current - Phase Relation in Pure R, L and C. Complex Impedance: Impedance Diagram– PhasorDiagram- Analysis of Series, Parallel Circuits. Power and Power Factor: Instantaneous Power - Average Power- Apparent Power and Power Factor- Reactive Power- Power Triangle. Resonance: Series Resonance – Bandwidth and Q factor- Introduction to Parallel Resonance.

CIRCUIT ANALYSIS & NETWORK THEOREMS **9 Hours**

Nodal analysis and Mesh analysis for D.C and A.C circuits, Superposition Theorem, Thevenin'sTheorem, Norton's Theorem, Reciprocity Theorem, Maximum Power Transfer Theorem, Millmann's Theorem, Duality in Networks.

MAGNETIC COUPLED CIRCUITS **9 Hours**

Introduction to Magnetic Circuits & Magnetic Materials- B-H Curve- Magnetic Leakage and Fringing - Comparisons of Magnetic and Electric Circuits - Self and Mutual Inductance-Co-Efficient of Coupling-Dot Convention-Analysis of Simple Coupled Circuits- Single Tuned Circuits

THREE PHASE CIRCUITS **9 Hours**

Phase Sequence-Line and Phase Quantities-Three Phase Star and Delta Connections -Analysis of Three Phase Circuits with Star and Delta Connected Balanced and Unbalanced Loads- Power Measurement in Three Phase Circuits using Two Wattmeter Method

TEXT BOOKS:

1. Sudhakar A. and Shyammohan S.P., Circuits and Networks: Analysis and Synthesis, Tata McGraw-Hill Education (India) Pvt Ltd, New Delhi, 2015.
2. AbhijitChakrabarti, Circuit Theory: Analysis and Synthesis, DhanpatRai& Co, 2014.

REFERENCES

1. William H. HaytJr, Jack E. Kemmberly, and Steven M. Durbin, Engineering circuit analysis, Tata McGraw-Hill Education (India) Pvt Ltd, New Delhi, 2011.
2. Joseph A. Edminister and MahmoodNahvi, Electric Circuits, Schaum's Series, Tata McGraw-Hill Education (India) Pvt Ltd, New Delhi, 2007.
3. Arumugam M. and Premkumar N., Electric Circuit Theory, Kanna Publishers, New Delhi, 1991.
4. Theraja B. L and Theraja A. K., A Textbook of Electrical Technology, S. Chand Limited, 2005
5. Mehta R. K and Mal A. K, Problems and Solutions in Electric Circuit Analysis, CBS Publishers & Distributors, 2002

PRACTICAL COMPONENT CONTENTS:

LIST OF EXPERIMENTS

1. Experimental Verification of Ohm's Laws & Kirchhoff's Laws.
2. Experimental Verification of Superposition Theorem.
3. Experimental Verification of Thevenin's Theorem.
4. Simulation and Experimental Verification of Reciprocity Theorem.
5. Simulation and Experimental Verification of Maximum Power Transfer Theorem.
6. Simulation and Experimental Verification of Mesh Analysis.
7. Measurement of Voltage, Current, Frequency and Phase Angle using CRO
8. Frequency Response of Series and Parallel Resonance Circuit.
9. Electrical wiring.
10. Electrical Appliances - Demonstration

Signature of the Chairman BOS EEE

Proof for Action Taken: 10 – The latest processor TMS 320F281 is Included in the course U18EET5005 DSP.

U18EET5005	DIGITAL SIGNAL PROCESSING	L	T	P	J	C
		3	0	0	0	3

COURSE OUTCOMES

After successful completion of this course, the students will be able to

CO1	Understand the different types of signals and systems and its applications.	**K2**
CO2	Apply various methods of transformation techniques and analyze the systems.	**K3**
CO3	Compute, simulate and analyze the DFT using FFT algorithms.	**K3**
CO4	Design and realize digital IIR and FIR filters.	**K3**
CO5	Understand the architecture and programming aspects of DSP processor.	**K2**

PRE-REQUISITE

1. Partial Differential Equations and Transforms

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S	S												
CO2	S	S												
CO3	S	S												
CO4	S	S	M											
CO5	M		M		M						M		S	M

COURSE ASSESSMENT METHODS

Direct Tools
1. Continuous Assessment Test I, II 2. Assignment, Open book test; Cooperative learning report, Group Presentation, Problem based learning, Project based learning, Mini Projects, Project report, Quiz, Role play, Self-Explanatory videos, Prototype or Product Demonstration etc. (as applicable) 3. End Semester Examination
Indirect Tools
1. Course-end survey 2. Programme Exit survey 3. Placement/Higher education record 4. Feedback (Students, Employers, Parents, Professional body members, Alumni)

SIGNALS AND REPRESENTATION **7 Hours**

Classification of signals: One Dimensional, Two-Dimensional, Three Dimensional Signal. Various Classification of Systems and signals - Basic Elements of DSP, Sampling Theorem - Applications of Digital Signal Processing - ECG.

DISCRETE TIME SYSTEM ANALYSIS **9 Hours**

Z-transform and its properties, ROC, Inverse z-transforms; difference equation – Solution by z-transform, Stability analysis, Linear and Circular Convolution.

DISCRETE FOURIER TRANSFORM & COMPUTATION **9 Hours**

DFT, magnitude and phase representation - Computation of DFT using FFT algorithm radix 2 – DIT and DIF –MATLAB Programming for FFT Computation.

Signature of the Chairman BOS EEE

DESIGN OF DIGITAL FILTERS **11 Hours**

FIR Filter – Linear phase characteristics - Windowing Techniques. IIR design - Analog filter design - Butterworth approximations - digital design using impulse invariant and bilinear transformation - Warping, pre-warping, Frequency transformation. FIR & IIR filter realization.

DSP PROCESSOR **9 Hours**

Introduction to DSP processors - Architecture and features of TMS 320F281 Processor – General purpose timer - PWM generation unit - capture control units- Introduction to code composer studio - DSP based speed control of PMSM motor.

REFERENCES

1. J.G. Proakis and D.G. Manolakis, 'Digital Signal Processing Principles, Algorithms and Applications', Pearson Education, New Delhi, 2003 / PHI.
2. D.H. Hayes, "Digital Signal Processing", Schaum's Outline Series, Tata McGraw Hill, New Delhi, 2007.
3. B. Venkataramani, M. Bhaskar, "Digital Signal Processors, Architecture, Programming and Applications", Tata McGraw Hill, New Delhi, 2003.
4. Alan V. Oppenheim, Ronald W. Schafer and John R. Buck, "Discrete – Time Signal Processing", Pearson Education, New Delhi, 2003.
5. Ramesh Babu, "Digital Signal Processing", 4th Edition, SciTech Publications (India) Pvt.Ltd.,2012.
6. "TMS320F281 data sheet and application notes", www.ti.com.

Theory:45 **Tutorial: 0** **Practical: 0** **Project: 0** **Total: 45 Hours**

Signature of the Chairman BOS EEE

Proof for Action Taken: 11,12 and 13 – Topic True RMS Measurement is included in the course U18EET3004 Measurements and Instrumentation module-3, Topic is renamed as Power quality analyser in the course U18EET3004 Measurements and Instrumentation, The topic DSO &MSO is included in the course U18EET3004 Measurements and Instrumentation.

U18EET3004	MEASUREMENTS AND INSTRUMENTATION	L	T	P	J	C
		3	0	0	0	3

COURSE OUTCOMES

After successful completion of this course, the students would be able to

CO1	Choose appropriate instruments for measuring electrical quantities	**K3**
CO2	Calculate the circuit parameters R,L,C using bridges	**K3**
CO3	Illustrate the concept of digital measurement system.	**K3**
CO4	Describe the function and working of various transducers for measuring physical quantities.	**K2**
CO5	Describe the role of intelligent sensor and data acquisition system for effective measurement and data storage.	**K2**

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S					W								
CO2	S		W											W
CO3	S				M	W						W	M	
CO4	S					W						W	M	
CO5	S				M	W						W	M	

COURSE ASSESSMENT METHODS

Direct
1. Continuous Assessment Test I, II 2. Assignment, Open Book Test, Cooperative Learning Report, Group Presentation, Problem based Learning, Project based Learning, Mini Projects, Project Report, Quiz, Role Play, Self-Explanatory Videos, Prototype or Product Demonstration etc. (as applicable) 3. End Semester Examination
Indirect
1. Course End Survey 2. Programme Exit Survey 3. Placement/Higher Education Record 4. Feedback (Students, Employers, Parents, Professional Body members, Alumni)

CONCEPT OF MEASUREMENT SYSTEMS **9 Hours**

Functional elements of an instrument – Static and dynamic characteristic – Errors in measurement – Standards and calibration – Construction, Principle of operation of MC & MI meters - Electro Dynamic moving type Wattmeter – Induction type Energy meter- Potentiometer-CRO-Time, Frequency & Phase angle Measurement

RESISTANCE, INDUCTANCE AND CAPACITANCE MEASUREMENT **9 Hours**

DC bridges – Kelvin double bridge, Wheat stone bridge, Mega Ohm Bridge, Megger – AC bridges - Schering bridge - Maxwell's inductance bridge - capacitance bridge – Anderson bridge - Wein bridge

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DIGITAL MEASUREMENT **9 Hours**

Digital Measurement of Electrical Quantities – Concept of digital measurement- - Concepts and types of Digital voltmeter - Digital MultiMeter -True RMS meter - DSO & MSO (Block Diagram)- frequency meter – Power Quality Analyzer -Energy meter.

ELECTRONIC TRANSDUCER AND APPLICATIONS **9 Hours**

Transducer: Characteristics, Classification and selection - Displacement Transducer: LVDT- Temperature Transducer: Resistance Temperature Detector, Thermocouples, Thermistor, and Pyrometer- Pressure Transducer: Piezo Electric Transducer - Liquid level Transducer: Ultrasonic Transducer – Liquid Flow transducer: Ultra sound type, Differential pressure type -Speed measurement using Encoder and hall effect sensor.

DATA ACQUISITION SYSTEM AND INTELLIGENT SENSORS **9 Hours**

Digital to Analog Converters: R-2R Ladder D/A Converter, Analog to Digital Converters: Successive Approximation A/D Converter, Data Acquisition System: Introduction, Types, Block diagram of single channel and multi-channel DAS– compact data logger, Microcomputer based data acquisition system- Intelligent Sensors: MEMS sensors, Nano sensors.

TEXT BOOKS

1. A.K. Sawhney, "A Course in Electrical and Electronic Measurements and Instrumentation", DhanpatRai& Sons Publications, New Delhi, 2012.
2. H.S.Kalsi, "Electronic Instrumentation", 3rd Edition, Tata McGraw Hill, New Delhi, 2010.

REFERENCES

1. Ernest O.Doeblin, "Measurement Systems – Applications and Design", 5th Edition, McGraw Hill, New Delhi, 2007.
2. A.D.Cooper and A.D.Helfrik, "Modern Electronic Instrumentation and Measurement Techniques", 2nd Edition, Prentice Hall of India, New Delhi, 2008.
3. S.Ramabhadran, "Electrical Measurements and Instruments", Khanna Publishers, New Delhi, 2009.
4. S.K.Singh, "Industrial Instrumentation and Control", 3rd Edition, Tata McGraw Hill Publishers, New Delhi, 2008.
5. E. W. Golding & F. C. Widdis, "Electrical Measurement & Measuring Instrument", 5th Edition, A.H.Wheeler& co., India, 2011.

Theory: 45 **Tutorial: 0** **Practical: 0** **Project: 0** **Total: 45 Hours**

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Department of Computer Science and Engineering

AY: 2018-19 **Date:15.04.2019**

Action Taken Report -Faculty Feedback

S.No	Analysis	Action Taken Report
1.	Relevant and recent topics can be included in the course syllabus	Latest software tools and technologies introduced in the applicable courses (U18CST4003-Theory of Computation, U18CSI4204-Software Engineering, U18CSI5201-Computer Networks etc.)
2.	Advanced Java can be included as Programme Elective	U15CSTE44-Advanced Java Programming is newly introduced elective in R15.
3.	Latest software tools and technologies can be introduced in the syllabus	Modern technologies like 4G and internetworking added in U18CST6002-Wireless Networks and Mobile Systems.
4.	Infosys syllabus can be adopted for the applicable courses in the curriculum.	For U18CSI7201/Cloud Computing, Infosys syllabus adopted
5.	Lab syllabus can be reframed in such a way that it gets related to the real time applications	Experiments mentioned in the lab component are related to real-time applications.

Prepared By

(Feedback/BoS Coordinator)

(Dr. D. Chandrakala)

Approved By

(Signature of Bos Chairman)

(Dr. J. Cynthia)

Professor & Head
Department of
Computer Science and Engineering
Kumaraguru College of Technology
COIMBATORE-641 006. INDIA

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U18CST4003 THEORY OF COMPUTATION

L	T	P	J	C
3	0	0	0	3

COURSE OUTCOMES

AFTER SUCCESSFUL COMPLETION OF THIS COURSE, THE STUDENTS SHOULD BE ABLE TO

CO1: Design or convert an automaton for any given problem and experiment and document using JFLAP tool (K5).

CO2: List the various closure properties of languages in Chomsky hierarchy (K4).

CO3: Construct Context Free Grammars to generate strings from a context free language and convert them into normal forms (K3).

CO4: Identify the hierarchy of formal languages, grammars and machines.(K3)

CO5: Distinguish between computability and non-computability; decidability and undecidability (K4)

Pre-requisite :U18MAT3102/Discrete Mathematics

CO/PO MAPPING (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												CO/PSO MAPPING		
COs	PROGRAMME OUTCOMES (POs)											PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	S	S		S							M	M		
CO2	S				M							M	M		
CO3	S		M									M	M		
CO4	S	M										M	M		
CO5	S											M	M		

COURSE ASSESSMENT METHODS

DIRECT
1. Continuous Assessment Test I, II 2. Assignment; Simulation using tool 3. End Semester Examination
INDIRECT
1. Course-end survey

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THEORY COMPONENT CONTENTS

AUTOMATA — 9 Hours

Introduction: Alphabets, languages, Chomsky hierarchy of languages.
Basic Machines Finite Automata(FA)-Deterministic Finite Automata(DFA)-Non-Deterministic Finite Automata (NFA) – Finite Automata with Epsilon transitions- Equivalence of DFA and NFA- NFA to DFA conversion-Applications of finite automata

REGULAR EXPRESSIONS AND LANGUAGES — 9 Hours

Regular Expression (RE) - Converting Regular Expression to FA- Converting FA to Regular Expression - Closure and Decision properties of Regular Expression - Equivalence and minimization of Automata.

CONTEXT-FREE GRAMMAR AND LANGUAGES — 11 Hours

Context-Free Grammar (CFG) - Parse Trees - Ambiguity in grammars and languages - Definition of the Pushdown automata - Languages of a Pushdown Automata - Equivalence of Pushdown automata and CFG, Deterministic Pushdown Automata-Normal forms for CFG – Chomsky Normal Form (CNF) – Greibach Normal Form (GNF)- Closure Properties of CFL.

TURING MACHINES — 9 Hours

The basic model for Turing machines (TM), Techniques for Turing machine construction, Turing recognizable (recursively enumerable) and Turing-decidable (recursive) languages, variants of Turing machines, unrestricted grammars

UNDECIDABILITY — 7 Hours

Church-Turing thesis, universal Turing machine, the universal and diagonalization languages, reduction between languages and Rice's theorem, undecidable problems about languages-PCP.
Case Study: Realization of the automaton using JFLAP tool.

