St. Xavier's Catholic College of Engineering (Autonomous), Chunkankadai, Nagercoil – 629003

Department of Electronics and Communication Engineering

Board of Studies Meeting Minutes # 03

Date: 21/12/2023
Time: 10.20 am – 1.40 pm
Venue: Hybrid Mode (Einstein Seminar Hall)

The third BoS meeting with University nominee for BoS of the department of ECE, SXCCE was conducted on 21/12/2023 at 10.20 am at Einstein Seminar Hall. All the faculty members of the department attended the meeting along with a university nominee, two expert members from outside the college, one representative from industry and one Postgraduate Meritorious Alumna. Dr. D. Jeraldin Auxillia /Prof/Department of ECE delivered the welcome address. Our Principal Dr.J.Maheswaran gave an introductory talk. Dr.S.Caroline, HOD Department of ECE presented the Curriculum and Syllabi of Semester V Core and Elective Courses for UG programme. Mrs.V.Femila Savio, Dr. C. Helen Sulochana, Dr.D.Jeraldin Auxillia, Dr.S.Absa and Dr.S.Mary Vasanthi presented the Syllabi of five Vertical courses respectively. Dr.C.Helen Sulochana/ Professor / ECE delivered the Vote of Thanks.

University Nominee for BoS
1. Dr.B.Sathyabama, Professor, Department of Electronics and Communication, Thiagarajar College of Engineering, Madurai-625015

Expert Members in the Subject from outside the college
1. Dr.E.S.Gopi, Associate Professor, Department of ECE, NIT, Trichy (ONLINE)
2. Dr.J.Sheeba Rani, Associate Professor, Department of Avionics, Indian Institute of Space Science and Technology (IIST), Trivandrum

Representative from Industry (ONLINE)
1.Dr.R.Solomon Roach, Senior Design Lead Engineer, Tessolve Semiconductor Pvt. Ltd., Chennai

Postgraduate Meritorius Alumnus
1.Mrs.A.Sahaya Shiny, Associate Tech Lead, CapeStart Software Pvt Ltd

Agenda for the Meeting

03.01. Confirmation of Second BoS meeting minutes held on 27/05/2023 and Decision/Action Taken report.
03.02. Discussion on the Suggestions / Recommendations offered by the members in the II Academic Council meeting and the II Governing Body meeting.
03.03. Discussion on the Suggestions / Recommendations offered by the members in the Syllabus Subcommittee & PAQIC meeting and Ratification of Fourth Semester Course outcomes.

03.04. Getting recommendation for approval for the Semester V Core and Vertical Courses detailed draft syllabi of UG Programme for Regulation 2022 with Teaching Strategies & Assessment Methods
03.05. Online NPTEL Courses
03.06. Hard and Soft Skills to be acquired by Students at the end of Programme
03.07. Rubrics for Industrial training
03.08. One Credit Courses
03.09. Other matters if any.

DISCUSSION

03.01. Confirmation of Second BoS meeting minutes held on 27/05/2023 and Decision/ Action taken report

The suggestions given by the BoS members and the action taken during the second BoS meeting was presented by the Head of the Department.

BOS Suggestions	Action Taken
B.E. ECE Semester III • Foundation of Data structures subject is mandatory for third semester.	C programming and data structures subject is included in syllabus.
• The syllabus of Soft skills and Coding I course need not be the same for all branches. The syllabus can be modified (for ECE and EEE common) on discussion with industrial experts. • If possible, Embedded C can be included in Soft Skills course.	Syllabus for Soft skills and Coding I course is modified for ECE and EEE students. Embedded C is included in Semester III of Soft Skills course.
B.E. ECE Semester IV • Include Machine learning concepts in the curriculum.	Planned for including in higher semesters. Included Machine Learning Techniques as Professional elective course
• Include Statistical Theory of Communication subject in the higher semesters.	Due to credit constraint, important topics of Statistical Theory of Communication subject will be included in Digital Communication syllabus (Semester VI).
• In Digital Communication, Baye's algorithm, Min Max technique, Bayesian method, Naïve method, Information theory and coding, Statistical signal processing, detection, MSME, Estimation topics should be included.	Since Digital Communication is included in Semester VI, all topics suggested by BoS members will be included.
• The syllabus of Soft skills and Coding II can be Programme specific.	Syllabus for Soft skills and Coding II course is modified as Programme Specific for ECE and EEE students.
• Check whether all communication related topics are included in the curriculum.	Analog, Digital, RF communication subjects are included as Core papers and Vertical 5 covers Communication papers (Wireless, Satellite, Optical, 4G/5G communication).