Theory: 45	Tutorial: 0	Practical: 0	Project: 0	Total: 45 Hours

REFERENCES

1. J.E.Hopcroft, R.Motwani and J.D Ullman, "Introduction to Automata Theory, Languages and Computations", Third Edition, Pearson Education, 2011
2. John C.Martin, "Introduction to Languages and the Theory of Computation", Fourth Edition, Tata McGraw Hill, 2010.
3. Kavi Mahesh, "Theory of Computation, A Problem-solving Approach" Wiley India Pvt, Ltd, 2012.
4. H.R.Lewis and C.H.Papadimitriou, "Elements of The theory of Computation", Second Edition, Pearson Education/PHI, 2003.
5. Micheal Sipser, "Introduction of the Theory and Computation", Thomson Brokecole,1997

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U18CSI4204 **SOFTWARE ENGINEERING**

L	T	P	J	C
3	0	2	0	4

COURSE OUTCOMES

AFTER SUCCESSFUL COMPLETION OF THIS COURSE, THE STUDENTS WILL BE ABLE TO:

CO1	Design a application using UML modeling.	[K4,S2]
CO2	Test the given application with various test case using a testing tool	[K4,S2]
CO3	Create a application with all the stages of software engineering lifecycle	[K5,S3]
CO4	Apply project management and change management	K3

Pre-requisite: U18CSI3202 - Object Oriented Programming

CO/PO MAPPING (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												**CO/PSO MAPPING**		
COs	**PROGRAMME OUTCOMES (POs)**												**PSOs**		
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	M	S				M				M			M		
CO2	M	M	S						M	M		M	M		
CO3	M		M						M	M	M	M	M		
CO4	M										S	M			

COURSE ASSESSMENT METHODS:

DIRECT

1. Continuous Assessment Test I, II (Theory component)
2. Open Book Test; Cooperative Learning Report, Assignment; Journal Paper Review, Group Presentation, Project Report, Poster Preparation, Prototype or Product Demonstration etc (as applicable) (Theory component)
3. Pre/Post - Experiment Test/Viva; Experimental Report for each Experiment (lab Component)
4. Model Examination (lab component)
5. End Semester Examination (Theory and lab components)

INDIRECT

1. Course-end survey

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THEORY COMPONENT CONTENTS

INTRODUCTION TO SOFTWARE ENGINEERING AND UML — 9 Hours

The Nature of Software -Software Engineering Failures- Software Engineering - Software Process Structure - Software Lifecycle Models - Agile Development - Scrum - Prototyping- Modeling with UML -Modeling Concepts

PROJECT MANAGEMENT AND REQUIREMENTS ANALYSIS — 9 Hours

Project Organization Concepts - Project Communication Concepts - UML Activity Diagram- Requirements Elicitation - Usability - Requirement Analysis - UML Use Case Diagram - UML Analysis Object Class Diagram

DESIGN — 9 Hours

System Design Concepts-System Design Activities: From Objects to Subsystems- Patterns - Architectural Patterns - UML Component and Deployment Diagram - Object Design - Design Patterns - UML Class and Communication Diagram

MAPPING MODELS TO CODE & TESTING — 9 Hours

Mapping Models to Code- Overview of Mapping - Mapping Concepts- Mapping Activities - Managing Implementation-Testing- Overview of Testing- Testing Concepts-Faults, Erroneous States, Failures-Test Cases- Test Stubs and Drivers- Corrections-Testing Activities- Component Inspection – Usability Testing-Unit Testing-Integration Testing-System Testing-Managing Testing-Planning Testing-Documenting Testing-Assigning Responsibilities-Regression Testing-Automating testing

MANAGING CHANGE — 9 Hours

Rationale Management- Overview of Rationale - Rationale Concepts- Rationale Activities: from Issues To Decisions-Managing Rationale- Configuration Management Concepts- Configuration Management Activities - Managing Configuration Management

Theory: 45	Tutorial: 0	Practical: 0	Project: 0	Total: 45 Hours

REFERENCES

1. Bernd Bruegge & Allen H. Dutoit, "Object-Oriented Software Engineering", Third Edition, 2014.
2. R.S. Pressman, "Software Engineering – A Practitioner"s Approach", Eighth Edition, McGraw Hill International Edition, 2015
3. Ivar Jacobson, "Object-Oriented Software Engineering", Pearson Education, Revised Edition 2009.
4. Stephen R.Schach, "Object-Oriented Classical Software Engineering", Mcgraw Hill, Eighth Edition 2010.
5. S. Thangasamy, "Essentials of Software Engineering", Wiley India, First Edition, 2012.

S. Sumathi.

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6. Yogesh Singh, "Object-Oriented Software Engineering", 2012.

7. M. Blaha and J. Rumbaugh, "Object Oriented Modeling and Design with UML", Second Edition, Prentice-Hall India, 2007.

LAB COMPONENT CONTENTS

To choose a real use case-based software development project, design, develop and test the software system with following milestones.

Milestones

1 Identify a application and model it using UML Use-Case Diagrams.(Star UML/ArgoUML/..)
2 Software Requirement Specification & UML Analysis Object Design Diagram
3 Module Description, Design & UML Component Diagram
4 Detailed Design & UML Deployment Diagram
5 Implementation & UML Object Design Class Diagram
6 Testing (Selenium tool/SonarQube/…)

Theory: 0	Tutorial: 0	Practical: 30	Project: 0	Total: 30 Hours

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U18CSI5201 **COMPUTER NETWORKS**

L	T	P	J	C
3	0	2	0	4

COURSE OUTCOMES

AFTER SUCCESSFUL COMPLETION OF THIS COURSE, THE STUDENTS SHOULD BE ABLE TO

CO1: Summarize the functionality and protocols operating in each layer of OSI reference model. [K3]
CO2: Compare network topology, devices and transmission medium. [K4]
CO3: Analyze error control, flow control and routing protocols. [K3][S2]
CO4: Analyze IP, TCP and UDP header formats. [K4] [S2]
CO5: Analyze Network traffic characteristics and congestion control mechanism. [K5][S3]

Pre-requisite :Nil

CO/PO MAPPING (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												CO/PSO Mapping		
COs	PROGRAMME OUTCOMES (POs)											PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S									M					
CO2	S	S	M	S						M		M			
CO3	S	M	M	M	M				M	M		M			M
CO4	S	S		S	M					M		M		M	
CO5	S	S		S	S			M	M	M		M			M

COURSE ASSESSMENT METHODS

DIRECT

1. Continuous Assessment Test I, II (Theory component)
2. Open Book Test; Cooperative Learning Report, Assignment; Journal Paper Review, Group Presentation, Project Report, Poster Preparation, Prototype or Product Demonstration etc (as applicable) (Theory component)
3. Pre/Post - Experiment Test/Viva; Experimental Report for each Experiment (lab Component)
4. Model Examination (lab component)
5. End Semester Examination (Theory and lab components)

INDIRECT

1. Course-end survey

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THEORY COMPONENT CONTENTS

DATA COMMUNICATIONS **8 Hours**

Data Communication – The OSI Model – TCP/IP Protocol Suite – Addressing – Transmission Media – Networking devices – Network Topologies.

DATA LINK LAYER **8 Hours**

Encoding - Error Detection – Reliable Transmission – MAC protocols – CSMA/CD – CSMA/CA.

NETWORK LAYER **11 Hours**

Circuit Switching – Packet Switching – Bridges and LAN Switches: Spanning Tree algorithm – Internetworking – IPv4 - Subnetting – IPv6 – Routing Techniques: Distance vector (RIP) – Link state (OSPF) — Interdomain Routing (BGP).

TRANSPORT LAYER **11 Hours**

UDP – TCP – Congestion Control and Resource Allocation: TCP Congestion Control – Congestion Avoidance Mechanisms – Quality of Service: Integrated Services – Differentiated Services – Network Traffic Analysis.

APPLICATION LAYER **7 Hours**

Domain Name System – Electronic Mail (SMTP, MIME, IMAP) – File Transfer (FTP) – WWW (HTTP).

Theory: 45	Tutorial: 0	Practical: 0	Project: 0	Total: 45 Hours

REFERENCES

1. Larry L. Peterson, Bruce S. Davie, "Computer Networks: A Systems Approach", Fifth edition, Morgan Kaufmann Publishers Inc., 2011.
2. William Stallings, "Data and Computer Communications", Tenth edition, Pearson Education, 2013.
3. Behrouz A Forouzan, "Data Communications and Networking", Fifth edition, Tata McGraw–Hill, New Delhi, 2013.
4. James F. Kurose, Keith W. Ross, "Computer Networking, A Top–Down Approach Featuring the Internet", Sixth edition, Pearson Education, 2012.

ONLINE COURSES AND VIDEO LECTURES:

https://www.coursera.org/specializations/computer-communications#courses
https://nptel.ac.in/courses/106105080/
https://nptel.ac.in/courses/106105081/

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LAB COMPONENT CONTENTS

30 Hours

LIST OF EXPERIMENTS

1. Develop client server based TCP applications using UNIX socket programming functions.
2. Develop client server based UDP applications using UNIX socket programming functions.
3. Simulation of data link and network layer protocols.
4. Performance analysis of TCP and UDP protocol using simulation tool.
5. Performance analysis of routing protocols using simulation tool.
6. Demonstrate the working of network tools such as Ping, TCPDump, Traceroute, Netstat, IPconfig.
7. Analyze the network traffic using Wireshark tool/Packet tracer tool.

Theory: 0	Tutorial: 0	Practical: 30	Project: 0	Total: 30 Hours

S. Sheela.

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U15CSTE44 **ADVANCED JAVA PROGRAMMING**

L	T	P	C
2	0	2	3

COURSE OUTCOMES

AFTER SUCCESSFUL COMPLETION OF THIS COURSE, THE STUDENTS SHOULD BE ABLE TO

CO1:	Analyze and build applications using various types of Inheritance and Interfaces (K4,S2)
CO2:	Identify errors and exceptions in program development (K3,S2)
CO3:	Develop solution for a given problem using collection classes and streams. (K3,S1)
CO4:	Build applications using Spring components (K3,S2)
CO5:	Select the appropriate methods for problem solving using object oriented concepts (K5, S3).

Pre-requisites : Nil

CO/PO MAPPING

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	PROGRAMME OUTCOMES (POs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	S								M			M	M	
CO2	S									M		M			
CO3	S									M					
CO4	S								M	M		M	M		
CO5		S	S		S					M		M		M	

COURSE ASSESSMENT METHODS

DIRECT
1. Continuous Assessment Test I, II 2. Assignment, Group Presentation, Mini Project 3. End Semester Examination
INDIRECT
1. Course-end survey

THEORY COMPONENT CONTENTS

INHERITANCE AND INTERFACES — 6 Hours

History and evolution of Java- Object Oriented Programming paradigm and principles– Arrays in java- Classes – Methods – Method Overloading – Constructors- Access Control - Inheritance –Method overriding- Dynamic method dispatch – Interfaces.

PACKAGES AND MULTITHREADING — 6 Hours

Polymorphism- Abstract classes and methods- final methods and classes - Packages - Exception Handling Fundamentals – Java's Built-in Exceptions-Creating new Exception subclasses- Multithreading –The Thread class and the Runnable Interface - Creating multiple threads – Synchronization- Interthread Communication

COLLECTION FRAMEWORK AND INPUT/OUTPUT CLASSES — 6 Hours

String Constructors - String Operations – Sequential Collection – ArrayList class, HashSet class, TreeSet class, Files and streams- File Reader and Writer –BufferedReader and BufferedWriter.

ENTERPRISE JAVA BEANS **6 Hours**

Introduction to EJB, Session Bean, Java Messaging Service, Message Driven Bean, Entity Bean, Remote Method Invocation, Java Database Connectivity

SPRING **6 Hours**

Introduction to Spring, Spring in IDE, Dependency Injection, Spring AOP, Spring MVC.

Theory: 30 **Tutorial: 0** **Practical: 0** **Project: 0** **Total: 30 Hours**

REFERENCES

1. Herbert Schildt, "Java the Complete Reference", Ninth edition Tata Mc Graw Hills, 2014.
2. Hortsmann & Cornell, "Core Java 2 Fundamentals", Vol-I, Pearson Education, Eighth edition, 2008.
3. Paul Deitel and Harvey Deitel, —"Java How to Program (Early Objects)", Tenth Edition, Pearson Prentice Hall 2014.
4. James-McGovern, et. al, "Java 2 Enterprise Edition 1.4 (J2EE 1.4) Bible", Wiley Publications, 2003.
5. Ashish Sarin, J Sharma, "Getting Started with Spring Framework: a hands-on guide to begin developing applications using Spring Framework", third edition, 2016.

E BOOKS AND ONLINE LEARNING MATERIALS

1. Herbert Schildt, "Java the Complete Reference", Eighth edition Tata Mc Graw Hills, 2011.
2. https://www.javatpoint.com/java-tutorial

LAB COMPONENT CONTENTS **30 Hours**

LIST OF EXPERIMENTS

1. Solve the problem using Classes and Methods.
2. Build the program using Method Overloading and Method Overriding
3. Build the program using the concepts of Inheritance, Packages and Interfaces
4. Experiment with User Defined Exception Handling.
5. Build Multithread using Thread Class and Runnable Interface
6. Solve the problem using Synchronization and Inter Thread Communication
7. Develop program using inbuilt methods of String class.
8. Experiment with collection classes and interfaces
9. Experiment with Input streams and Output streams.
10. Develop an application using JDBC connectivity.
11. Build an application using Spring MVC

Theory: 0	Tutorial: 0	Practical: 30	Project: 0	Total: 30 Hours

ONLINE COURSES AND VIDEO LECTURES:

https://www.javatpoint.com/java-tutorial

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U18CST6002 WIRELESS NETWORKS AND MOBILE SYSTEMS

L	T	P	J	C
3	0	0	0	3

COURSE OUTCOMES

AFTER SUCCESSFUL COMPLETION OF THIS COURSE, THE STUDENTS SHOULD BE ABLE TO

CO1: Compare various wireless transmission and media access techniques. K3
CO2: Identify and Interpret fields in GSM and GPRS frame structures. K3
CO3: Analyse physical, link and network layer characteristics of wireless networks K4
CO4: Compare Mechanisms for Improving TCP Performance over Wireless Links. K3
CO5: Understand 4G features and technologies K2

Pre-requisite: U18CSI5201 - Computer Networks

CO/PO MAPPING (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												CO/PSO Mapping		
COs	PROGRAMME OUTCOMES (POs)											PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M										M			
CO2	S	M													
CO3	S	S			M					M		M			
CO4	M	M								M		M	M		
CO5	M	M										M	M		

COURSE ASSESSMENT METHODS

DIRECT
1. Continuous Assessment Test I, II 2. Assignment, Journal paper review, Group Presentation 3. End Semester Examination
INDIRECT
1. Course-end survey

THEORY COMPONENT CONTENTS

MOBILE NETWORKS 9 Hours

Telecommunication Systems — modulation – multiple access techniques - Wireless LAN – IEEE 802.11 Standards – GSM – Architecture – Protocols – Localization and calling – Handover – security - GPRS - Broadcast Systems – DAB - DVB

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WIRELESS NETWORKS **8 Hours**

Wireless LANs and PANs– IEEE 802.11 Standard – Architecture – Physical and MAC layer- MAC management– HiperLAN – Bluetooth- Wi-Fi – WiMAX.

ROUTING **9 Hours**

Mobile IP – DHCP – MANET: Routing – Classification – Table driven routing- On-Demand routing- Hybrid routing- Hierarchical state routing- Power-aware routing- Operations of Multicast routing

TRANSPORT AND APPLICATION LAYERS **8 Hours**

Traditional TCP– WWW -WAP – Architecture – WDP – WTLS – WTP – WSP – WAE – WML– WML Scripts- WTA Architecture.

4G & INTERWORKING **7 Hours**

4G features and challenges, 4G Technologies, Overview of LTE, Advanced LTE, Interworking Objectives and requirements, Schemes to connect WLANs and 3G Networks, Session Mobility, Interworking Architectures for WLAN and GPRS.

SIMULATION **4 Hours**

Simulation of MANET - media access protocols – routing protocols using OMNeT++ or NS3

Theory: 45	Tutorial: 0	Practical: 0	Project: 0	Total: 45 Hours

REFERENCES

1. Jochen Schiller, "Mobile Communications", PHI, Second Edition, 2011.
2. C.Siva Ram Murthy and B.S.Manoj, "Adhoc Wireless Networks: Architectures and Protocols", Prentice Hall PTR, 2004
3. Vijay. K. Garg, —Wireless Communication and Networking‖, Morgan Kaufmann Publishers, 2007.
4. Jochen Burkhardt, "Pervasive Computing: Technology and Architecture of Mobile Internet Applications", Addison-Wesley Professional; Third Edition, 2007
5. Frank Adelstein, Sandeep KS Gupta, Golden Richard, "Fundamentals of Mobile and Pervasive Computing", McGraw-Hill, 2005.
6. William Stallings, —Wireless Communications and Networks‖, Pearson Education, 2009.
7. Stefano Basagni , et al, "Mobile Ad hoc Networking", Wiley –IEEE press,2004

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U18CSI7201 CLOUD COMPUTING

L	T	P	J	C
3	0	2	0	4

COURSE OUTCOMES

AFTER SUCCESSFUL COMPLETION OF THIS COURSE, THE STUDENTS SHOULD BE ABLE TO

CO1: Demonstrate server virtualization concept and create virtual servers [K3,CO2]
CO2: Apply network virtualization and create virtual private cloud [K3,S2]
CO3: Design Web Application in public cloud environment. [K5,S3]
CO4: Build databases in public cloud [K5,S3]

Pre-requisite: U17CSI5201/Computer Networks

CO/PO MAPPING (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												CO/PSO Mapping		
COs	PROGRAMME OUTCOMES (POs)												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	S	S		S				M			M			S
CO2		M	M		M				M			M			S
CO3		M	M		M				M		M	M		M	S
CO4		M	M		M				M		M	M	M		S

COURSE ASSESSMENT METHODS:

DIRECT

1. Continuous Assessment Test I, II (Theory component)
2. Open Book Test, Assignment; Journal Paper Review, Group Presentation, Project Report, Poster Preparation, Case Study, Prototype or Product Demonstration etc (as applicable) (Theory component)
3. Pre/Post - Experiment Test/Viva; Experimental Report for each Experiment (lab Component)
4. Model Examination (lab component)
5. End Semester Examination (Theory and lab components)

INDIRECT

1. Course-end survey

THEORY COMPONENTS CONTENTS

INTRODUCTION **7 Hours**

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Brief history and evolution - History of Cloud Computing, Evolution of Cloud Computing, Traditional vs. Cloud Computing. Why Cloud Computing, Cloud service models (IaaS, PaaS & SaaS). Cloud deployment models (Public, Private, Hybrid and Community Cloud), Benefits and Challenges of Cloud Computing. Introduction to AWS Public Cloud Vendor.