M.E. Applied Electronics • Open elective subject may be pure theoretical course. Check the curriculum template of Open elective.	Curriculum Template for Open Elective course is modified. (L T P C - 3 0 0 3)
• Any subject can be chosen as open elective. The prerequisite for choosing open elective must be clearly defined in the curriculum.	It is mentioned in the curriculum.
• Prepare the approved open elective list by collecting the list from all departments and approval of HoD.	Approved list is available.
• Consider PCB design as a skill development course instead of having it as a professional elective subject. Either reduce the lecture hours from 3 to 1 or change the syllabus with advanced topics based on existing credit.	Advanced topics (Electronic Design Automation - EDA Tools) are included in the syllabus and existing lecture hours and credits are retained.
• As Deep learning is a common subject for both Medical Electronics and Applied Electronics, suggestions given in Medical Electronics should be reflected in the curriculum.	Changes made in the Deep Learning syllabus are reflected in Applied Electronics detailed syllabus.
Need Updation • Advanced Digital Image Processing subject: o As Advanced Digital Image Processing syllabus contain only fundamental topics change the subject name to Digital Image processing. o Can include a reference book "Digital Image Processing with MATLAB" by Dr.E.S.Gopi in the Digital Image processing syllabus. o Texture feature based segmentation should be removed from second unit because texture description is in third unit. Unit 2 and 3 can be swapped. o Can include advanced topics like Computer Graphics basics, Video processing, 2D concepts, cost estimation, Image fusion, Graph imaging and basics relevant to Applied Electronics. • Change the subject name of Signal Integrity & high speed design to Digital High Speed Design. • A**dvanced Microprocessor and Microcontroller** o Instead of expanding the syllabus like data format addressing modes etc just give a generic name as Introduction to	Title of the subject is modified to Digital Image Processing. Reference book is included in the syllabus. Contents of Unit 2 and 3 are swapped. Image fusion is included in Unit 5. Subject name is modified to Digital High Speed Design. Changes are made in the curriculum

Microprocessor. Can limit the syllabus need not be detailed (Unit I) o Check whether the latest versions of reference books are available with same content.	and syllabi. Changes are made in the curriculum and syllabi.
M.E Communication Systems • In Image Processing subject o Syllabus is too vast. First and second unit overlapping topics can be removed. o Syllabus needs to be crisp. • In Radar Signal Processing subject o Include some hardware set up in Radar syllabus. Or • In Telecommunication System Modeling and Simulation, o Software Defined Radio (SDR) can be added in practical session. In practical subjects instead of using inbuilt function make the students to design from the scratch.	Overlapping topics are removed and syllabus is reduced. Since these two subjects are Elective IV with 4 credits, Software Defined Radio (SDR) experiments are incorporated in Telecommunication System Modeling and Simulation and carried out with design.
M.E Medical Electronics • Anna university representative suggested that 3D printing in Medicines subject can be changed as 3D printing for Medical Models or Applications. • In Medical Imaging systems and Radio therapy, concepts of Radio therapy should be included or can change the subject as Medical Imaging Systems. • In Pattern Recognition, include some advanced topics in unit V. In unit V one topic can be kept as flexible and the current trending topic can be added.	Name is changed to 3D printing in Medical Applications. The concepts of Radio therapy is included in Unit 4. Advanced topics are included in the syllabus and applications are included in Unit 5.
General Suggestions • Journal publications for PG students need not be mandatory. If they publish an article in a journal, it can be taken for awarding O grade in Project Phase II. • Regarding NPTEL course for PG, we should check whether they have undergone the same course in their UG. The course should not be a repetition of the courses learnt in UG. • NPTEL course can be made optional. • Follow a separate methodology for grading NPTEL and the credit transfer as the students are competing with outside people.	

DISCUSSION

- ✓ Clarification of University representative regarding Question paper setting – AU representative analyzed and checked both the Internal and End semester question papers and suggested that Internal question papers set by Internal faculty are good and meets the CL.
- ✓ Furthermore since we are Autonomous, faculties should be given freedom to set End semester Question papers.

03.02. Discussion on the Suggestions / Recommendations offered by the members in the II Academic Council meeting and the II Governing Body meeting.

General suggestions were offered by the members and there were No programme specific suggestions were given.

03.03. Discussion on the Suggestions / Recommendations offered by the members in the Syllabus Subcommittee & PAQIC meeting and Ratification of Fourth Semester Course outcomes.

Syllabus Sub Committee Meeting		
Discussion	**Approved COs**	**Discussion / Decision**
Analog Communication	CO3: Apply the concepts of Random Process to the design of Communication systems. CO4: Demonstrate the significance of noise considerations in communication systems. CO5: Identify the sampling and quantization concepts in modulation systems.	It was discussed to change the CO as CO3: Apply the concepts of Random Process in Communication systems. CO4: Demonstrate the significance of noise in communication systems. CO5: Explain the sampling and quantization concepts in modulation systems
Analog Communication Lab	-	Discussed to change the Order of CO's
Linear Integrated Circuits	CO5: Construct special function ICs and waveform generators	CO5: Construct waveform generators and voltage regulators using Special Function ICs
Digital Signal Processing	CO2: Develop IIR and FIR filters. CO3: Identify the effects of finite precision representation on digital filters. CO4: Analyze multirate filters. CO5: Examine adaptive filters appropriately in communication systems.	Course Outcome - Design IIR and FIR filter redefined as CO2: Design IIR filter CO3: Design FIR filter CO4: Outline the effects of finite precision representation on digital filters CO5: Illustrate the concept of adaptive filters and DSP applications
Electromagnetic Fields	CO2: Identify the characteristics of Electrostatic field.	CO2: Describe the characteristics of Electrostatic field.

	CO3: Choose the concepts of Electric field in material space and solve the boundary condition. CO4: Explain the concepts and characteristics of magneto static field in material space and solve boundary conditions. CO5: Demonstrate the significance of time varying field.	CO3: Explain the characteristics of magneto static field. CO4: Outline the significance of time varying field. CO5: Summarize the behaviour of the propagation of EM waves.
Control Systems	State variable analysis of digital control system	Last topic of Unit 5 can be removed

PAQIC Meeting		
Agenda	**Suggestions from Members**	**Action Taken**
Target for academic year 2023-2024	• For the previous target of 2.3, only POs (PO1, PO2, PO10) were attained, but the other POs and PSOs were not attained in the year 2022-2023. • As most of the POs and PSOs are not attained, the target for the academic year 2023-24 is again set as **2.3**.	Special programmes or courses will be conducted to improve the target and attainment.
PO attainment	• To help improve the attainment of POs, include topics related to those POs which otherwise cannot be mapped to COs. This may help to improve the attainment of POs.	
NPTEL Courses	• NPTEL courses may be suggested to students to the maximum as it may improve their self-learning capability.	NPTEL Online courses upto a maximum of two can be studied by students and credit transfer is possible.
Value added courses	• Courses from MoU signed companies, Environment and Sustainability programmes and Ethical programmes may be conducted as Value added courses.	• Courses from MoU signed companies (ChekInTek, Knowsys Technologies etc) were organized to students as Value Added Courses. • So far Environment and Sustainability programmes and Ethical programmes were not conducted as Value added courses – will plan in future.
Teaching Methodologies and Assessment	• Procedures like interactive videos, lectures from industry experts, self paced teaching and learning methods	• Activity based teaching methods are conducted to students but they are not

	can be encouraged. This will help to get live sessions from industries and societies. • Activity based assessment with proper evaluation procedure, particularly for core subjects may be considered. • E-content/video generation-based assessment can also be used.	considered as assessment tools with proper evaluation procedure. A common assessment procedure will be followed based on the instructions from Dean Academics and Principal. • E-content/video generation-based assessment is not followed. If possible will be conducted by Course in charges.

03.04. Getting recommendation for approval for the Semester V Core and Vertical Courses detailed draft syllabi of UG Programme for Regulation 2022 with Teaching Strategies & Assessment Methods

SEMESTER I

SL. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY COURSES								
1.	MA22101	Matrices and Calculus	BSC	3	1	0	4	4
2.	PH22101	Engineering Physics	BSC	3	0	0	3	3
3.	CH22101	Engineering Chemistry	BSC	3	0	0	3	3
4.	CS22101	Problem Solving and Python Programming	ESC	3	0	0	3	3
THEORY COURSES WITH PRACTICAL COMPONENT								
5.	EN22101	Communicative English	HSMC	2	0	2	4	3
PRACTICAL COURSES								
6.	BS22101	Physics and Chemistry Laboratory	BSC	0	0	4	4	2
7.	CS22102	Python Programming Laboratory	ESC	0	0	4	4	2
MANDATORY COURSES								
8.	IP22101	Induction Programme	-	-	-	-	-	0
9.	HS22101	Higher Order Thinking	MC	1	0	0	1	1

10.	HS22102	Universal Human Values : Understanding Harmony and Ethical Human Conduct	HSMC	2	0	0	2	2
TOTAL				**17**	**1**	**10**	**28**	**23**

SEMESTER II

SL. NO.	COURSE CODE	COURSE TITLE	CATE - GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY COURSES								
1.	MA22201	Statistics and Numerical Methods	BSC	3	1	0	4	4
2.	EE22201	Basic Electrical and Instrumentation Engineering	ESC	3	0	0	3	3
3.	EC22201	Electric Circuits and Electron Devices	ESC	3	0	0	3	3
4.	ME22201	Engineering Graphics	ESC	2	2	0	4	3
THEORY COURSES WITH PRACTICAL COMPONENT								
5.	EN22201	Technical English	HSMC	2	0	2	4	3
6.	PH22202	Physics for Electronics Engineering	BSC	2	0	2	4	3
7.	CH22201	Environment and Sustainability	BSC	2	0	2	4	3
PRACTICAL COURSES								
8.	EC22202	Circuits and Devices Laboratory	ESC	0	0	4	4	2
9.	ES22203	Engineering Practices Laboratory	ESC	0	0	4	4	2
MANDATORY COURSES								
10.	GE3152	Heritage of Tamil	MC	1	0	0	1	1
TOTAL				**18**	**1**	**16**	**35**	**27**

SEMESTER III

SL. NO.	COURSE CODE	COURSE TITLE	CATE - GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY COURSES								
1.	MA22303	Linear Algebra and Transforms	BSC	3	1	0	4	4
2.	EC22301	Electronic Circuits	PCC	3	0	0	3	3

3.	EC22302	Signals and Systems	PCC	3	0	0	3	3
4.	EC22303	C Programming and Data Structures	PCC	3	0	0	3	3
THEORY COURSES WITH PRACTICAL COMPONENT								
5.	EC22304	Digital Principles and System Design	PCC	3	0	2	5	4
PRACTICAL COURSES								
6.	EC22305	Electronic Circuits Laboratory	PCC	0	0	4	4	2
7.	EC22306	C Programming and Data Structures Laboratory	PCC	0	0	4	4	2
EMPLOYABILITY ENHANCEMENT COURSES								
8.	SD22302	Coding Skills and SoftSkills Training – Phase I	EEC	0	0	4	4	2
MANDATORY COURSES								
9.	AC22301	Constitution of India	AC	2	0	0	2	0
10.	HS22301	Value Education-I	MC	1	0	0	1	0
11.	GE3252	Tamils and Technology	MC	1	0	0	1	1
TOTAL				**19**	**1**	**14**	**34**	**24**