CLOUD VIRTUALIZATION **7 Hours**

Basics of virtualization, Server virtualization, VM migration techniques, Role of virtualization in Cloud Computing.

PRIVATE AND PUBLIC CLOUD **14 Hours**

Private Cloud Definition, Characteristics of Private Cloud, Private Cloud deployment models, Private Cloud Vendors - CloudStack, Eucalyptus and Microsoft, Private Cloud – Benefits and Challenges. Private Cloud implementation in Amazon EC2 service.

What is Public Cloud, Why Public Cloud, When to opt for Public Cloud, Public Cloud Service Models, and Public Cloud Vendors and offerings (IaaS, PaaS, SaaS). Demonstrating public cloud with AWS, Introduction to EC2 and Storage services of AWS. Private vs. Public Cloud – When to choose.

CLOUD SECURITY **10 Hours**

Explain the security concerns in Traditional IT, Introduce challenges in Cloud Computing in terms of Application Security, Server Security, and Network Security. Security reference model, Abuse and Nefarious Use of Cloud Computing, Insecure Interfaces and APIs, Malicious Insiders, Shared Technology Issues, Data Loss or Leakage, Account or Service Hijacking, Unknown Risk Profile, Shared security model between vendor and customer in IAAS/PAAS/SAAS, Implementing security in AWS.

FUTURE DIRECTIONS IN CLOUD COMPUTING **7 Hours**

When and not to migrate to Cloud, Migration paths for cloud, Selection criteria for cloud deployment, Issues/risks in cloud computing, Future technology trends in Cloud Computing.

Theory: 45	Tutorial: 0	Practical: 0	Project: 0	Total: 45 Hours

REFERENCES:

1. Raj Kumar Buyya, James Broberg, Andrezei M.Goscinski, Cloud Computing: Principles and paradigms, 2011
2. Judith Hurwitz, Robin Bllor, Marcia Kaufman, Fern Halper, Cloud Computing for dummies, 2009.
3. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, 2008.
4. Anthony T. Velte, Toby J. Velte, and Robert Elsen peter, Cloud Computing: A Practical Approach, McGraw Hill, 2010.
5. Borko Furht, Handbook of Cloud Computing, Armando Escalante (Editors), Springer, 2010.

Signature of BOS chairman, CSE

Brief history and evolution - History of Cloud Computing, Evolution of Cloud Computing, Traditional vs. Cloud Computing. Why Cloud Computing, Cloud service models (IaaS, PaaS & SaaS). Cloud deployment models (Public, Private, Hybrid and Community Cloud), Benefits and Challenges of Cloud Computing. Introduction to AWS Public Cloud Vendor.

CLOUD VIRTUALIZATION **7 Hours**

Basics of virtualization, Server virtualization, VM migration techniques, Role of virtualization in Cloud Computing.

PRIVATE AND PUBLIC CLOUD **14 Hours**

Private Cloud Definition, Characteristics of Private Cloud, Private Cloud deployment models, Private Cloud Vendors - CloudStack, Eucalyptus and Microsoft, Private Cloud – Benefits and Challenges. Private Cloud implementation in Amazon EC2 service.

What is Public Cloud, Why Public Cloud, When to opt for Public Cloud, Public Cloud Service Models, and Public Cloud Vendors and offerings (IaaS, PaaS, SaaS). Demonstrating public cloud with AWS, Introduction to EC2 and Storage services of AWS. Private vs. Public Cloud – When to choose.

CLOUD SECURITY **10 Hours**

Explain the security concerns in Traditional IT, Introduce challenges in Cloud Computing in terms of Application Security, Server Security, and Network Security. Security reference model, Abuse and Nefarious Use of Cloud Computing, Insecure Interfaces and APIs, Malicious Insiders, Shared Technology Issues, Data Loss or Leakage, Account or Service Hijacking, Unknown Risk Profile, Shared security model between vendor and customer in IAAS/PAAS/SAAS, Implementing security in AWS.

FUTURE DIRECTIONS IN CLOUD COMPUTING **7 Hours**

When and not to migrate to Cloud, Migration paths for cloud, Selection criteria for cloud deployment, Issues/risks in cloud computing, Future technology trends in Cloud Computing.

Theory: 45	Tutorial: 0	Practical: 0	Project: 0	Total: 45 Hours

REFERENCES:

1. Raj Kumar Buyya, James Broberg, Andrezei M.Goscinski, Cloud Computing: Principles and paradigms, 2011
2. Judith Hurwitz, Robin Bllor, Marcia Kaufman, Fern Halper, Cloud Computing for dummies, 2009.
3. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, 2008.
4. Anthony T. Velte, Toby J. Velte, and Robert Elsen peter, Cloud Computing: A Practical Approach, McGraw Hill, 2010.
5. Borko Furht, Handbook of Cloud Computing, Armando Escalante (Editors), Springer, 2010.

Signature of BOS chairman, CSE

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DEPARTMENT OF BIOTECHNOLOGY

Action Taken Report - "Faculty Feedback"
Academic Year 2018-2019

Date: 15-Apr 2019

S.No	Suggestions	Action Taken
1.	Unit Operation Lab to offered after HMT Course	Unit Operation lab is offered along HMT in Sem 6
2.	Topics on Biosimilars to be included	Included in the U17BTT6001 & U18BTI6001 Biopharmaceutical Technology

Prepared by
BOS Coordinator

Approved by
Chairman BOS

Proof: Unit Operation Experiments included in Heat & Mass Transfer Operation

6. Prepare immobilized enzymes and evaluating their effectiveness : Agar-agar / sodium alginate / chitin
7. Extraction of papain enzyme from papaya leaf and fruit
8. Removal of blood stain from the cloth by papain / removal of starch stain by amylase
9. Partial purification of enzymes: Ultrafiltration / solvent & salt precipitation

Theory: 45 hour **Tutorial: 0 hour** **Practical: 30 hour** **Project: 0 hour** **Total Hour: 75**

REFERENCES

1. Shanmugham.S and Sathishkumar.T, (2012); Enzyme Technology, 2nd edition, I.K. International Publishing House Pvt. Ltd., New Delhi, India.
2. Voet D and Voet G. (2010), Biochemistry,4th edition, John Wiley & Sons
3. Nicholas Price and Lewis Stevens, (2009); Fundamentals of Enzymology, 3rd Edition, Oxford University Press, India.
4. Trevor Palmer, Enzymes (2007); Biochemistry, Biotechnology and Clinical Chemistry, 2nd Edition, Horwood Publishing Limited, United Kingdom
5. Branden C and Tooze J. (1999), Introduction to protein structure. 2nd Edition, Garland Science.
6. Fersht, Alan. (1999), Structure and mechanism in protein science: A Guide to Enzyme Catalysis and Protein Folding.3rd revised edition, W.H.Freeman & Co Ltd.
7. Moody, Peter CE, Anthony J. Wilkinson, and Tony Wilkinson. (1990), Protein engineering. 2nd Edition, Oxford University Press, USA.

Web references

http://www.novozymes.com(/en/about-us/our-business/what-are enzymes/Pages/default.aspx

2 https://nptel.ac.in/courses/104105076/7

U17BTI5203	HEAT AND MASS TRANSPORT IN BIOPROCESS	L	T	P	J	C
		3	0	2	0	4

Course Objectives:

- To comprehend and apply the principles and operations of heat transfer
- To understand the fundamentals and applications of mass transfer in bioprocess engineering.

Course Outcomes (COs):

After successful completion of this course, the students should be able to

CO1: Outline the modes of heat of transfer
CO2 Design the heat transfer equipment in bioprocess industries
CO3: Illustrate the principles of diffusion and apply the concepts of interphase mass transfer in bioreactor
CO4: Apply the concept of distillation and drying in bioprocess
CO5: Comprehend the extraction separation in bioprocess
CO6: Interpret the membrane separation in bioprocess

Prerequisite

1. U17BTT3003 Bioprocess Calculations

Signature of BOS chairman, BT

4. Studies on steam distillation
5. Convective drying of food/biological materials
6. Mass transfer studies on rotating disc contactor
7. Liquid membrane separation of bioactive compounds

Theory: 45 hour **Tutorial: 0 hour** **Practical: 30 hour** **Project: 0 hour** **Total Hour: 75 hour**

REFERENCES

1. Treybal, R.E., (2017) *Mass-transfer operations*. McGraw-Hill.
2. Doran, P. M. (2012). *Bioprocess engineering principles*. Elsevier.
3. Rajput, R.K. (2008) Heat and Mass Transfer, S. Chand and Co.
4. Shuler, M. L., & Kargi, F. (2002). Bioprocess Engineering: Basic Concepts. 2nd edition. *Upper Saddle*.

WEB REFERENCES

1. http://nptel.ac.in/courses/103103032
2. http://nptel.ac.in/courses/103103035

U17INI5600	ENGINEERING CLINIC - III	L	T	P	J	C
		0	0	4	2	3

Course objectives

- To help the students look into the functioning of simple to complex devices and systems
- To enable the students to design and build simple systems on their own
- To help experiment with innovative ideas in design and team work
- To create an engaging and challenging environment in the engineering lab

Course Outcomes

After successful completion of this course, the students should be able to:

CO1: Identify a practical problems and find a solution
CO2: Understand the project management techniques
CO3: Demonstrate their technical report writing and presentation skills

Pre-requisite:

U17INI4600 ENGINEERING CLINICS II

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Department of Information Technology

AY: 2018-19 **Date:15.04.2019**

Action taken report -Teacher Feedback

S.No	Analysis	Action taken report
1.	Existing curriculum for R15 can be added with latest elective courses	Machine learning, Block Chain Technology courses are added as electives for the R15 regulation.
2.	Electives are Offered under the identified Tracks: Network and IoT, Data Analytics, Cyber Security	Syllabus for these tracks (Network and IoT, Data Analytics, CyberSecurity) are framed. • Cyber Security – Information Coding Techniques, Web Application Security, BioMetrics, Block chain Technology • Data Analytics – Artificial Intelligence, Deep Learning, Data Visualization • Network and IoT – Ad hoc and Sensor Networks, Software Defined Networks, Next Generation Systems

Prepared by

BoS Coordinator

Approved by

BoS Chairman

proof for Action taken 1: Electives added in R15 curriculum

Professional Electives (PE)									
	Course Code	Course Title	Category	Contact Hours	Hrs/Week & Credits				Pre-requisites
					L	T	P	C	
1	U15ITE001	Theory of Computation	PE	3	3	0	0	3	MAT403
2	U15ITE002	TCP/ IP Socket Programming	PE	3	3	0	0	3	ITT402
3	U15ITE003	Distributed Systems	PE	3	3	0	0	3	ITT402
4	U15ITE004	Principles of Compiler Design	PE	3	3	0	0	3	-
5	U15ITE005	User Interface Design	PE	3	3	0	0	3	-
6	U15ITE006	Cloud Computing	PE	3	3	0	0	3	ITT402
7	U15ITE007	Ad Hoc & Sensor Networks	PE	3	3	0	0	3	ITT402
8	U15ITE008	High Speed Networks	PE	3	3	0	0	3	ITT402
9	U15ITE009	Computational Intelligence	PE	3	3	0	0	3	ITE024, MAT403
10	U15ITE010	Service Oriented Architecture	PE	3	3	0	0	3	ITT601
11	U15ITE011	Real Time Systems	PE	3	3	0	0	3	ITT404
12	U15ITE012	Information Coding Techniques	PE	3	3	0	0	3	-
13	U15ITE013	Software Architecture	PE	3	3	0	0	3	ITT501
14	U15ITE014	Digital Image Processing	PE	3	3	0	0	3	ECT511
15	U15MCE708	Mobile Robotics	PE	3	3	0	0	3	-
16	U15GST002	Total Quality Management	HS	3	3	0	0	3	-
17	U15GST003	Principles of Management	HS	3	3	0	0	3	-
18	U15GST004	Operation Research	BS	3	3	0	0	3	-
19	U15ITE015	C # and .NET Programming	PE	3	3	0	0	3	ITT303
20	U15ITE016	Building Enterprise Applications	PE	3	3	0	0	3	ITT502
21	U15ITE017	Business Intelligence	PE	3	3	0	0	3	ITT604
22	U15ITE018	Information Retrieval	PE	3	3	0	0	3	ITT604
23	U15ITE019	Software Quality Assurance & Testing	PE	3	3	0	0	3	ITT501
24	U15ITE020	Software Project Management	PE	3	3	0	0	3	ITT501
25	U15ITE021	Management Information System	PE	3	3	0	0	3	-
26	U15ITE022	Information Security	PE	3	3	0	0	3	-

27	U15ITE023	Open Source Technoiogies	PE	3	3	0	0	3	-
28	U15ITE024	Artificial Intelligence	PE	3	3	0	0	3	MAT403
29	U15ITE025	Coding and Hacking	PE	6	0	0	6	3	-
30	U15ITE026	Front End Web Designing	PE	6	2	0	4	4	-
31	U15ITE027	Introduction to Enterprise ResourcePlanning	PE	3	3	0	0	3	-
32	U15ITE028	Ethical Hacking	PE	3	3	0	0	3	-
33	U15ITE029	Embedded Platforms	PE	4	2	1	1	4	-
34	U15ITE030	Integrated Product Development	PE	4	1	1	2	3	-
35	U15ITE031	Cyber Security	PE	3	3	0	0	3	-
36	U15ITE032	Design Patterns	PE	3	3	0	0	3	ITT303
37	U15ITE033	Sensors, Actuators &Interfaces	PE	5	2	1	2	4	-
38	U15ITE034	Internship-I	EEC	2 weeks	0	0	2	1	-
39	U15ITE035	Internship-II	EEC	4 weeks	0	0	4	2	-
40	U15ITE036	Internship-III	EEC	6 weeks	0	0	6	3	-
41	U15ITE037	Problem Solving	PE	8	0	0	8	4	-
42	U15ITE038	Machine Learning	PE	3	3	0	0	3	-
43	U15ITE039	Block Chain Technology	PE	3	3	0	0	3	-

U15ITE038

MACHINE LEARNING

L	T	P	J	C
3	0	2	0	4

COURSE OBJECTIVES:

- To understand the need for machine learning for various problem solving
- To study the various supervised, semi-supervised and unsupervised learning algorithms in machine learning
- To understand the latest trends in machine learning
- To design appropriate machine learning algorithms for problem solving

COURSE OUTCOMES:

After Successful completion of this course, the students will be able to:

CO1 Differentiate between supervised, unsupervised, semi-supervised machine learning approaches

CO2 Discuss the decision tree algorithm and identity and overcome the problem of overfitting

CO3 Discuss and apply the back-propagation algorithm and genetic algorithms to various problems

CO4 Apply the Bayesian concepts to machine learning

CO5 Analyse and suggest appropriate machine learning approaches for various types of problems

Pre-requisite: U17ITI5202–DATA MINING TECHNIQUES

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak													PSO		
COs	Programme Outcomes(POs)														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	1	2	3
CO1	S	S											M		
CO2	M	M											M		
CO3	M	M	M										M		
CO4	M	M	M										M		
CO5	M	M	M	M	M				M			M	M	M	M

COURSE ASSESSMENT METHODS:

Direct
1. Continuous Assessment Test I, II (Theory component)
2. Assignment, Group Presentation (Theory component)
3. Pre/Post - experiment Test/Viva(Lab component)
4. Model examination (Lab component)
5. End Semester Examination (Theory and Lab components)
Indirect
1. Course-end survey

THEORY COMPONENT CONTENTS

INTRODUCTION

9 Hours

Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.