SEMESTER IV

SL. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY COURSES								
1.	EC22401	Analog Communication	PCC	3	0	0	3	3
2.	EC22402	Electromagnetic Fields	PCC	3	0	0	3	3
3.	EC22403	Control Systems Engineering	PCC	3	0	0	3	3
4.	EC22404	Linear Integrated Circuits	PCC	3	0	0	3	3
THEORY COURSES WITH PRACTICAL COMPONENT								
5.	EC22405	Digital Signal Processing	PCC	3	0	2	5	4
PRACTICAL COURSES								
6.	EC22406	Analog Communication Laboratory	PCC	0	0	4	4	2
7.	EC22407	Linear Integrated Circuits Laboratory	PCC	0	0	4	4	2

EMPLOYABILITY ENHANCEMENT COURSES								
8.	SD22402	Coding Skills and SoftSkills Training – Phase II	EEC	0	0	4	4	2
MANDATORY COURSES								
9.	AC22401	Industrial Safety Engineering	AC	3	0	0	3	0
TOTAL				**18**	**0**	**14**	**32**	**22**

SEMESTER V

SL. NO.	**COURSE CODE**	**COURSE TITLE**	**CATE - GORY**	**PERIODS PER WEEK**			**TOTAL CONTACT PERIODS**	**CREDITS**
				L	**T**	**P**		
THEORY COURSES								
1.		Professional Elective I	PEC	3	0	0	3	3
2.		Professional Elective II	PEC	3	0	0	3	3
THEORY COURSES WITH PRACTICAL COMPONENT								
3.	EC22501	Networks and Security	PCC	2	0	2	4	3
4.	EC22502	VLSI Design	PCC	2	0	2	4	3
5.	EC22503	Microprocessor and Microcontroller	PCC	2	0	2	4	3
EMPLOYABILITY ENHANCEMENT COURSES								
6.	EC22504	Technical Seminar	EEC	0	0	2	2	1
7.	EC22505	In plant / Industrial Training	EEC	-	-	-	-	1
8.	SD22501	Soft Skills & Coding III	EEC	0	0	4	4	2
MANDATORY COURSES								
9.	AC22501	Entrepreneurship Development	AC	2	0	0	2	0
10.	HS22501	Value Education-II	MC	1	0	0	1	0
TOTAL				**15**	**0**	**12**	**27**	**19**

SEMESTER VI

SL. NO.	**COURSE CODE**	**COURSE TITLE**	**CATE - GORY**	**PERIODS PER WEEK**			**TOTAL CONTACT PERIODS**	**CREDITS**
				L	**T**	**P**		
THEORY COURSES								
1.	MS22601	Professional Ethics	HSMC	3	0	0	3	3
2.		Open Elective – I	OEC	3	0	0	3	3
3.		Professional Elective	PEC	3	0	0	3	3

		III						
4.		Professional Elective IV	PEC	3	0	0	3	3
THEORY COURSES WITH PRACTICAL COMPONENT								
5.	EC22601	Digital Communication	PCC	3	0	2	5	4
6.	EC22602	Embedded Systems and IOT Design	PCC	2	0	2	4	3
EMPLOYABILITY ENHANCEMENT COURSES								
7.	SD22601	Quantitative Aptitude & Coding I	EEC	0	0	4	4	2
TOTAL				**17**	**0**	**8**	**25**	**21**

SEMESTER VII

SL. NO.	**COURSE CODE**	**COURSE TITLE**	**CATE - GORY**	**PERIODS PER WEEK**			**TOTAL CONTACT PERIODS**	**CREDITS**
				L	**T**	**P**		
THEORY COURSES								
1.	MS22701	Principles of Management	HSMC	3	0	0	3	3
2.		Professional Elective V	PEC	3	0	0	3	3
3.		Professional Elective VI	PEC	3	0	0	3	3
4.		Open Elective – II	OEC	3	0	0	3	3
5.		Open Elective – III	OEC	3	0	0	3	3
THEORY COURSES WITH PRACTICAL COMPONENT								
6.	EC22701	RF Communication	PCC	2	0	2	4	3
EMPLOYABILITY ENHANCEMENT COURSES								
7.	SD22701	Quantitative Aptitude & Coding II	EEC	0	0	4	4	2
8.	EC22702	Product development Lab/ Mini project work	EEC	0	0	6	6	3
TOTAL				**17**	**0**	**12**	**29**	**23**

SEMESTER VIII

SL. NO.	**COURSE CODE**	**COURSE TITLE**	**CATE - GORY**	**PERIODS PER WEEK**			**TOTAL CONTACT PERIODS**	**CREDITS**
				L	**T**	**P**		
EMPLOYABILITY ENHANCEMENT COURSES								
1.	EC22801	Internship/ Project Work	EEC	0	0	12	12	8

TOTAL	0	0	12	12	8

TOTAL CREDITS: 167

SUMMARY

B.E. Electronics and Communication Engineering											
S.No	Subject Area	Credits per Semester								Total Credits	AICTE
		I	II	III	IV	V	VI	VII	VIII		
1	HSMC	5	3				3	3		14	15
2	BSC	12	10	4						26	25
3	ESC	5	13							18	24
4	PCC			17	20	9	7	3		56	48
5	PEC					6	6	6		18	18
6	OEC						3	6		9	18
7	EEC			2	2	4	2	5	8	23	15
8	MC	1	1	1		0				3	-
9	AC			x	x	x				x	0
Total		23	27	24	22	19	21	23	8	167	163

PROFESSIONAL ELECTIVE COURSES

LIST OF IDENTIFIED VERTICALS	
Vertical 1	VLSI DESIGN AND TECHNOLOGY
Vertical 2	IMAGE AND SIGNAL PROCESSING
Vertical 3	HEALTHCARE DEVICES AND TECHNOLOGY
Vertical 4	IOT AND ITS APPLICATIONS
Vertical 5	WIRELESS AND SPACE TECHNOLOGIES

LIST OF SUBJECTS OFFERED BY ECE TO OTHER DEPARTMENT STUDENTS

OPEN ELECTIVE – I

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	EC22681	Robotics	PCC	3	0	0	3	3
2	EC22682	Medical Instrumentation	PCC	3	0	0	3	3

OPEN ELECTIVE – II

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		

1	EC22781	Biometric Technology	PCC	3	0	0	3	3
2	EC22782	Mobile App Development	PCC	3	0	0	3	3

OPEN ELECTIVE – III

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	EC22783	PCB Design and Fabrication	PCC	3	0	0	3	3
2	EC22784	Consumer Electronics	PCC	3	0	0	3	3

SYLLABUS

03.05. Online NPTEL Courses

LIST OF IDENTIFIED NPTEL COURSES		
Vertical 1	VLSI DESIGN AND TECHNOLOGY	1. Analog IC design 2. Design and analysis of VLSI subsystems 3. Digital Design with Verilog 4. Digital IC design 5. VLSI physical design with timing analysis
Vertical 2	IMAGE AND SIGNAL PROCESSING	1. Biomedical Signal Processing 2. Digital Image Processing 3. Image Signal Processing 4. Computer Vision and Image Processing - Fundamentals and Applications 5. Introduction to Machine Learning
Vertical 3	HEALTHCARE DEVICES AND TECHNOLOGY	-
Vertical 4	IOT AND ITS APPLICATIONS	1. Embedded Sensing, Actuation and Interfacing Systems 2. Embedded Systems Design
Vertical 5	WIRELESS AND SPACE TECHNOLOGIES	1. Optical Wireless Communications for Beyond 5G Networks and IoT 2. Digital Communication using GNU Radio

Credit Transfer - NPTEL Course undergone by the Student and the Credits earned for credit transfer

Name of the Student	Register Number	Class & Section	NPTEL Course	Duration of the course	Credits	Status
JOHIN J N	962221106060	III ECE B	Physics of Renewable Energy Systems	12	3	67% Elite
REGIN V	962221106087	III ECE B	Physics of Renewable Energy Systems	12	3	56%
STEPHIN SAMUVEL S	962221106104	III ECE B	Physics of Renewable Energy Systems	12	3	47%
KRISHNA	962221106067	III ECE B	Physics of Renewable Energy Systems	12	3	50%
JOSHUA R S	962221106063	III ECE B	Physics of Renewable Energy Systems	12	3	60% Elite

V M SACHIDHANANDHA PRABHU	962221106089	III ECE B	Physics of Renewable Energy Systems	12	3	78% Elite - Silver
MOHAMED SHAMEEM S	962221106074	III ECE B	Physics of Renewable Energy Systems	12	3	60% Elite

03.06. Hard and Soft Skills to be acquired by Students at the end of Programme

TECHNICAL & SOFT SKILLS

SOFT SKILLS	TECHNICAL SKILLS	Strategies for Developing Skills
Communication Skills • Active listening skills • Technical Writing skills • Presentation skills • Non-verbal communication skills • Conflict resolving • Confidence building Teamwork and Project Collaboration • Strategic Planning • Executing • Managing Problem Solving Skills: • Critical Thinking • Troubleshooting • Innovation • Creativity skills • Research skills • Questioning • Reasoning • Ethical Decision-Making Organizing Skills • Time management • Goal-setting • Planning • Prioritization Emotional Intelligence	• Design Skill • Programming Skill • Testing Skill • Problem Solving Skill • Teaching Skill • Presentation Skill Programming Skills • C,C++, Python, MATLAB programming • Developing software projects • Implementing algorithms • Analyzing simulation results Basic Electronics • Hardware knowledge • Critical thinking skill • Problem solving skill • Testing skills • Communication skills Circuit Design • Design • Development • Test • Integration • Validation Electronic Circuits • Designing / Building circuits • Debugging systems • Explaining complex concepts • Analyzing circuits • Creating schematics • Simulating circuits	✓ Experiential Learning ✓ Role Play ✓ Team Work ✓ Case Studies ✓ Extra-Curricular Activities ✓ Individual Seminar ✓ Group Discussion ✓ Industrial Visit ✓ Field Visit ✓ ELECTROS Association ✓ Professional and Nonprofessional cell activities ✓ Quiz ✓ Competitions ✓ Internship ✓ Mini / Major projects ✓ Symposia ✓ Paper/ Poster Presentation ✓ Participation in Conferences ✓ Publications ✓ One-minute minute presentation ✓ Online Certification Courses (NPTEL/ SWAYAM) ✓ (Scheduled / Self-paced)