NEURAL NETWORKS AND GENETIC ALGORITHMS **9 Hours**

Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evaluation and Learning.

BAYESIAN AND COMPUTATIONAL LEARNING **9 Hours**

Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

INSTANT BASED LEARNING **9 Hours**

K- Nearest Neighbour Learning – Locally weighted Regression – Radial Basis Functions – Case Based Learning.

ADVANCED LEARNING **9 Hours**

Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning

Theory: 45 Tutorial: 0 Practical:0 Project: 0 Total: 45 Hours

REFERENCES:

1. Tom M. Mitchell, —Machine Learning, McGraw-Hill Education (India) Private Limited, 2013.
2. EthemAlpaydin, —Introduction to Machine Learning (Adaptive Computation and Machine Learning), The MIT Press 2004.
3. Stephen Marsland, —Machine Learning: An Algorithmic Perspective, CRC Press, 2009.
4. Kevin P. Murphy , Machine Learning A Probabilistic Perspective, The MIT Press,2012
5. Jason Bell, —Machine learning – Hands on for Developers and Technical Professionals, First Edition, Wiley, 2014
6. Peter Flach, —Machine Learning: The Art and Science of Algorithms that Make Sense of Data, First Edition, Cambridge University Press, 2012.

LAB COMPONENT:

List of Projects:

1.Supervised and Unsupervised learning
2.Social Media Analysis
3.Sentimental Analysis
4.Recommender Systems
5.Prediction algorithms

Theory: 0 Tutorial: 0 Practical:30 Project: 0 Total: 30 Hours

L	T	P	J	C
3	0	0	0	3

U15ITE039 BLOCKCHAIN TECHNOLOGY

COURSE OBJECTIVES

- To acquire the basic knowledge and understandings of Bitcoin
- To understand the mechanisms of Bitcoin, Ethereum, Hyperledger
  To understand the current trends of Blockchain

COURSE OUTCOMES:

After successful completion of this course, the students should be able to

CO1 Discover the secure and efficient transactions with Bitcoin.

CO2 Identify and analyze the applications of Bitcoin script

CO3 Experiment with Bitcoin mining

CO4 Develop private Blockchain environment and develop a smart contract on Ethereum

CO5 Build the Hyperledger architecture and the consensus mechanism applied in the Hyperledger

Pre-requisite: U17ITT5001 - CRYPTOGRAPHY AND NETWORK SECURITY

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak													PSO		
Cos	Programme Outcomes(POs)														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	1	2	3
CO1	S	M	M	M								M	M		
CO2	S	M	M										M		
CO3	S	M	M												M
CO4	S	S	M	M								M			M
CO5	S	M	M									M			M

COURSE ASSESSMENT METHODS:

Direct
1. Continuous Assessment Test I, II 2. Assignment, Group presentation 3. End Semester Exam
Indirect
1.Course Exit Survey

THEORY COMPONENT CONTENTS

CRYPTOCURRENCY AND BLOCKCHAIN- INTRODUCTION **9 Hours**

Cryptography and Cryptocurrency- Anonymity and Pseudonymity in Cryptocurrencies Digital Signatures-Cryptocurrency Hash Codes. Distributed networks-Block chain- An

Introduction Distinction between databases and Block chain- Distributed ledger Block chain ecosystem-Block chain structure- Block chain technology- Working - Permissioned and permission-less Block chain

BITCOIN AND BLOCKCHAIN **9 hours**

Bitcoin – history- Bitcoin- usage, storage, selling, transactions, working- Invalid Transactions- Parameters that invalidate the transactions- Scripting language in Bitcoin Applications of Bitcoin script- Nodes and network of Bitcoin- Bitcoin ecosystem

BITCOIN MINING **9 hours**

Purpose of mining- Algorithm used in mining- Mining hardware- Bitcoin mining pools cloud mining of Bitcoin -Mining Incentives-Security and centralizations

ETHEREUM **9 hours**

The Ethereum ecosystem, DApps and DAOs - Ethereum working- Solidity- Contract classes, functions, and conditionals- Inheritance & abstract contracts- Libraries- Types & optimization of Ether- Global variables- Debugging- Future of Ethereum- Smart Contracts on Ethereum- different stages of a contract deployment- Viewing Information about blocks in Block chain- Developing smart contract on private Block chain- Deploying contract from web and console

HYPERLEDGER **9 hours**

Hyperledger Architecture- Consensus- Consensus & its interaction with architectural layers- Application programming interface- Application model -Hyperledger frameworks- Hyperledger Fabric -Various ways to create Hyperledger Fabric Block chain network- Creating and Deploying a business network on Hyperledger Composer Playground- Testing the business network definition- Transferring the commodity between the participants

Theory: 45 **Tutorial : 0** **Practical : 0** **Project : 0** **Total hours:45**

REFERENCES:

1. Mastering Bitcoin: Unlocking Digital Cryptocurrencies, by Andreas M Antonopoulos 2018
2. Ethereum: Block chains, Digital Assets, Smart Contracts, Decentralized Autonomous Organizations-2016.

OTHER ONLINE COURSES:

1. https://www.coursera.org/learn/ibm-blockchain-essentials-for-developers
2. https://www.coursera.org/learn/blockchain-basics

Proof for Action taken &: Electives offered in Tracks.

PROGRAMME ELECTIVES									
S.No	Course Code	Course Title	Course Mode	CT	L	T	P	J	C
Data Analytics									
1.	U17ITE0001	Artificial Intelligence	Theory	PE	3	0	0	0	3
2.	U17ITE0002	Deep Learning	Theory	PE	3	0	0	0	3
3.	U17ITE0003	Data Visualization	Theory	PE	3	0	0	0	3
Cyber Security									
4.	U17ITE0004	Information Coding Techniques	Theory	PE	3	0	0	0	3
5.	U17ITE0005	Web Application Security	Theory	PE	3	0	0	0	3
6.	U17ITE0006	Biometric Systems	Theory	PE	3	0	0	0	3
7.	U17ITE0007	Blockchain Technology	Theory	PE	3	0	0	0	3
Network and IoT									
8.	U17ITE0008	Adhoc and Sensor Networks	Theory	PE	3	0	0	0	3
9.	U17ITE0009	Next Generation Networks	Theory	PE	3	0	0	0	3
10.	U17ITE0010	Software Defined Networks	Theory	PE	3	0	0	0	3
Other Electives									
11.	U17ITE0011	Distributed Systems	Theory	PE	3	0	0	0	3
12.	U17ITE0012	Principles of Compiler Design	Theory	PE	3	0	0	0	3
13.	U17ITE0013	Graphics and Multimedia	Theory	PE	3	0	0	0	3
14.	U17MAE0101	Partial Differential Equations and Transforms	Theory	BS	3	1	0	0	4

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Department of Aeronautical Engineering

AY: 2018-19 **Date: 15.04.2019**

Action taken report -Teacher Feedback

S.No	Analysis	Action taken report
1.	'Automation' course name to be modified	Changed as Automatic Control Systems
2.	'Aircraft Materials and Hardware' course name can be changed as 'Aircraft Hardware and Materials'	Changed as Aircraft Hardware and Materials
3.	'UAV Navigation' and 'UAV System Design' courses can be swapped or can be combined as one in R18 curriculum.	Combined and named as UAV System Design
4.	For mandatory course, 'Indian Constitution' course can be replaced by 'Intellectual Property Rights (IPR)' course.	Indian Constitution course is common for all the departments.
5.	In ProtoSem curriculum, 'Project Work Phase II' name has to be reflected	Project Work Phase II name will appear in the Grade Sheets for ProtoSem Students
6.	More textbook references can be included for 'Aircraft Structures-II' course	More references included for Aircraft Structures-II
7.	'Vibrations and Aeroelasticity' course may be considered as a core course	Vibrations and Aeroelasticity is changed as a core course in the Sixth Semester

Prepared By,

BoS Coordinator

Approved By,

BoS Chairman

Proof for Action Taken: 1 to 3 & 7

- **Changed as Automatic Control Systems**
- **Changed as Aircraft Hardware and Materials**
- **Combined and named as UAV System Design**
- **Vibrations and Aeroelasticity is changed as a core course in the Sixth Semester**

Semester IV										Pre-requisite
S.No	**Course code**	**Course Title**	**Course Mode**	**CT**	**L**	**T**	**P**	**J**	**C**	
1	U18MAT4101	Numerical Methods and Probability	Theory	BS	3	1	0	0	4	U18MAT3101
2	U18AEI4201	Low Speed Aerodynamics	Embedded-Theory & Lab	PC	2	0	2	0	3	U18AEI3201
3	U18AEI4202	Automatic Control Systems	Embedded-Theory & Lab	PC	2	0	2	0	3	-------
4	U18AET4003	Aircraft Structures I	Theory	PC	3	0	0	0	3	U18AEI3203
5	U18AET4004	UAV System Design	Theory	PC	3	0	0	0	3	-------
6	U18AET4005	Aircraft Hardware and Materials	Theory	PC	3	0	0	0	3	-------
7	U18INI4600	Engineering Clinic 4	Embedded-Practical & Project	ES	0	0	4	2	3	-------
								Total Credits	**22**	
								Total Contact Hours/week	**27**	

Semester VI										Pre-requisite
S.No	**Course code**	**Course Title**	**Course Mode**	**CT**	**L**	**T**	**P**	**J**	**C**	
1	U18AET6001	Flight Dynamics	Theory	PC	4	0	0	0	4	U18AEI4201
2	U18AET6002	Finite Element Method	Theory	PC	3	0	0	0	3	U18AEI3203
3	U18AET6003	Vibrations and Aeroelasticity	Theory	PC	3	0	0	0	3	U18AEI5202
4	U18AET6104	Rocket Propulsion	Theory	PC	2	1	0	0	3	U18AEI5205
5	OE II	Open Elective II	Theory	OE	3	0	0	0	3	-------
6	U18AEE00--	Professional Elective I	Theory	PE	3	0	0	0	3	-------
7	U18AEP6505	Design and Simulation Laboratory	Lab	PC	0	0	2	0	1	U18AET5003
8	U18AEP6506	Airframe and Aero Engine Maintenance Laboratory	Lab	PC	0	0	2	0	1	-------
								Total Credits	**21**	
								Total Contact Hours/week	**23**	

Proof for Action Taken: 6 More references included for Aircraft Structures-II

U18AEI5202	AIRCRAFT STRUCTURES-II	L	T	P	J	C
		2	0	2	0	3

Course Outcomes

After successful completion of this course, the students will be able to

CO1: Analyze the response of structures due to unsymmetrical bending.
CO2: Analyze bending, shear and torsion of open and closed thin-walled sections.
CO3: Analyze the failure modes occur in thin walled plates structures.
CO4: Analyze behavior of aircraft structural components under various types of loads.
CO5: Determine the stress fringe value for photo-elastic materials

Pre-requisites :

1. U18AET4003/ Aircraft Structures-I

CO-PO and CO-PSO Mapping:

	CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak													
COs	**Program Outcomes(POs) and Program Specific Outcomes (PSOs)**													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1		S		S									M	
CO2		S		S									M	
CO3		S											M	
CO4		S											M	
CO5				S										M

Course Assessment methods

Direct
1. Continuous Assessment Test I, II (Theory component). 2. Assignment, Group Presentation 3. Pre/Post - Experiment Test/Viva; Experimental Report for each experiment (lab component). 4. Model examination (lab component) 5. End Semester Examination (Theory and lab component)
Indirect
1. Course-end survey

Theory Component contents

UNSYMMETRICAL BENDING — 6 Hours

Bending stresses in beams of unsymmetrical sections (K-method, Neutral axis method and Principal axis Method) – Bending of symmetric sections with skew loads.

SHEAR FLOW IN OPEN SECTIONS — 7 Hours

Thin walled beams – Concept of shear flow – Shear centre – Elastic axis – One axis of symmetry – Wall effective and ineffective in bending – Unsymmetrical beam sections.

SHEAR FLOW IN CLOSED SECTIONS — 7 Hours

Bredt-Batho formula – Single and Multi-cell structures – Shear flow in single, multi-cell structures under torsion – Shear flow in single and multi-cell under bending with walls effective and ineffective.

BUCKLING OF PLATES **5 Hours**

Rectangular sheets under compression – Local buckling stress of thin walled sections – Crippling stresses by Needham's and Gerard's methods– Sheet stiffener panels – Effective width – Inter rivet and sheet wrinkling failures.

STRESS ANALYSIS IN WING AND FUSELAGE **5 Hours**

Tension field web beams (Wagner Beam) –Loads on aircraft structural components – Lift distribution – V-n diagram.

Lab component:

List of Experiments

1. Unsymmetrical bending of cantilever beam.
2. Shear centre location for open section.
3. Shear centre location for closed section.
4. Determination of stresses of constant strength beam.
5. Stresses in circular disc using photo elastic model.
6. Stresses in rectangular beam using photo elastic model.
7. Determination of Stress concentration factor for a flat plate with hole using photoelasticity.
8. Vibration of a cantilever beam.
9. Flexibility matrix of a cantilever beam.
10. Fabrication of composite laminate.

List of Equipments:

1. Photoelastic apparatus
2. Vibration Beam Setup
3. Vacuum Bagging Layup setup

Theory: 30	Tutorial: 0	Practical: 30	Project: 0	Total: 60 Hours

REFERENCES

1. Bruhn. E.H., 'Analysis and Design of Flight vehicles Structures', Tri-state off set company, USA, 1985.
2. Megson, T.H.G., 'Aircraft Structures for Engineering Students', Fifth Edition (Rev.), Butterworth-Heinemann, 2012.
3. Bruce K. Donaldson., 'Analysis of Aircraft Structures', Second Edition, Cambridge University Press., 2008.
4. Peery, D.J., and Azar, J.J., 'Aircraft Structures', Second Edition, McGraw-Hill, 1993.
5. G. Lakshmi Narasaiah, 'Aircraft Structures', CRC Press, 2011.
6. C T Sun, 'Mechanics of Aircraft Structures', Second Edition, Wiley publisher, April 2006.

WEBSITE REFERENCES

1 https://ocw.mit.edu/courses/mechanical-engineering/2-080j-structural-mechanics-fall-2013/course-notes/MIT2_080JF13_Lecture11.pdf

2 https://www.youtube.com/watch?v=jwTrStB_8Lg

3 https://www.youtube.com/watch?v=WCEsOI9m97o&t=542s

KUMARAGURU
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Department of Textile Technology

AY: 2018-19 **Date: 15.04.2019**

Action taken report -Teacher Feedback

S.No	Analysis	Action taken report
1.	Professional electives grouping to be done as per domain.	Professional electives grouping done as per domain
2.	ERP related courses can be introduced.	Introduced in syllabus as one credit course Course code: U17TXC006 Course Name: ERP in Textiles

Approved By,

Dr.Bharadhi Dhurai

BoS Chair person

KUMARAGURU
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Department of Textile Technology

AY: 2018-19 **Date: 15.04.2019**

Action taken report -Teacher Feedback

S.No	Analysis	Action taken report
1.	Professional electives grouping to be done as per domain.	Professional electives grouping done as per domain
2.	ERP related courses can be introduced.	Introduced in syllabus as one credit course Course code: U17TXC006 Course Name: ERP in Textiles

Proof

Professional electives grouping done as per domain

ELECTIVE I

Code No.	Course	L	T	P	C
U14TXTE51	High Performance Fibres	3	0	0	3
U14TXTE52	Maintenance Management in Textile Mills	3	0	0	3
U14TXTE53	Pattern Making and Grading	3	0	0	3

ELECTIVE II

U14TXTE61	Instrumental Analysis of Textiles and Chemicals	3	0	0	3
U14TXTE62	Textile Composites	3	0	0	3
U14TXTE63	Garment Wet Processing	3	0	0	3

ELECTIVE III

U14TXTE71	Medical Textiles	3	0	0	3
U14TXTE72	Clothing Science	3	0	0	3
U14TXTE73	Marketing and Merchandising	3	0	0	3

ELECTIVE IV

U14TXTE74	Apparel Production Planning and Control	3	0	0	3
U14TXTE75	Entrepreneurship Development	3	0	0	3
U14TXTE76	Statistical Application in Textile Engineering	3	0	0	3

ELECTIVE V

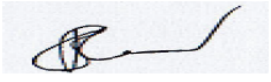
U14TXTE81	Industrial Engineering in Textile Industry	3	0	0	3
U14TXTE82	Project Preparation, Appraisal and Implementation	3	0	0	3
U14TXTE3	Environmental Management in Textile Industry	3	0	0	3

ELECTIVE VI

Code No.	Course	L	T	P	C
U14GST002	Total Quality Management	3	0	0	3
U14GST004	Operations Research	3	0	0	3
U14GST005	Engineering Economics and Financial Management	3	0	0	3

ELECTIVE VII

U14MCE502	Textile Mechatronics	3	0	0	3
U14MCE603	Energy Conservation and Audit	3	0	0	3
U14AUTE28	Technical Textiles for Automobiles	3	0	0	3



Signature of BOS chairman, TXT

Introduced in syllabus as one credit course
Course code: U17TXC006
Course Name: ERP in Textiles

U17TXC006 **ERP IN TEXTILES**

L	T	P	J	C
1	0	0	0	1

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Discuss the importance, merits, demerits and limitations of ERP.