• Emotion control • Motivation • Self-direction • Lifelong learning Independent skills • Personal care • Clothing care • Time management • Managing emotions • Managing stress • Self awareness Presentation Skills • Body Language • Audience Engagement • Confidence • Use Visuals • Story Telling Creativity Skills • Problem Solving • Analysis • Lateral thinking • Creative writing • Imagination • Visual layouts • Mind mapping Networking Skills • Public Speaking • Active listening • Building relationship • Emailing skills Personality Development Skills • Body language • Etiquettes and manners • Good attitude • Psychological stability • Presence of mind • Smart Leadership Skills • Co-ordinating	• Building prototypes • Troubleshooting issues • Circuit testing VLSI • Designing optimum circuitry with less power • Optimizing circuits • Fabricating circuits • Contributing to research • Industry specific tools and technologies • Digital design knowledge • Physical designing – Digital, Verilog HDL, Timing analysis, Perl scripting • Verification – Digital, Verilog, System Verilog, Testbench for various design • DfT – Digital, Verilog HDL,DfT concepts, Perl, Python Embedded Systems • Understanding of digital and analog circuits • Understanding of Operating systems & RTOS • Understanding architrecture of various controllers • Designing and developing applications for specific requirements • Establishing communication between different components of the system • Debugging and testing • Low level programming • Assembly level programming • interface with peripherals • multiprocessor designing • Continuous learning	

• Interpersonal relationship • Team building • Conflict resolution • Rapport building Time Management Skills • Allocating work • Focus • Goal setting • Planning • Scheduling • Prioritization	• Troubleshoot • Designing and Developing real time applications/ Home automation Networks / Communication • Identifying required routing protocols for Networks • Design and development of 4G / 5G systems • Analyzing features in the signal Biomedical – algorithm development for disease diagnosis	

03.07. Rubrics for Industrial training

Criteria/ Recommended Scores	**Excellent (5)**	**Good (4)**	**Average (2)**	**Poor (1)**	**PO's**
Introduction of the given topic **Explanation**	In-depth knowledge about the topic Main idea is focused and supported with detailed information Complete explanation with illustrations/ examples	Comprehension of the topic Main idea is clear and supported with general information Partial explanation with example/ illustrations	Adequate knowledge of the topic Main idea is fairly clear and supported with limited information Partial explanation with no illustration/ examples	Inadequate knowledge of the topic Main idea is not clear and random collection of information No clear explanation. Only few relevant statements	PO1, 2, 3
Usage of latest application	Latest applications are used	Moderate Usage of new technology	Slightly Outdated	No latest applications used	PO5

Communication Skill **Interactive Skills** **1. Body language** **2. Eye contact** **3. Voice**	Exemplary communicative skill Exemplary body language, eye contact, loud voice	Very good communicative skill. Very good body language, eye contact, voice	Moderate communicative skill Moderate language and confidence level, satisfactory eye contact , voice	Poor communicative skill Poor body language, rarely maintain eye contact and audible voice	PO10
Feedback - Level of confidence in answering, clearing doubts	Exemplary confidence level in clearing doubts with example	Very good confidence level and able to clear doubts	Moderate confidence level and able to clear double with less clarity	Demonstrate poor confidence level not able to clear doubts	PO12
Completion and meeting the requirements	Requirements anddeadlines are met completely	Requirements and deadlines are met with slight deviation	Only few requirements and deadlines are met	Requirements and deadlines are not met	PO8,9

03.08. One Credit Courses

One Credit Course (II years)
on
MATLAB Programming

Course Description **Credit: 01**

The course provides basic introduction to the MATLAB computing environment and is scheduled for beginning users to work on with signal and image processing basics and applications. It is designed to give students a basic understanding of MATLAB, including a detailed insight analysis of signal and image processing applications. No prior programming experience or knowledge of MATLAB is assumed. Concepts covered include basics of MATLAB programming environment, designing and implementing signal and image processing application using MATLAB code.

Objective

- To enhance programming knowledge with MATLAB software.
- To provide an insight programming experience in signal and image processing environment.
- To introduce real time application solving scientific problem in signal and image processing environment.

Module 1 Fundamentals of MATLAB **6**

Getting started with MATLAB, Mathematical functions, Basic plotting, Matrix generation, Array and linear equations, Introduction to programming in MATLAB.

Module 2 Basics of Signal Processing **6**

Getting started with DSP tool box, Signal generation, Transforms and spectral analysis, Filter design.

Module 3 Real time applications simulation of Signal Processing **6**

Analog and digital modulation schemes, Classification and Regression analysis. Classify patterns with neural network.

Module 4 Basics of Image Processing **6**

Importing and exporting images, Converting between image types, Adjusting the contrast, Detecting edges and shapes, Objects Segmentation based on color and texture, Modifying objects shape using morphological operations, Detecting, extracting, and matching image features, Reducing noise with special filters.

Module 5 Real time applications simulation of Image Processing 6

Image enhancement, Image filtering, Feature extraction, Image segmentation.

Course Outcome:

After the completion of the course students will be able to

1. Understand the basic of MATLAB programming software
2. Summarize the features of signal and image processing in MATLAB environment
3. Analyze and develop real time applications in signal and image processing fields using MATLAB

Total : 30 periods

One Credit Course (III years)

on

Advanced Automation with Internet of Things (IoT)

Objective of the Course: Credit: 01

This Course focuses on hands - on IoT concepts such as sensing, actuation and communication. It covers the development of Internet of Things (IoT) prototypes including devices for sensing, actuation, processing, and communication to develop skills and experiences. The Internet of Things (IoT) is the next wave, world is going to witness. Today we live in an era of connected devices where the future is of connected things.

Learning Outcome:

After the completion of the course, the students will be able design some IoT based prototypes.

Duration of the Course: 30 hours

Module 1 – IoT Introduction

- Concepts and Definitions of The Internet of Things (IoT)
- History of IoT
- Requirements, Functionalists, and structure of IoT
- IoT enabling technologies
- IoT Architecture
- The major component of IoT (Hardware & Software)
- IoT services and applications

Module 2 – IoT Data Acquisition & Platforms

- Software simulation - Tinkercad
- Micro Controllers (Arduino uno/Nodemcu, Rasberry-Pi)
    - Setup the Arduino IDE, Writing Arduino Software
    - Basics of Embedded C programming for Arduino
    - Interfacing LED, LCD, Sensors & Actuators with Arduino

Module 3 – IoT Data Analytics & Visualization

- Cloud Platforms for IoT
- Cloud services -- SaaS, PaaS, IaaS
- Cloud providers & offerings
- Analysis of data on cloud
- Visualization and interpretation of Data

Module 4 – IoT Data Storage & Retrieval

- Overview and Role of Storage in Cloud / Server
- Databases Connectivity with IOT and uses
- Case Study over Cloud Services

Module 5 – IoT Case Studies

- Deploy with IoT Applications (Web, Mobile, Device)
- Case studies over various clouds
- Controlling Home Appliances from any part of the World
- Case study with Cloud Server

One Credit Course (IV years)
on
3D Modeling in Blender & 3D Printing

Objective of the Course: **Credit: 01**

Through hands-on learning, the students will develop skills in 3D modeling using Blender and gain an understanding of the entire process, from designing to printing. By the end of the session, participants will be able to create their own 3D models and confidently prepare them for 3D printing. This session aims to provide practical knowledge and empower participants to explore the exciting world of 3D modelling and printing.

Learning Outcome:

After the completion of the course, students will develop proficiency in 3D modeling in Blender, Tinkercad and successfully 3D print their own creations.

Duration of the Course: 30 hours

Module 1: Introduction to 3D Modeling (5P)

Tools: Blender and Tinkercad

Topics:

- Understanding 3D modeling concepts.
- Overview of Blender and Tinkercad interfaces.
- Basic tools and navigation in Blender and Tinkercad.
- Hands-on practice with simple 3D shapes and objects.

Module 2: Advanced 3D Modeling (5P)

Tool: Blender

Topics:

- Exploring advanced modeling techniques in Blender.
- Creating intricate shapes and structures.
- Introduction to modifiers, sculpting, and texture mapping.
- Building complex 3D models for various purposes.

Module 3: Introduction to Tinkercad (5P)

Tool: Tinkercad

Topics:

- Getting started with Tinkercad's user-friendly interface.
- Designing basic 3D models using Tinkercad's building blocks.
- Combining shapes and manipulating objects in Tinkercad.

- Practical exercises to reinforce Tinkercad skills.

Module 4: Designing Functional 3D Models (5P)

Tools: Blender and Tinkercad

Topics:

- Creating practical 3D models for real-world applications.
- Customizing designs for specific purposes (e.g., prototypes, functional parts).
- Incorporating design principles for usability and functionality.
- Hands-on projects to design and refine functional 3D models.

Module 5: Exploring 3D Printing Materials and Techniques (5 P)

Tools: Cura

Topics:

- Understanding various 3D printing materials (e.g., PLA, ABS, PETG).
- Selecting the right material for specific projects.
- Exploring different 3D printing techniques (e.g., Fused Deposition Modeling, Stereolithography).
- Experimenting with advanced printing settings in Cura.

Module 6: 3D Printing Workflow (5 P)

Tool: Cura

Topics:

- Understanding 3D printing technology and its applications.
- Slicing 3D models using Cura and generating G-code.
- Types of 3D printers and their limitations.
- Troubleshooting common issues during the printing process.

DISCUSSION

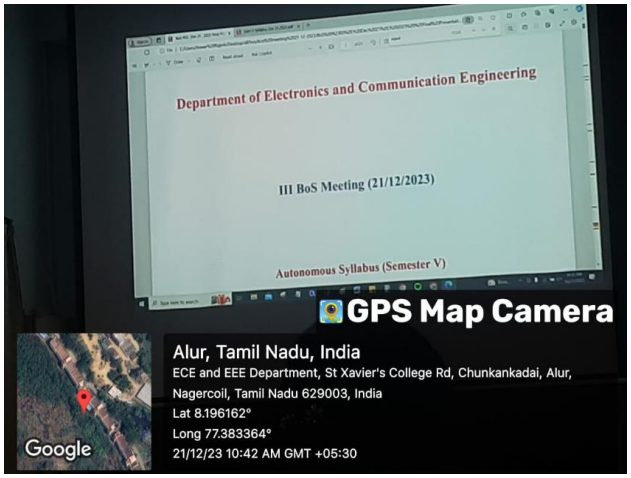
Suggestions given by BOS members	Action Taken
• By seeing the in depth concept and question, fix the COs	Corrections are made in the COs.
• After the examination, we have to verify whether the POs are attained or not. If not, through COs and/or Value Added Courses and NPTEL courses attain the required POs.	It will be verified and based on PO attainment, Value Added Courses and NPTEL courses will be planned.
• For TCPC course, atleast 4 credits (L T P C – 3 0 2 5) have to be allotted.	If the contact period is 5 and credit is 4, then the total credits would be increased to around 170. As per AICTE, the total credit is 163. Total credits mentioned in Anna University for ECE is 162. The total credit in SXCCE is 167.
• In Part B and Part C of question paper, either or choice questions should be in	It is practiced.