CO2: Explain the various modules in ERP.

CO3: Describe the implementation methods of ERP and training procedures.

Pre-requisite : Nil

CO-POs & PSOs Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	M	M												
CO2		M												
CO3		M		M										

Course Assessment methods

Direct	Indirect
1. Examination	1. Course end survey

Fundamentals – Definitions and overview of ERP – advantages and limitations of ERP; Modules Major features, reports and uses of the ERP Modules with special focus on textile enterprises: Production Management, Quality Management, Plant Maintenance, Materials Management, Human Resources, Sales and Marketing, Finance and Accounting. Implementation – ERP implementation cycle – team training, testing, going live, end-user training, post implementation; in-house implementation – pros and cons; faster implementation methodologies; future directions in ERP; issues in implementation and solutions for textile industry.

Theory 15 Hours **Total: 15 Hours**

REFERENCES

1. Mahadeo Jaiswal and Ganesh Vanapalli, Textbook of Enterprise Resource Planning (ERP), Macmillan Publishers India, 2005.
2. L. M. Applegate, R. D. Austin and F. W. McFarlan, Creating Business Advantage in the
3. Information Age. New York: McGraw-Hill, 2002.
4. E. Monk and B. Wagner,Concepts in Enterprise Resource Planning (2nd ed.), Thomson Course Technology, Boston, 2006.
5. D. L. Olson, Managerial Issues of Enterprise Resource Planning Systems, New York: McGraw- Hill, 2004.
6. K. Sandoe, G. Corbitt and R. Boykin, Enterprise integration,Hoboken, NJ: John Wiley & Sons Inc., 2001

Dr.J.Srinivasan

Signature of BOS chairman, TXT

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KCT BUSINESS SCHOOL

Department of Management Studies

AY: 2018-19

Date: 25.06.2018

Action taken report – Faculty Feedback

S.No	Analysis	Action taken report
1.	More banking related courses are to be offered on off campus mode.	DBF (Diploma in Banking & Finance) has been initiated for student enrolment
2.	Foundation courses (P17BACE112-Managerial Economics & P17BACE114-Accounting for management) needs to be more time bound. Current timeline for completion of courses is not sufficient	Have taken into consideration and proposed to increase the credits in the forthcoming BoS for the two courses.
3.	Content and timeline for handling P17BAEEM006 Digital Marketing courses are to be extended.	Full time Digital Marketing courses are launched.
4.	The composition between Major and Minor should be relooked into.	The analysis has been discussed and likely to get modified in the next BoS
5.	Curriculum should be oriented to real CBCS	Multi-Disciplinary approach in student choice of courses brought into discussion and execution

Prepared By,

BoS Coordinator

Approved By,

BoS Chairman

Proof of Action Taken

1. Increased number of Banking courses offered

ELECTIVES OFFERED

Finance Electives

S.No	Course Code	Course Title	Credits	Assessment	
				CAM	EoS
1	P17BAEEF01	Commercial Banking	4	50	50
2	P17BAEEF02	Retail Banking	4	50	50
3	P17BAEEF03	Accounting for Banking	4	50	50
4	P17BAEEF04	Credit Management	3	50	50
5	P17BAEEF05	Legal & Regulatory Aspects of Banking	4	50	50
6	P17BAEEF06	Trade Finance	4	50	50
7	P17BAEEF07	International Finance	4	50	50
8	P17BAEEF08	Rural Banking and Micro Finance	3	50	50
9	P17BAEEF09	Merchant Banking and Financial Services	3	50	50
10	P17BAECF10	Consumer Lending	1	50	-
11	P17BAEEF11	Security Analysis and Portfolio Management	4	50	50
12	P17BAEEF12	Securities Operations and Risk Management	3	50	50
13	P17BAEEF13	Wealth Management 1	4	50	50
14	P17BAECF14	Behavioural Finance	1	50	-
15	P17BAEEF15	Wealth Management 2	4	50	50
16	P17BAEEF16	Mutual Funds	4	50	50
17	P17BAEEF17	Equity Derivatives Management	3	50	50

2. Increase in the time for Foundation courses

P17BACC112	Managerial Economics			3 credits
Objectives	1. Introduce the microeconomic concepts - demand, pricing, cost determination, entry into and exit from markets, price - output decisions. 2. Illustrate market structures and discuss on cost price behaviour in each structures 3. Introduce the Macro Economic Concepts governing business and economy			
Pre-requisite Courses	None			
Contents	**Topics**	**No of sessions**	**L***	**P***
	• Introduction of Managerial Economics - Scope, Relationship with other Disciplines	2	2	0
	• Micro Economics -Firms and Managerial Objectives • Demand, Law of Demand, Determinants of demand, Elasticity of demand, Law of diminishing marginal utility - Exceptions of Demand - Demand forecasting techniques (only theory) • Supply, Law of Supply, Elasticity of Supply	6	6	0
	• Production functions – Short and long run laws of production, law of returns to scale • Cost - types of cost, Short and long run cost output relationship, Economies and diseconomies of Scale	10	4	7
	• Market Structure - Perfect Competition, monopoly, duopoly, oligopoly, Monopolistic market structures - characteristics & Price - Output determination • Pricing Methods	14	4	10
	• Macroeconomics - nature & importance. National Income - concepts - GNP, GDP, NNP. • Business cycle - Phases of Business Cycle - Controlling Trade Cycle. • Inflation - Definition, Kinds and effects of Inflation, Demand Pull & Cost Push Inflation - Policy Measures to control. • Indian Financial System, Fiscal Policy: Definition, Objectives. Monetary Policy- Meaning, Scope, Instruments	12	12	0
	Total Hours	**45**	**28**	**17**
Course outcomes	1. Explain the concepts revolving around Micro Economics. 2. Apply the concept in real time production and market environment. 3. Explain the concepts concerning to Macro Economics.			
Reference Books	D N Diwedi (2009). Managerial Economics. Seventh Edition, Vikas Publication Piyali Ghosh Geetika, Purba Roy Chowdhury (2017).Managerial Economics, 3 e, McGraw-Hill Education			
Pedagogy and Assessment	Pedagogy: Lectures, Discussions and Field study Assessment : Report, presentation, Quiz			
Course Design	Dr.S.Sangeetha & Dr.B.Poongodi			

P17BACC114	Accounting for Management			3 credits	
Objectives	1. Introduce the basic concepts of financial accounting. 2. Discuss and interpret financial and cost statements. 3. Outline the basic concepts of budgeting				
Pre-requisite Courses	None				
Content	Topics		**No. Of sessions**	**L**	**P**
	Fundamental Accounting concepts-Basic Accounting principles-Elements of accounting- Double entry system- accounting cycle-accounting equations.		10	5	5
	Financial Statements- Introduction-Overview-Income Statement /P&L account- Balance sheet-Statement of cash flows- Ratio Analysis and Interpretation- key elements impacting financial Statements.		10	5	5
	Cost-Definition-Elements of cost- cost centre and profit centre-cost unit- cost elements- cost classification- methods of costing-constructing a basic sheet – Marginal Costing.		10	5	5
	Financial Budgeting and Budgetary Control- types of budgets-Zero based budgeting – Standard costing- Activity Based costing		15	8	7
	Total hours		**45**	**23**	**22**
Learning Outcomes	1. Outline the basic concepts of accounting for management. 2. Analyse financial statements and interpret the findings. 3. Understand the different types of budgets in decision making				
Reference Books	Sharma & Gupta, Shashi K (2012), Management Accounting. New Delhi. Kalyan Publishers Ltd.				
Pedagogy and Assessment	Pedagogy: Lecture, Hands-on training. Assessment: MCQs and Financial and cost statement Preparation and Presentation, Assignments, End Semester Exams				
Course Design	Dr.V.R.Nedunchezhian				

***No: of sessions for the above two courses were increased to 45 sessions from 30 sessions**

3.CBCS Based Curriculum & relooking into Major & Minor specializations

2. Credit System

Choice Based Credit System (CBCS) is followed which provides choice for students to select from the prescribed courses and also Open Electives. The CBCS provides flexibility in designing curriculum and assigning credits based on the course content and hours of teaching. It offers a **'cafeteria' approach** in which the students can take courses of their choice, learn at their own pace, undergo additional courses and acquire more than the required credits, and adopt an interdisciplinary approach to learning.

2.1 Credit Hours

Under the CBCS of UGC guidelines, the requirement for awarding a degree is prescribed in terms of number of credits to be completed by the students. Credit is a unit by which the course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of lecture/ practice and two hours of field project per week. One credit hour is equal to 60 minutes. A maximum of 20% of the total credit hours can be earned through self-learning or MOOC.

- **Lecture Credit Hours**: The term 'lecture' covers everything from the traditional model, where a faculty introduces concepts and methods to a group of students, to approaches that might be much more interactive. It could also involve a variety of contributors, and make use of a range of media and technologies. Lectures are assumed, in general, to involve larger groups of but size will vary depending upon the nature of what is being taught, the medium, the size of the overall student cohort, and practical concerns.

- **Practice Credit Hours**: Application/ Project Based Learning will be included in Practice credit hours. Examples are wide ranging and could include presentations, interview skills, tutorials, cases, aptitude building, group discussions, soft skill sessions, games, activities, field surveys and studies which are integrated with the lecture hours. Examples of fieldwork might include survey work and other forms of data collection, excavations and explorations through visits to a business or industrial site. The work might be unsupervised or supervised, and supervision could be provided by faculty. Some fieldwork may be conducted virtually. Fieldwork might be conducted in groups of various sizes, or by individuals, depending on the nature of the work involved. Tests, assessments and exams will be included in Practice credit hours.

- **Project Credit Hours:** Project hours will include Dissertation/Project Supervision hours would typically include preparation/ planning, hours spent in the field or on actual project, meetings & discussions with a supervisors and preparation of report and presentation report.

- **Independent Learning Credit Hours:** Credit hours associated with this type of instruction will be assigned credit depending upon the amount of activity associated with the course, faculty supervision, and students outside work activity. Usually the credits awarded will be same as the taught course.

Contact Period per week	Credits
One Lecture/ Practice session/ week (Lecture, Tutorial, problem solving, case studies, activities, Games, presentations, field learning, desk research, skill development)	1
Two Project sessions/ week (Project, Industry/ Social Immersions). Includes preparatory, on field and Report/ Presentation Preparation)	1

*Indicative: 15 weeks/ semester; One session is equal to 60 minutes

2.2 Minimum Credits to be Earned

The total number of credits a student earns during the four semesters of study period is called the Total credits. A Student must earn minimum of **100 credits** for successful completion of the MBA program. Further, the student has to meet the course and credit distribution also as specified below. Credit flexibility is given in each semester for fast and slow learners. A maximum of 20% of the total credits can be earned through online courses by SWAYAM / NPTEL / International Universities.

2.3 Earning Extra Credits

A student may earn extra credits of up to a maximum of **115 credits**. These course/ (s) can be taken in any semester through **self study / enroll in the course** if offered. "Extra" courses are ones that do not count for degree credit. Such courses appear on a student's permanent academic record with the final course mark, and are noted as "EXT", but do not count as accumulated degree credits and are not included in calculating a student's Grade Point Average. Extra Credits may be earned either through the courses offered in the MBA program or the Flexible and Comprehensive Learning Framework (FCLF) offered by KCT.

2.4 Types of Courses & Credit Distribution

Several types of courses are offered during the MBA program to build a holistic knowledge and skill set.

No	Type	Description	Mini Credits
1	Foundation	Course at a basic level, preparing students for more advanced study	08
2	Core	Course, which is fundamental for the program and should be mandatorily studied	40
3	Electives	Electives allow students to tailor their studies to their specific career goals and interests through specializations	24
4	Project	Course involving application of knowledge in solving / analyzing /practicing/ exploring real life business situations in the field for a considerable period of time	18
5	Open Electives	Course that enriches and presents divergent perspectives to career and life - which are open to all students from different specializations	10
			100

2.4.3 Concentration. Concentration is the area of specialization, which allows the student to specialize in an area of his/her choice based on her/his career interest. The concentrations offered are **Analytics and Systems, Entrepreneurship, Finance, Human Resource, Marketing, Operations**. In the concentration of his/her choice, the students can choose from the courses offered and **a minimum of 24 credits** will have to be earned in the area of concentration. In addition the Internship can also be carried out in the concentration area. Students specializing in entrepreneurship will be free to choose courses across specializations to strengthen the entrepreneurial aspirations

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Department of Automobile Engineering

AY: 2018-19

Date: 15.04.2019

Action taken report - Teachers Feedback

S.No	Analysis	Action taken report
1	**Manufacturing Technology (U17AUI3203)** Concept of light weighting and right weighting can be incorporated. Manufacturing Technology Lab Experiments should include making of components.	The topics were added to the syllabus.
2	**Machine Drawing (U17AUI4203)** Form tolerances can be incorporated.	The topic is included in the syllabus.
3	**Vehicle Body Engineering (U17AUT4004)** Keyless Entry systems to be included in Vehicle Body Engineering.	The topic is added to the syllabus.
4	**Automotive Electrical and Electronics Engineering (U17AUI5201)** Automotive Electronics can be given as a separate course since the contents are more towards Electrical.	Added as a new course in R 18

Prepared By,

BoS Coordinator

Approved By,

BoS Chairman

SEMESTER 5

S.No	Course Code	Course Name	Course Mode	CT	L	T	P	J	C	Pre-requisite
1	U18AUT5001	Automotive Electronics	Theory	PC	3	0	0	0	3	Nil
2	U18AUT5102	Design of Machine Elements	Theory	PC	3	1	0	0	4	U18AUI3202
3	U18AUT5103	Mechanics of Machines	Theory	PC	3	1	0	0	4	Nil
4	U18AUI5204	Finite Element Analysis	Embedded – Theory & Lab	PC	3	0	2	0	4	U18MAT4101
5	U18AUP5505	Automotive Electrical and Electronics Engineering Laboratory	Practical	PC	0	0	2	0	1	U18AUT4005

Course Assessment methods:

	Direct		Indirect
1	Assignments	1	Course Exit Survey
2	Continuous Assessment Tests		
3	End-Semester Examination		

Introduction L: 3 Hrs
Need of Graphical Language, Importance Machine Drawing
Classification of Machine Drawings:
Part Drawing and Assembly Drawing
Sectioning L: 3 Hrs
Conventional Representations L: 7 Hrs
Standard parts and Screwed Fastenings.
Limits, Fits, Dimensional and Form Tolerances L: 9 Hrs
Definitions, Classifications of Fits, System of Fits, Selection of Fits, Method of Indicating Fits on Drawings, Tolerance Grade, Positions of Tolerance, Form Tolerance, Fundamental of Deviations, Shaft and Hole Basis systems, Method of Placing Limit Dimensions
Part and Assembly Drawings L: 8 Hrs
Introduction, BOM and its Importance, Assembly procedures

door locks.

COMFORT SYSTEMS L: 9 Hrs
Power Steering, ePAS, Cruise control, Adaptive cruise control, Transmission - fundamentals, control types MT, AT, CVT and DCT, hill assist, HVAC – Climate Control, Tyre pressure monitoring systems, Seats, Mirrors, Sun-Roofs, Park assist, Infotainment – Car Stereo and Radio.

DRIVER ASSISTANCE SYSTEMS L: 9 Hrs
Telematics, global positioning systems, geographical information systems, navigation systems, voice command systems, automotive vision system, lane departure warning system, Security Systems – central lock, vehicle immobilizers, keyless entry, anti-theft technology, smart card system, number plate coding.

Theory : 45 Hrs	Tutorial: 0 Hrs	Total Hours: 45

References:

1 "Navigation and Intelligent Transportation Systems" - Ronald K. Jurgen, SAE International, USA, 1998.
2 "Electronic Engine Control Technologies" - Ronald K. Jurgen, SAE International, 2004.
3 "Intelligent Vehicle Technologies: Theory and Applications" - Ljubo Vlacic, Michel Parent

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Department of Fashion Technology

AY: 2018-19

Action taken report –Faculty Feedback

Date : 15.04.2019

S.No	Analysis	Action taken report
1.	A new course on intimate apparels should be added in the curriculum since there is a very good scope in market and also the manufacturing procedure is different from basic garments	The course U18FTE0006 intimate apparels are added in the electives under apparel technology track.
2.	The core course apparel brand management should be shifted to seventh semester along with apparel retail management.	The core course U18FTT7001 apparel brand management is shifted to seventh semester.
3.	Portfolio Presentation I can be moved to 6th semester and portfolio presentation II should be shifted to 7th semester	In the curriculum, U18FTP6505 portfolio I and U18FTP7503 Portfolio II is given in 6th and seventh semester respectively.
4.	Apparel production lab should be shifted to 5th semester from 6th semester which will help portfolio lab efficiently.	The course U18FTP5504 apparel production lab is now offered before portfolio presentation.

PreparedBy,

BoS Coordinator

Approved By,

BoS Chairman

Sl.No:1 - The course U18FTE0006 intimate apparels are added in the electives under apparel technology track.

Programme Electives									
S.No	**Course code**	**Course Title**	**Course Mode**	**CT**	**L**	**T**	**P**	**J**	**C**
Fashion designing									
1	U18FTE0001	Apparel Product Development	Theory	PE	3	0	0	0	3
2	U18FTE0002	Surface Ornamentation	Theory	PE	3	0	0	0	3
3	U18FTE0003	Visual Merchandising	Theory	PE	3	0	0	0	3
4	U18FTE0004	Fashion Boutique Management	Theory	PE	3	0	0	0	3
5	U18FTE0005	Traditional Indian Textiles and Crafts	Theory	PE	3	0	0	0	3
6	U18FTE0006	Intimate Apparels	Theory	PE	3	0	0	0	3

U18FTE0006 INTIMATE APPARELS

L	T	P	J	C
3	0	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1	Categorize intimate apparel and choose suitable fabrics	K5
CO2	Appraise on basic principles in designing and construction of various types of inner wear for men and women	K3
CO3	Develop skills in designing intimate men's garments	K6
CO4	Develop skills in designing intimate women's garments.	K6
CO5	Relate the suitability of accessories and other construction methods of producing intimate Apparels	K5
CO6	Evaluate the performance of Intimate apparel	K4

Pre Requisite :

U18FTT3003 Pattern Making and Adaptation

U18FTI4203 Apparel Design and Development

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak														
COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S												S	
CO2		S											S	M

CO3		S	M										M	
CO4	M		W										M	
CO5		S	S										M	M
CO6			S	S	M								S	

Course Assessment methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1. Course Exit Survey

Course Content

INTIMATE APPAREL **9 Hours**

Definition-Types- Night Wear, Under Wear, Classification of Kid's, Women's and Men's Intimates. Quality requirements for selecting suitable fibers, fabrics, designs for intimate apparels. Physical and physiological health effect of Intimate apparel. Latest finishes for intimate apparels

MEN'S INTIMATE APPARELS **9 Hours**

Introduction, Design and development- measurements - Step by step drafting procedure and construction sequence - vests, briefs, trunk, pyjama and bathrobe.

WOMEN'S INTIMATE APPAREL **9 Hours**

Introduction, Design and development - measurements - Step by step drafting procedure and construction sequence - waist petticoat, bra, panty, camisole, night dress, negligee

INTIMATE APPAREL ACCESSORIES **4 Hours**

Accessories - bra wire, hook and eye tape, ring and slider, buckle, plastic bone, Elastics, Threads etc. used for intimate apparel.

INTIMATE APPAREL PRODUCTION TECHNOLOGY **5 Hours**

Principles, methods, technical aspects and controls of lamination, moulding and seamless knitting technology for production of intimate apparels.

PERFORMANCE EVALUATION OF INTIMATE APPAREL **9 Hours**

Functional Requirements – comfort – sewability – appearance retention – durability - after care

Performance Evaluation – thermal properties – moisture permeability – liquid transport properties – low stress mechanical properties – dimensional stability & skewness stability – colour fastness – wearer trials

Requirements for engineering intimate apparels – Fibre & yarn characteristics Fabric composition, thickness structure

Theory : 45 Hours **Total: 45 Hours**

REFERENCES

1. W. Yu, J. Fan, S.C. Harlock, S.P. Ng "Innovation and Technology of Women's Intimate Apparel", Woodhead Publishing Limited, England, 2006.
2. Ann Haggar, " Pattern Cutting For Lingerie, Beach Wear And Leisure Wear", Black Well Science Limited, France, 2001.
3. Lynn Nottage, "Intimate Apparel / Fabulation", Theatre Communications Group, USA, 2006.
4. Stokes Terry, "Intimate Apparel", Brooklyn: Release Press, USA, 1980.
5. Singer, "Sewing Lingerie", Cy Decosse Incorporated, Mexico, 1991.

Sl.No:2 - The core course U18FTT7001 apparel brand management is shifted to seventh semester

Semester VII										Pre-requisite
S.No	Course code	Course Title	Course Mode	CT	L	T	P	J	C	
1	U18FTT7001	Apparel Brand Management	Theory	PC	3	0	0	0	3	Nil
2	U18FTT7002	Apparel Retail Management	Theory	PC	3	0	0	0	3	Nil
3	U18FTE….	Programme Elective III	Theory	PE	3	0	0	0	3	Nil
4	U18FTE….	Programme Elective IV	Theory	PE	3	0	0	0	3	Nil
5	U18FTP7503	Portfolio Presentation II	Lab	PC	0	0	2	0	1	U18FTP6505
6	U18FTP7701	Project -Phase I	Project only Course	PW	0	0	0	6	3	Nil
								Total Credits	16	
								Total Contact Hours/week	20	

Sl.No:3 – U18FTP6505 portfolio I and U18FTP7503 Portfolio II is given in 6th and seventh semester respectively.

Semester VI										Pre-requisite
S.No	Course code	Course Title	Course Mode	CT	L	T	P	J	C	
1	U18FTT6001	Apparel Production Planning and Control	Theory	PC	3	0	0	0	3	Nil
2	U18FTT6002	Apparel Merchandising and Cost Management	Theory	PC	3	0	0	0	3	Nil
3	U18FTT6003	Industrial Engineering in Apparel Industry	Theory	PC	3	0	0	0	3	Nil
4	U18FTE….	Programme Elective I	Theory	PE	3	0	0	0	3	Nil
5	U18OE….	Open Elective II	Theory	OE	3	0	0	0	3	Nil
6	U18FTE…	Programme Elective II	Theory	PE	3	0	0	0	3	Nil
7	U18FTP6504	Apparel CAD lab	Lab	PC	0	0	2	0	1	Nil
8	U18FTP6505	Portfolio Presentation I	Lab	PC	0	0	2	0	1	U18FTI4203
								Total Credits	20	
								Total Contact Hours/week	22	

Semester VII										Pre-requisite
S.No	Course code	Course Title	Course Mode	CT	L	T	P	J	C	
1	U18FTT7001	Apparel Brand Management	Theory	PC	3	0	0	0	3	Nil
2	U18FTT7002	Apparel Retail Management	Theory	PC	3	0	0	0	3	Nil
3	U18FTE….	Programme Elective III	Theory	PE	3	0	0	0	3	Nil
4	U18FTE….	Programme Elective IV	Theory	PE	3	0	0	0	3	Nil
5	U18FTP7503	Portfolio Presentation II	Lab	PC	0	0	2	0	1	U18FTP6505
6	U18FTP7701	Project -Phase I	Project only Course	PW	0	0	0	6	3	Nil
								Total Credits	**16**	
								Total Contact Hours/week	**20**	

Sl.No:4 – The course U18FTP5504 apparel production lab is now offered before portfolio presentation

Semester V										Pre-requisite
S.No	Course code	Course Title	Course Mode	CT	L	T	P	J	C	
1	U18MAT5102	Probability and Statistics	Theory and Tutorial	BS	3	1	0	0	4	Nil
2	U18FTI5201	Textile Chemical Processing	Embedded - Theory & Lab	PC	3	0	2	0	4	Nil
3	U18FTI5202	Textile and Apparel Quality Evaluation	Embedded - Theory & Lab	PC	3	0	2	0	4	Nil
4	U18FTT5003	Knitting Technology	Theory	PC	3	0	0	0	3	Nil
5	U18OE….	Open Elective I	Theory	OE	3	0	0	0	3	Nil
6	U18FTP5504	Apparel Production Lab	Lab	PC	0	0	2	0	1	U18FTI4203
7	U18FTP5505	Industrial Training *	Industry	PC	0	0	2	0	1	NIL
8	U18INI5600	Engineering Clinic V	Project based course	ES	0	0	4	2	3	Nil
								Total Credits	**23**	
								Total Contact Hours/week	**30**	

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Department of Civil Engineering

AY: 2018-19 **15.04.2019**

Action taken report -Faculty Feedback

S.No	Analysis	Action taken report
1.	Course Outcomes must be relevant to POs and mapped with justification	Revisions in COs are approved.
2.	Quality of question paper must be improved to address HOTs.	Department Exam cell notified about the requirement for execution.
3.	Project Evaluation committee must have at least 4 members	Approved for implementation

Prepared by,

BoS Coordinator

Approved by,

BoS Chairman

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KUMARAGURU COLLEGE OF TECHNOLOGY, COIMBATORE-641049

(An Autonomous Institution affiliated to Anna University, Chennai)

Action Taken Report- Faculty Feedback

Department of Electronics and Communication Engineering

Academic Year: 2018 – 2019

Date: 15.04.2019

S.No	Feedback	Action Taken
1.	Fundamentals of two port network concepts to be added in Network Theory	Two port network concepts have been included in Network Theory
2.	Band pass sampling concepts to be included in Signals and systems.	Band pass sampling concepts has been included in U17ECT3101-Signals and systems.
3.	Review of DTFT -Frequency response and pole zero analysis concept to be introduced in Digital Signal Processing.	DTFT -Frequency response and pole zero analysis concept introduced in U17ECI4201-Digital Signal Processing
4.	In Communication Engineering I, multiplexing concepts has to be added as an introduction.	Multiplexing concept has been added along with modulation in the course U17ECI5201-Communication Engineering I

Prepared By,

BoS Coordinator

Approved By,

BoS Chairman

Proof for Action Taken 2: Band pass sampling concepts has been included in U17ECT3101-Signals and systems.

U17ECT3101 **SIGNALS AND SYSTEMS**

L	T	P	J	C
3	1	0	0	4

Course Outcomes (COs):
After successful completion of this course, the students should be able to

CO1: Distinguish different types of signals and systems (K4).
CO2: Analyze periodic signals using Fourier series (K4).
CO3: Evaluate Continuous Time signals and system using Fourier Transform (K4).
CO4: Analyze Discrete Time signals and systems using DTFT and Z Transform (K4).
CO5: Explain sampling of continuous time signals (K2).

Pre-requisites: -

CO/PO Mapping:
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S	M												M
CO2	S	M												M
CO3	S	S	M	M										S
CO4	S	S	M	M										S
CO5	S	S												S

Course Assessment Methods

DIRECT
Continuous Assessment Test I, II Assignment Group Presentation End Semester Examination
INDIRECT
Course-end survey

CONTINUOUS AND DISCRETE TIME SIGNALS AND SYSTEMS **17 Hours**

Continuous Time (CT) &Discrete Time (DT) signals- Classification - standard signals – basic operations on signals - Continuous time and discrete time systems - properties - Linear Time Invariant (LTI) systems- Stability- Causality- Continuous and discrete convolution.

FOURIER ANALYSIS OF CT SIGNALS AND SYSTEMS **12 Hours**

Fourier series analysis of periodic signals- spectrum - Properties of Continuous Time Fourier Series (CTFS) - Convergence of CTFS - Representation of aperiodic signals by Continuous Time Fourier Transform(CTFT)- spectrum - Properties of CTFT - Convergence of CTFT - CT system representation by differential equation - Frequency response of systems characterized by differential equations.

Signature of BOS chairman, ECE

SAMPLING **06 Hours**

Representation of continuous time signals by its samples - Sampling theorem – Reconstruction of a signal from its samples, aliasing.

FOURIER ANALYSIS OF DT SIGNALS AND SYSTEMS **12 Hours**

Discrete Time Fourier Series (DTFS)-spectrum- –properties - Discrete Time Fourier Transform (DTFT) - Properties – discrete time system representation by difference equations - Frequency response of systems characterized by difference equations.

Z TRANSFORM ANALYSIS OF SIGNALS AND SYSTEMS **13Hours**

Z transform – RoC –Forward and Inverse Transform use Residue, long Division, Partial Fraction methods - Properties of Z transform – Pole-zero plot- Analysis and characterization of LTI system using Z transform- frequency response of DT systems

Theory: 45	Tutorial: 15	Practical: 0	Project: 0	Total: 60 Hours

REFERENCES:

1. Alan V. Oppenheim, Alan S. Willsky , S.HamidNawab, "Signals and Systems", Pearson Education, 2nd Edition, 2012.
2. Simon Haykin, Barry Van Veen, "Signals and Systems", ,John Wiley & Sons, 3rd Edition, 2012.
3. H. P. Hsu, "Signals and Systems" Schaum'sOutline Series, McGraw Hill Professional, 2010
4. John G Proakis and Manolakis, "Digital Signal Processing Principles, Algorithms and Applications", Pearson Education, 4th Edition, 2014.
5. M. J. Roberts, "Signals and Systems Analysis using Transform method and MATLAB",McGraw-Hill Education, Second Edition, 2011.
6. K. Lindner, "Signals and Systems", McGraw Hill International,1999.

Signature of BOS chairman, ECE

Proof for Action Taken 3: DTFT -Frequency response and pole zero analysis concept introduced in U17ECI4201-Digital Signal Processing

U17ECI4201 **DIGITAL SIGNAL PROCESSING**

L	T	P	J	C
3	0	2	0	4

Course Outcomes (COs):
After successful completion of this course, the students should be able to

CO1: Apply DFT algorithm for signal analysis (K4).
CO2: Design, implement and analyze IIR filter for the given specification (K4).
CO3: Design, implement and analyze FIR filter for the given specification (K4).
CO4: Compare different structures for filter implementations (K4).
CO5: Analyze the effect of finite word length (K3).
CO6: Compare DSP Processor Architectures (K2).

Pre-requisites:
1.U17ECT3101 Signals and Systems

CO/PO Mapping:
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S	S	M		S				M	M				S
CO2	S	S	M		S				M	M				S
CO3	S	S	M		S				M	M				S
CO4	S	M												S
CO5	S	M												S
CO6	S	M			M									S

Course Assessment Methods

DIRECT
Continuous Assessment Test I, II (Theory Component) Assignment (Theory Component) Pre/Post - experiment Test/Viva; Experimental Report for each experiment (Lab component) Model examination (lab component) End Semester Examination (Theory and lab component)
INDIRECT
Course-end survey

DISCRETE FOURIER TRANSFORM **09 Hours**

DFT and its properties, Relation between DTFT and DFT, Radix-2 FFT algorithms –DFT computation using Decimation in time and Decimation in frequency algorithms, Overlap-add and save Methods.

Signature of BOS chairman, ECE

INFINITE IMPULSE RESPONSE DIGITAL FILTERS **12 Hours**

Design of analog Butterworth and Chebyshev Filters – Frequency transformation in analog domain – Design of IIR digital filters - Impulse invariance techniques, Bilinear transform – Prewarping – Realization of IIR filters - Direct, cascade and parallel forms, Lattice structure.

FINITE IMPULSE RESPONSE DIGITAL FILTERS **12 Hours**

Linear phase FIR filters – Design using Rectangular, Hamming, Hanning and Blackmann Windows – Frequency sampling method – Realization of FIR filters – Direct form and Lattice structure

FINITE WORD LENGTH EFFECTS **06 Hours**

Representation of numbers, Quantization of filter coefficients in IIR and FIR filters, Round off effects in digital filters –Limit cycle Oscillations, Scaling, Quantization effect in fixed point realization of digital filters.