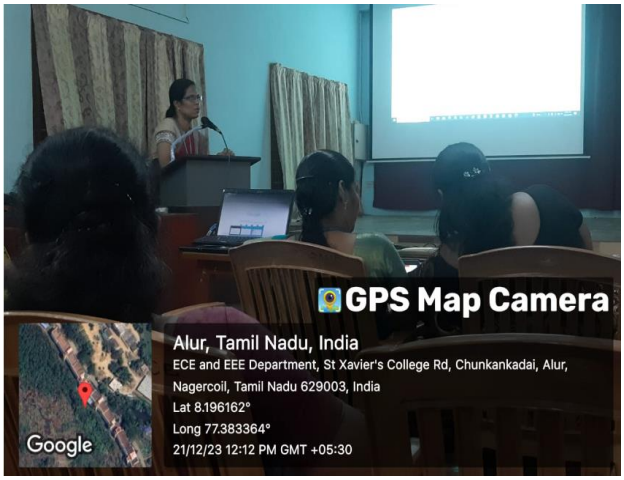
the same Cognitive Level.	
• EC22781 Robotics subject (Open Elective) should be renamed. Since it is the combination of Electronics and Mechanical fields.	EC22781 subject is renamed as Robotic Process Automation.
• For the subject EC22782 Medical Instrumentation, specify the prerequisite needed.	Prerequisite required will be specified once the syllabus is framed (OE – Sixth Semester).
• New/ Latest edition of Textbooks should be added for all courses.	Included in syllabus
• In VLSI design practical course, give the specific name as Implementation on FPGA instead of Xilinx /Altera. Implementation using Xilinx need not be specified.	Modified in the syllabus.
• Mention the names of Virtual lab (IIT/NIT) in the assessment methods.	Will be included by the respective course in charges.
• Specify the topics for assessment methods while preparing course plan.	Will be specified by the concerned course in charges in the course plan.
• For VLSI Design subject, include Mini Project as assessment method.	Mentioned in the syllabus.
• Assessment method need not be included in syllabus but can be included in course plan by the course instructor.	As per the instructions given will follow that.
• Instead of making students select any area for technical seminar presentation, some specific domain areas related to the core field can be given to students.	Will be followed for Technical seminar
• Instead of specifying NPTEL course name, suggest the domain area for the Vertical courses. • For NPTEL credit transfer, students must get at least Elite credit in NPTEL exam. • Regarding the credit transfer, check whether the students satisfied the specified strategies.	Regarding NPTEL credit transfer suggestions given as per Anna University guidelines and common guidelines framed from college will be followed.
• For DSP Processor, instead of TM3205xx series use TMC320C645 series and Da Vinci Processor.	Syllabus is modified as per the suggestion given.
• As per the suggestion, Machine Learning subject in Vertical 2 can be offered as Open elective course for other department students.	Will offer this course as Open Elective for other department students.

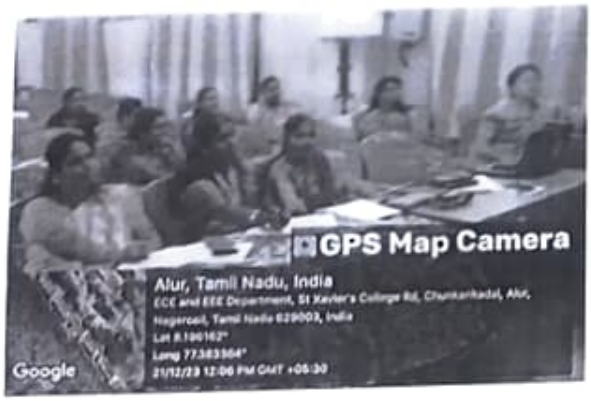
• Adaptive Method of Signal Processing topic can be included in Unit2 of Wearable Devices.	Included in the syllabus.
• Rename the Vertical 4 title: Trends in Embedded and IOT (Since it is general make it to more specific).	Vertical renamed as IOT and its Applications
• If possible, include Signal processing concepts in Wireless and Space Technologies vertical.	It is included.

03.09. Other matters if any

- ✓ For the final years, Consumer Electronics can be given as Value added course.
- ✓ With regard to VLSI and Embedded subject, students can be made to learn any industry specific software tools.
- ✓ For a two week Internship / Industry training, the rubrics framed can be modified.
- ✓ COs and CLs to be once again checked before publication of syllabus in website.
- ✓ Regarding the skill set, introduce a Design Thinking Course for local needs. Start from third semester, split the students in a team, ask them to visit the local community needs. Based on the community needs, conduct some brainstorming sessions and come up with different solutions for the same problem. Complete the writings during fourth semester. Start the implementation in the fifth semester. Complete the prototype model in the sixth semester. During seventh semester, make them apply for patent or fund for their project.
- ✓ No issues in the course contents.
- ✓ For the End semester examination, we have the Table of Specification with marks and cognitive levels. Both the End semester exam pattern question and the Internal Assessment Test question pattern should be similar.
- ✓ After the exam, one senior faculty should verify the CO-PO mapping and attainment.







Dr.B.Sathyabama
(AU Nominee)

Dr.E.S.Gopi
(Subject Expert)

Dr.J.Sheeba Rani
(Subject Expert)

Dr.R.Solomon Roach
(Industry Representative)

Dr. J.Maheswaran
(Principal/ SXCCE)

Mrs.A.Sahaya Shiny
(Alumna)

Dr.S.Caroline
(HoD/ SXCCE)

Dr.R.P.Anto Kumar
(Dean Academics/ SXCCE)