DSP ARCHITECTURE **06 Hours**

Comparison of Von-Neumann and Harvard architecture - Architecture of TMS320C67XX Processors- Addressing modes- Memory organization - Program Control – Pipelining- On-Chip Peripherals- Interrupts.

REFERENCES:

1. John G Proakis and Manolakis, "Digital Signal Processing Principles, Algorithms and Applications", Pearson, Fourth Edition, 2014.
2. Venkataramani B, and Bhaskar M, "Digital Signal Processors: Architecture, Programming & Applications", Tata McGraw Hill, New Delhi, 2011.
3. Monson H.Hayes, "Digital Signal Processing "Schaum's Outline Series, McGraw Hill Professional, 2nd Edition,2011
4. Johny R. Johnson, "Introduction to Digital Signal Processing", PHI, 2006.
5. S.K. Mitra, "Digital Signal Processing, A Computer Based approach", Tata McGrawHill,, 4th Edition, 2013.
6. E.C. Ifeachor and B.W. Jervis, "Digital signal processing – A Practical approach", Second edition, Pearson, 2002.

LAB COMPONENT

LIST OF EXPERIMENTS

1. Generate and perform operations on signals
2. Pole Zero plot and stability analysis of systems.
3. Convolution and correlation.
4. Implementation of algorithms for DFT/IDFT.
5. Spectral analysis of Sampled signal
6. Design of FIR filters.
7. Design of IIR filters.

Experiments using TMS320C67XX

8. Filter implementation
9. Verify DSP concepts with real time signals.

Theory: 45	Tutorial:0	Practical: 30	Project: 0	Total: 75 Hours

Signature of BOS chairman, ECE

Proof for Action taken 4: Multiplexing concept has been added along with modulation in the course U17ECI5201-Communication Engineering I

L	T	P	J	C
3	0	2	0	4

U17ECI5201 COMMUNICATION ENGINEERING- I

Course Outcomes (COs):

After successful completion of this course, the students should be able to

CO1: Demonstrate basic building blocks of communication systems (K2).
CO2: Compare the performance of amplitude modulation techniques (K4,S3).
CO3: Implement and analyze angle modulation techniques (K4,S3).
CO4: Discriminate and implement different analog pulse Modulation techniques (K3,S3).
CO5: Apply and demonstrate digital pulse modulation techniques. (K3,S3)

Pre-requisites:

1. U17ECT3101-Signals and Systems

CO/PO Mapping:
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	PROGRAMME OUTCOMES													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S								S					M
CO2	S	M							S					M
CO3	S	M							S					M
CO4	S	M							S					M
CO5	S	M							S					M

Course Assessment Methods

DIRECT
Continuous Assessment Test I, II (Theory Component) Assignment (Theory Component) Pre/Post - experiment Test/Viva; Experimental Report for each experiment (Lab component) Model examination (lab component) End Semester Examination (Theory and lab component)
INDIRECT
Course-end survey

THEORY COMPONENT CONTENT:

INTRODUCTION **09 Hours**

Electronic Communication Systems – Electromagnetic Spectrum –Communication Channels. Representation of signals: Hilbert transform – I-Q Representation of pass-band signal.
Noise – Types of noise –Signal to noise ratio – Noise Factor – Noise Figure - Mathematical Representation of White noise and Narrowband Noise.

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AMPLITUDE MODULATION **12 Hours**

Linear summing, Non linear mixing - Multiplexing-Modulation, Need for Modulation - Principles of Amplitude modulation - Mathematical Representation, Waveforms – Spectrum – Bandwidth – Phasor representation, Power Relations. Types-DSBFC,DSBSC,SSBSC,VSB – Square law, Switching Modulators, Generation of AM Signal - Class A Modulator, Balanced Ring Modulator, Filter Method, Phase Shift Method, Demodulation of AM Signal - Coherent Detection– Costas Loop, Envelope Detector. AM Transmitter - Receiver Characteristics - Super heterodyne Receiver - Noise in AM receivers

ANGLE MODULATION **12 Hours**

Basic Principles – Types of Angle Modulation: Frequency Modulation, Phase Modulation – Mathematical Representation – Waveforms – Spectrum – Bandwidth – Power – Relationship between FM and PM – Narrowband and Wideband FM – Phasor Representation.

Generation of FM signal - FM Reactance modulator – Direct and Indirect FM Transmitters-Demodulation of FM Signals: Tuned Circuit Frequency Discriminators – Balanced slope detector, Foster-Seely Discriminator –PLL – FM receiver. Noise in FM Receivers – Pre-emphasis and De-emphasis – Capture effect – Threshold effect – Performance Comparison of AM and FM Systems.

04 Hours

PULSE ANALOG MODULATION SCHEMES: Analog pulse modulation- PAM, PPM, PWM, Case study – Impulse Radio.

08 Hours

BASEBAND PULSE DIGITAL MODULATION SCHEMES: Pulse Code Modulation – Quantization-Companding- A-law & μ-law algorithms – Linear Prediction - Differential Pulse Code Modulation, Adaptive differential pulse code modulation – Delta Modulation-Adaptive Delta Modulation. Line coding techniques-NRZ / RZ – unipolar, polar, bipolar and biphase signals.

REFERENCES:

1. Simon Haykin, "Communication Systems", John Wiley & Sons, Fifth Edition, 2009.
2. Herbert Taub, Donald L Schilling and GoutamSaha, "Principles of Communication Systems", McGraw Hill, Fourth Edition, 2013.
3. B.P.Lathi, ZhiDing. "Modern Digital and Analog Communication Systems", Oxford University Press, Fourth Edition, 2009.
4. John G. Proakis, MasoudSalehi, "Communication Systems Engineering", Pearson Education, 2008.
5. Ferrel G. Stremler, "Introduction to Communication Systems", Prentice-Hall, Fourth Edition, 2001.
6. W. Tomasi, "Electronic Communication Systems", Prentice-Hall, Fourth Edition 2001.

Signature of BOS chairman, ECE

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Department of Electronics & Instrumentation Engineering

AY: 2018-19 15.04.2019

Action taken report - Teachers Feedback

S.No	Analysis	Action taken report
1.	Include one course outcome related to deep learning in the course U18EII6202 – Digital Signal Processing and Deep learning.	Incorporated
2.	Suggested to include standard books for the course U18EIE0012 - System identification, modelling and simulation.	Incorporated
3.	Curriculum shall not be changed for minimum 4 years	Shall be incorporated based on the decision by DOA

Prepared by,

V. Mathimekalai AP/EIE

BoS Coordinator

Approved by,

BoS Chairman

Proof for ATR point No 1

U18EII6202 **DIGITAL SIGNAL PROCESSING AND DEEP LEARNING**

L	T	P	J	C
3	0	2	0	4

Course Outcomes (CO):

After Successful completion of this course, the students will be able to :

CO 1: Understand the characteristics of discrete-time signals and discrete systems

CO 2: Analyze signal / system properties using mathematical tools

CO 3: Apply and develop algorithms for digital systems

CO 4: Illustrate efficient computation of DFT

CO 5: Discuss advanced features and architecture of generic P-DSP

CO 6: Design FIR and IIR filters

Pre-requisite: U18EII4203- Modelling and Analysis of Dynamic Systems.

COs	PO												PSO	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	M													
CO2		S											S	
CO3			S											S
CO4	S													
CO5				S										
CO6	M													

Course Assessment Methods:	
Direct	**Indirect**
• Internal Tests • Assignment • Model Lab Exam • End Semester Theory & Practical Exam	• Course Exit Survey

Course Content:

DISCRETE TIME SIGNALS AND SYSTEMS **9 Hours**

Representation of a CT signal by samples – Sampling theorem – Reconstruction of a signal from its samples – Aliasing – DT Signals – Impulse, Step, Pulse, Sine, Exponential – Properties of DT signals - Transformation of independent variable – Shifting, scaling, folding - Discrete Time LTI systems – Properties – Impulse response – Convolution sum – Properties of Convolution

Z-TRANSFORM AND SYSTEM ANALYSIS **9 Hours**

DTFT – Properties - Z transform – Forward Transform - Inverse Transform using Partial Fractions - Properties – Pole-Zero plot – Difference Equations - Transfer function - Analysis of Discrete Time systems using DTFT and Z Transform.

DISCRETE FOURIER TRANSFORM **9 Hours**

Introduction to DFT– Properties of DFT – Efficient computation of DFT – FFT algorithms – Introduction to Radix-n algorithms - Radix-2 FFT – Decimation-in-Time and Decimation–

K.K.

BOS Chairman

in-Frequency algorithms – Butterfly diagram.

DESIGN OF DIGITAL FILTERS **9 Hours**

FIR filter design: Linear phase characteristics - Windowing Technique –Rectangular, Hamming, Hanning, Blackmann windows – IIR filter design: Analog filter design - Butterworth and Chebyshev approximations – Impulse invariance and Bilinear transformations - FIR and IIR filter structures – Direct form I and II - cascade and parallel forms – Finite Precision effects.

ADVANCED TOPICS IN DSP AND MACHINE LEARNING **9 Hours**

Concepts of multi-rate signal processing – Decimation and interpolation by integer factor – Sampling rate conversion – Introduction to DSP architecture - Harvard, Modified Harvard architectures –Machine learning – AI revolution – Block chain – Using AI to augment human intelligence.

List of Experiments:

1. Matlab Primer – 1D and 2D array manipulations
2. Signal generation and sampling analysis
3. Audio signal – Frequency domain analysis
4. Audio capture and processing
5. Design of filters – FIR
6. Design of filters - IIR
7. Noise removal using filtering of audios
8. Implementation of simple neural networks
9. Implementation of neural networks with hidden layers
10. Simple regression applications.

Theory Hours: 45	**Practical Hours: 30**	**Total Hours: 75**

References:

1. Mrinal Mandel and Amir Asif, "Continuous and Discrete Time Signals and Systems", Cambridge International Student Edition, Cambridge University Press, 2007.
2. Leonard Eddison, "Machine Learning – A technical approach to machine learning for beginners", 2017
3. JohnG.ProakisandDimitrisG.Manolakis, "DigitalSignalProcessing,Principles AlgorithmsandApplications",PHI, 3rdEdition.2000.
4. B. Venkataramani, M. Bhaskar, "Digital Signal Processors, Architecture, Programming and Applications", Tata McGraw Hill, New Delhi, 2003. (Unit V)
5. JohnyR.Johnson,"IntroductiontoDigitalSignalProcessing",PHI, 2009.
6. Won Y. Yang et. Al., "Signals and Systems with MATLAB", Springer International Edition, 2009
7. Steven W. Smith, "The Scientists and Engineer's Guide to Digital Signal Processing", California Technical Publishing, 1997.
8. James H. McClellan, Ronald W. Schafer, Mark A. Yoder, "Signal Processing First", 2nd Edition

K.K.

BOS Chairman

Proof for AIR point No 2

U18EIE0012 **SYSTEM IDENTIFICATION, MODELLING AND SIMULATION**

L	T	P	J	C
3	0	0	0	3

Course Outcomes (CO):

After Successful completion of this course, the students will be able to :

CO1: Choose the correct model structure

CO2: Design inputs (probe signals) for identification

CO3: Estimate the non-parametric and parametric models

CO4: Perform the data pre-processing for identification

Pre-requisite: Nil

COs	PO												PSO	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S						W						S	
CO2		M			S									M
CO3	S	S			M								S	
CO4		M												

Course Assessment Methods:	
Direct	**Indirect**
• Internal Tests • Assignment • End Semester Theory	• Course Exit Survey

Course Content:

MODELS OF DETERMINISTIC LTI SYSTEMS **9 Hours**

Discrete-time convolution models, response-based models, difference equation descriptions, transfer function and state-space models, discretization. Stochastic processes: Review (auto- and cross-correlation functions, white- noise process and ARMA models).

BASICS OF ESTIMATION THEORY **9 Hours**

Estimators, bias and variance, convergence, consistency, asymptotic distribution of parameter estimates. Generic estimation methods: Ordinary least squares, Variants of LS methods, Maximum Likelihood Estimation.

INPUT-OUTPUT MODELS FOR IDENTIFICATION: **9 Hours**

non-parametric (step, impulse and frequency response) and parametric models (ARX, ARMAX, OE, B-J).Prediction: one-step ahead prediction, k-step ahead predictors, simulation

IDENTIFICATION OF NONPARAMETRIC AND PARAMETRIC MODELS:9Hours

Estimation of impulse response and frequency response functions; prediction-error minimization (PEM) methods, correlation methods, instrumental variable (IV) methods. Statistical and Practical Aspects: time-delay estimation, diagnostics for model quality checks, residual analysis, model validation, and handling drifts, outliers and missing data; input design.

IDENTIFICATION OF STATE-SPACE MODELS: **9 Hours**

Kalman filter, subspace identification methods, Grey-box modeling. Advanced topics: Recursive and closed-loop identification..

Theory Hours: 45	Practical hours : 0	Total Hours: 45

BOS Chairman

TEXT BOOKS:

1. System Identification: Theory for the User , 2nd Edition, Prentice Hall by Lennart Ljung, 1999.
2. System Identification: An Introduction , 2011by Karel J. Keesman, Springer
3. Mastering System Identification in 100 Exercises –2012 by Johan Schoukens , Wiley-IEEE Press
4. Principles of System Identification: Theory and Practice Hardcover –2014 by Arun K. Tangirala, CRC Press
5. The Elements of Statistical Learning: Data Mining, Inference, and Prediction, Second Edition –2017by Trevor Hastie, Springer.

BOS Chairman

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Department of Mechanical Engineering

AY: 2018-19 **Date: 15.04.2019**

Teacher Feedback

1. Syllabus content of the elective course on marketing management to be revised and the course can be renamed.
2. Course name and content of Metal cutting, and Computer aided manufacturing course to be modified by removing CIM components like group technology and extensive coverage of NC and CNC part programming.
3. In the Metal cutting and Computer aided manufacturing embedded course Number of experiments offered can be reduced from 12 to 10 or 8 experiments.

Prepared By,

Dr.B.Senthilkumar

BoS Coordinator

Approved By,

Dr.C.Velmurugan

BoS Chairman

Dr. C. VELMURUGAN, M.E.,Ph.D.
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Department of Mechanical Engineering

AY: 2018-19 **Date: 15.04.2019**

Feedback Analysis Report -Teacher

1. Syllabus content of the elective course on marketing management to be revised and the course can be renamed. - The elective course content was revised to meet the industrial marketing.
2. Course name and content of Metal cutting, and Computer aided manufacturing course to be modified by removing CIM components like group technology and extensive coverage of NC and CNC part programming. –In the course U17MEI3201Metal cutting and computer aided manufacturing the content CIM implementation and data communication was removed, and Group Technology and Computer Aided Process Planning was added.
3. In the Metal cutting and Computer aided manufacturing embedded course Number of experiments offered can be reduced from 12 to 10 or 8 experiments. - The number of experiments reduced to 9.

Prepared By,

Dr.B.Senthilkumar

BoS Coordinator

Approved By,

Dr.C.Velmuruga

BoS Chairman

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AY: 2018-19 **Date: 15.04.2019**

Action taken report -Teacher Feedback

S.No	Analysis	Action taken report
1.	Syllabus content of the elective course on marketing management to be revised and the course can be renamed.	The elective course content was revised to meet the industrial marketing
2.	Course name and content of Metal cutting, and Computer aided manufacturing course to be modified by removing CIM components like group technology and extensive coverage of NC and CNC part programming.	In the course U17MEI3201 Metal cutting and computer aided manufacturing the content CIM implementation and data communication was removed, and Group Technology and Computer Aided Process Planning was added. Also, the course code U17MEI3201 was changed to U18MEI3201.
3.	In the Metal cutting and Computer aided manufacturing embedded course Number of experiments offered can be reduced from 12 to 10 or 8 experiments.	The number of experiments reduced to 9 by revising the experiments.

Prepared by,

Dr.B.Senthilkumar.

BoS Coordinator

Approved By,

Dr.C.Velmurugan

BoS Chairperson

Dr. C. VELMURUGAN, M.E.,Ph.D.
Professor & Head
Department of Mechanical Engineering
Kumaraguru College of Technology
Coimbatore - 641 049.

Proof for Action Taken: Point 1: In the course U17MEI3201 Metal cutting and computer aided manufacturing the content CIM implementation and data communication was removed, and Group Technology and Computer Aided Process Planning was added. Also, the course code U17MEI3201 was changed to U18MEI3201.
Point :2 The number of experiments reduced to 9 by revising the experiments.

Semester III										
S.No.	Course code	Course Title	Course Mode	CT	L	T	P	J	C	Pre-requisite
1	U18MAT3101	Partial differential equations and transforms	Theory	BS	3	1	0	0	4	–
2	U18MEI3201	Metal Cutting and Computer Aided Manufacturing	Embedded-Theory & Lab	PC	3	0	2	0	4	–
3	U18MET3002	Engineering Mechanics	Theory	ES	3	0	0	0	3	–
4	U18MET3003	Engineering Thermodynamics	Theory	PC	3	0	0	0	3	–
5	U18MEI3004	Computer aided design	Theory	ES	3	0	0	0	3	–
6	U18MEI3205	Machine drawing	Embedded Theory and Practical	PC	2	0	2	0	3	–
7	U18INI3600	Engineering Clinic III	Project based course	ES	0	0	4	2	3	–
8	U18VEP3503	FAMILY VALUES (Mandatory)	Practical course	HE	0	0	2	0	0	–
								Total Credits	23	
								Total Contact Hours/week	28	

U18MEI3201	METAL CUTTING AND COMPUTERAIDED MANUFACTURING	L	T	P	J	C
		3	0	2	0	4

Course outcomes

After successful completion of the course, the student would be able to

- **CO 1** Apply the fundamentals of metal cutting and cutting tool materials
- **CO 2** Study the types of machine tools and working principles of machine tools
- **CO 3** Applyprinciples of surface integrity in finishing processes and study gear manufacturing techniques
- **CO 4** Apply the manufacturing activities inter relation with computers for plant operations
- **CO 5** Apply the concept of Group Technology in computer aided manufacturing
- **CO 6** Apply system modeling tools in CIM and the fundamental concepts of data communications

Pre-requisite: Nil

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak	
COs	**ProgrammeOutcomes (POs)**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S	S							S	S				S
CO2	M								S	S				S
CO3	S								S	S				S
CO4	M						M							S
CO5	M						M		M	M				S
CO6	M				M		M		M	M				S

Course Assessment methods:

DIRECT
1. Continuous Assessment Test I, II (Theory component) 2. Assignment; Group Presentation, Project 3. Demonstration etc (as applicable) (Theory component) 4. Pre/Post - Experiment Test/Viva; Experimental Report for each Experiment (lab Component) 5. Model Examination (lab component) 6.End Semester Examination (Theory and lab components)
INDIRECT
1. Course-end survey

THEORY OF METAL CUTTING **9 Hours**

Introduction to Metal Cutting Methods – Mechanics of Metal Cutting – Orthogonal – Oblique – Merchants' Circle Diagram – Details of Derivation – Chip Details – Heat Generation – Cutting Tool Life – Cutting Tool Nomenclature – Economics of tool life – Optimal cutting speed for productivity - Cutting tool Materials - Cutting fluids – Recent Developments and Applications - Dry Machining and High-Speed Machining

MACHINE TOOLS **8 Hours**

Introduction to Lathe – Shaper – Planning – Milling – Drilling – Boring – Grinding – Honing – Working Principles – Operations – Working Holding Devices.

SURFACE FINISHING PROCESSES AND GEAR MANUFACTURING **8 Hours**

Grinding Machines – Grinding wheel Specifications – Honing – Lapping –Burnishing – Super Finishing – Surface Integrity concepts – Gear Manufacturing Processes – Gear cutting – Gear Hobbing – Gear Shaping Machines – Manufacture of Spur – Helical – Bevel – Worm and Worm Wheel – Gear Finishing, Honing.

INTRODUCTION TO NUMERICAL CONTROL **7 Hours**

Introduction, programmed automation, Nomenclature, type and features of NC machine tools, Axes designation, point to point, straight and continuous control systems

INTRODUCTION TO COMPUTER INTEGRATED MANUFACTURING **7 Hours**

The meaning and origin of CIM- the changing manufacturing and management scene - External communication - islands of automation and software-dedicated and open systems- product related activities of a company- marketing engineering - production planning - plant operations - physical distribution- business and financial management.

GROUP TECHNOLOGY AND COMPUTER AIDED PROCESS PLANNING **7 Hours**

Role of Group Technology in CAD/CAM integration - part families - classification and coding – DCLASS, MICLASS and OPITZ coding systems-benefits of Group Technology Process planning - role of process planning in CAD/CAM integration - approaches to computer aided process planning -variant approach and generative approaches.

INTEGRATED LAB EXPERIMENTS:

1. Spur Gear cutting using Milling machine
2. Dove tail machining using shaper machine
3. Cylindrical grinding and Surface grinding on given workpiece
4. Facing, plain and step turning and taper turning.
5. Single start V-Thread cutting and knurling.
6. Boring and internal thread cutting.
7. Manual part programming (using G and M codes) in CNC Lathe. Machining operations include turning, facing, taper turning, and step turning (any two operations).
8. Machining operations include Linear and Circular interpolation, chamfering and grooving (any two operations).
9. Manual part programming (using G and M codes) in CNC Milling. Machining operations include Linear and Circular interpolation (contour motions).

Theory: 45 Tutorial: 0 Practical: 30 Project: 0 Total: 75 hours

REFERENCES:

1. Jain, R.K., and Gupta, S.C., "Production Technology", Khanna Publishers, New Delhi, 2004.
2. Sharma P.C., "A Text Book of Production Technology", S.Chand& Company Ltd., New Delhi,2010.
3. HajraChoudhry, S.K., and Bose, S.K., "Workshop Technology", Media Promoters and Publishers Pvt. Ltd., Bombay, 2004.
4. Mikell.P.Groover,"Automation, Production Systems and computer integrated manufacturing", Pearson Education,2007.
5. Radhakrishnan P, SubramanyanSandRaju V., "CAD/CAM/CIM",New Age International (P) Ltd, New Delhi, 2004.
6. Ranky, Paul G.,"Computer Integrated Manufacturing", Prentice Hall International, 2003.
7. David D.Bedworth, Mark R.Hendersan, Phillip M.Wolfe "Computer Integrated Design and Manufacturing", McGraw-Hill Inc, 2004.

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Department of Textile Technology

AY: 2018-19 -2 **Date: 15.04.2019**

Action taken report -Teacher Feedback

S.No	Analysis	Action taken report
1.	Medical Textile course to be renamed as Biopolymer and Medical Textiles	Medical Textile course renamed as Biopolymer and Medical Textiles Course code: U17TXE0010 Course Name: Bio Polymers and Medical Textiles
2.	Speciality textile production course can be included in elective	Included in elctive: Course Name:U17TXE0003 Course code: Manufacture of Specialty Yarns and Fabrics

Approved By,

Dr.J Srinivasan

BoS Chairman

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Department of Textile Technology

AY: 2018-19 -2 **Date: 15.04.2019**

Action taken report -Teacher Feedback

S.No	Analysis	Action taken report
1.	Medical Textile course to be renamed as Biopolymer and Medical Textiles	Medical Textile course renamed as Biopolymer and Medical Textiles Course code: U17TXE0010 Course Name: Bio Polymers and Medical Textiles
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Proof

Medical Textile course renamed as Biopolymer and Medical Textiles

Course code: U17TXE0010

Course Name: Bio Polymers and Medical Textiles

Programme Electives									
S.No	**Course code**	**Course Title**	**Course Mode**	**CT**	**L**	**T**	**P**	**J**	**C**
Fibres, Yarn & Fabric									
1	U17TXE0001	Manufactured Fiber Technology	Theory	PE	3	0	0	0	3
2	U17TXE0002	High Performance Fibers	Theory	PE	3	0	0	0	3
3	U17TXE0003	Manufacture of Specialty Yarns and Fabrics	Theory	PE	3	0	0	0	3
Processing & Garments									
4	U17TXE0004	Apparel Production Planning and Control	Theory	PE	3	0	0	0	3
5	U17TXE0005	Garment Processing	Theory	PE	3	0	0	0	3
6	U17TXE0006	Textile Marketing and Merchandising	Theory	PE	3	0	0	0	3
7	U17TXE0007	Clothing Science	Theory	PE	3	0	0	0	3
Technical Textiles									
8	U17TXE0008	Nano and smart materials in Textiles	Theory	PE	3	0	0	0	3
9	U17TXE0009	Textile Composites	Theory	PE	3	0	0	0	3
10	U17TXE0010	Bio Polymers and Medical Textiles	Theory	PE	3	0	0	0	3
Management & Entrepreneurship									
11	U17TXE0011	Textile Project Management and Finance	Theory	PE	3	0	0	0	3
12	U17TXE0012	Entrepreneurship Development in Textiles	Theory	PE	3	0	0	0	3
13	U17TXE0013	Textile Mill Management	Theory	PE	3	0	0	0	3
14	U17TXE0014	Industrial Engineering for Textile and Apparel Industry	Theory	PE	3	0	0	0	3

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Signature of BOS chairman, TXT

Included in elective:
Course Name:U17TXE0003
Course code: Manufacture of Specialty Yarns and Fabrics

U17TXE0003 MANUFACTURE OF SPECIALTY YARNS AND FABRICS

L	T	P	J	C
3	0	0	0	3

Course Outcomes (COs)

After successful completion of this course, the students should be able to

CO1: Understand the production and application of various specialty yarns.
CO2: Design and application of fancy yarns.
CO3: Understand the production and application of various specialty fabrics.
CO4: Understand industrial application of specialty fabrics.
CO5: Understand the Pile surfaced carpet weaves.
CO6: Develop various fancy yarn structures.

CO-POs & PSOs Mapping
(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	M												M	
CO2		M												
CO3	M												M	
CO4				M										
CO5					M									
CO6	M													

Course Assessment Methods

Direct	Indirect
1.Internal test I 2.Internal test II 3.Assignment/ Seminar/ Tutorial 4.End Semester Examination	1.Course end survey

MANUFACTURING ATTITUDES AND THE APPLICATIONS OF FANCY YARNS 9 Hours

Manufacturing attitudes and equipment, Applications for fancy yarns, Structures and formation of fancy yarns, The design and application of fancy yarns.

MANUFACTURING TECHNIQUES 9 Hours

Yarn production systems, elastomeric yarns, core spun yarn, bi component and bi constituent yarn, SIRO yarn.

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Signature of BOS chairman, TXT

NARROW FABRICS: **9 Hours**

Introduction –fibre and yarn types, fabrics. Preparation for narrow fabric production - winding, warping, sizing, looming. Woven narrow fabrics and their constructions – structure of narrow fabrics woven on shuttleless looms. Conventional shuttle looms, unconventional shuttle looms and shuttleless looms for narrow fabrics production.

SPECIAL FABRICS AND CARPETS **9 Hours**

Elasticated fabrics, zip - fastener tapes, curtain - heading tapes, ladder tapes, trimmings, braids, labels, nets, laces, flocked fabrics. Non-pile carpet weaves and their looms. Pile surfaced carpet weaves and their looms. Needle felt floor coverings.

INDUSTRIAL TAPES AND WEBBINGS **9 Hours**

Slide fastener tapes - Insulating tapes – Book binder's tapes – Labeling Tapes – Border Tapes – Elastic- Pleated lingerie ribbing. Manufacture of spindle drive webbing – Print webbings – Webbings for automobile safety belts

Theory 45 Hours	**Total 45 Hours**

REFERENCES:

1. Jarmila Svedova ," Industrial Textiles", Elsevier Science Publishing Co in, ISBN – 0444-98754-1, New york, 1990.
2. Alexander N G," Desighing Interior Environment", Mas court Brace Covanorich Inc, Newyork, 1996.
3. Crew A H and Arahamsen H, "Carpets: Back to Front", Textile Progress, Vol.19 No.3, The Textile Institute, Mancheste,1987.
4. Turner J P, " The production and properties of narrow fabrics", Textile Progress , Vol.8 No.4, The Textile Institute Manchester, 2002
5. Sabit Adanur, "Wellington Sears Handbook of Industrial Textiles", Technomic publishing company Inc., USA, 1995
6. R H Gong and R M Wright " Fancy yarns Their manufacture and application" Woodhead Publishing Ltd, 2002, ISBN 1 85573 577 6

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DEPARTMENT OF COMPUTER APPLICATIONS

AY: 2018-19 **Date: 15.04.2019**

ACTION TAKEN REPORT - TEACHERS

S.NO	ANALYSIS	ACTION TAKEN REPORT
1.	Subjects and syllabus for Semester III is too heavy.	Can be considered for next revision.
2.	Task based group assignment/projects can be given to students.	Implemented in • P18INI3600 Engineering Clinic –I
3.	Information Security can be moved to core subjects list, But BOS members felt that it can be in elective list.	It was included in elective titled P18CAE0002 - Information Security
4.	Students can be motivated to undergo certification courses like NPTEL, Course era etc. and can be given suitable credits.	Students are motivated to do NPTEL and other Certification Courses.

Prepared By,

BoS Coordinator

Approved By,

BoS Chairman

Proof for Action Taken 1 :

SEMESTER-III							
Course Code	**Course Title**	**Course Mode**	**L**	**T**	**P**	**J**	**C**
P18CAI3201	User Interface Design and Development	Embedded – Theory &Lab	3	0	2	0	4
P18CAT3102	Analysis of Algorithms	Theory	3	1	0	0	4
P18CAT3003	Data Mining and Visualization	Theory	3	0	0	0	3
P18MAI3201	Probability and Statistics for Data Analysis	Embedded – Theory &Lab	3	0	2	0	4
P18CAI3204	Programming with JAVA	Embedded – Theory &Lab	3	0	2	0	4
P18ENP3501	Professional Skills II	Lab	0	0	2	0	1
P18INI3600	Engineering Clinic –I	Embedded Lab& Project	0	0	4	2	3

Proof for Action Taken 2:

List of Program Electives

Code No.	Course Title	Course Type	L	T	P	J	C
P18CAE0001	Service Oriented Architecture	PE	3	0	0	0	3
P18CAE0002	Information Security	PE	3	0	0	0	3
P18CAE0003	Object Oriented Analysis and Design	PE	3	0	0	0	3
P18CAE0004	Game Development	PE	3	0	0	0	3
P18CAE0005	Software Project Management	PE	3	0	0	0	3
P18CAE0006	E- Commerce	PE	3	0	0	0	3
P18CAE0007	TCP/IPV6 Protocol Suite	PE	3	0	0	0	3
P18CAE0008	Wireless Networks	PE	3	0	0	0	3
P18CAE0009	Ethics in Computing	PE	3	0	0	0	3
P18CAE0010	Domain Analytics	PE	3	0	0	0	3
P18CAE0011	Artificial Intelligence	PE	3	0	0	0	3
P18CAE0012	Accounting and Financial Management	PE	3	0	0	0	3
P18CAE0013	Enterprise Resource Planning	PE	3	0	0	0	3
P18CAE0014	Managing Technical People	PE	3	0	0	0	3

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Department of Mechatronics Engineering

AY: 2018-19 **Date: (23.04.18)**

Action taken report -Faculty Feedback

S.No	Analysis	Action taken report
1.	Suggested to have case study in U17MCE0002 Condition monitoring	Implemented in the subject
2.	Regarding end semester project proper training can be given to the students by the industrial experts to make them capable to do U17MCP7701 Project in the industrial environment.	Industrial expert invited for guest lecture and training
3.	LYSPICE software to use in U17MCP2501 Electronic Devices and Circuits Laboratory	Software tool was used in lab experiment

Prepared By,

BoS Coordinator

Approved By,

BoS Chairman

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Department of Mechatronics Engineering

AY: 2018-19 **Date: (23.04.18)**

Action taken report -Faculty Feedback(Proof)

Proof 1:

VIBRATION AND NOISE MONITORING	**06 Hours**
Principles of Vibration Monitoring, Misalignment Detection, Eccentricity Detection, Cracked Shaft, Bowed and Bent Shaft, Unbalanced Shaft, Looseness, Rub, Bearing Defects, Faults in Fluid Machines, Acoustical Terminology, Noise Sources, Sound Fields, Noise Measurements, Noise Source Identification	
THERMOGRAPHY	**06 Hours**
Thermal Imaging Devices, Use of IR Camera, Industrial Applications of Thermography in Condition Monitoring	

Proof 3:

9. Voltage Regulator (Zener diode, Transistor series and shunt)
10. Half-wave and Full-wave Rectifier with and without filter.
11. Circuit design using software (Multisim, Pspice)
12. Printed Circuit Board (PCB) design and fabrication using (software) for simple circuits.