



Program: Digital Electronics		
Course Title: Automotive Electronics		Course Code: 17EDEC708
L-T-P: 3-0-1	Credits: 4	Contact Hours: 5
ISA Marks: 50+100	ESA Marks: 50	Total Marks: 200
Teaching Hours: 40	Examination Duration: 3 hrs	
<p>Chapter No. 1. Automotive Fundamentals Overview Introduction to Automotive Industry and Modern Automotive Systems Vehicle classifications and specifications need for electronics in automobiles, Application areas of electronics in the automobiles Four Stroke Cycle, Engine Control, Ignition System, Spark plug, Spark pulse generation, Ignition Timing, Drive Train, Transmission, Brakes, Steering System.</p> <p>Chapter No. 2. Sensors and Actuators Oxygen (O2/EGO) Sensors, Throttle Position Sensor (TPS), Engine Crankshaft Angular Position (CKP) Sensor, Magnetic Reluctance Position Sensor, Engine Speed Sensor, Ignition Timing Sensor, Hall effect Position Sensor, Optical Crankshaft Position Sensor, Manifold Absolute Pressure (MAP) Sensor Strain gauge, Engine Coolant Temperature (ECT) Sensor, Knock Sensor, Throttle angle sensor, Fuel Injector Actuator, Ignition Actuator</p> <p>Chapter No. 3. Electronic Engine Control Engine parameters, variables, Engine Performance terms, Electronic Fuel Control System, Electronic Ignition control, Idle speed control, EGR Control</p> <p>Chapter No. 4. Vehicle Motion Control and Safety Systems Cruise Control, Antilock Brake System (ABS), Electronic Steering Control, Power Steering, Traction Control, Electronic Stability Program.</p> <p>Chapter No:5. Automotive communication protocols Overview of Automotive communication protocols : CAN, LIN .</p> <p>Chapter No. 6. Advanced Driver Assistance Systems (ADAS) Lane Departure Warning, Collision Warning, Automatic Cruise Control, Pedestrian Protection, Headlights Control, Connected Cars technology and trends towards Autonomous vehicles.</p> <p>Chapter No. 7. Automotive safety standards ISO26262 and Diagnostics Functional Safety: Need for safety standard-ISO 26262, safety concept, safety process for product life cycle, safety by design, validation. Fundamentals of Diagnostics: Basic wiring system and Multiplex wiring system, Preliminary checks and adjustments, Self-diagnostic system. Fault finding and corrective measures, OBD & off board diagnostic.</p>		<p>8Hrs</p> <p>7Hrs</p> <p>5Hrs</p> <p>6Hrs</p> <p>3Hrs</p> <p>5Hrs</p> <p>6Hrs</p>
Text books:		
<ol style="list-style-type: none"> 1. Denton.T – Automobile Electrical and Electronic Systems, Edward Arnold publication, 1995. 		
References:		
<ol style="list-style-type: none"> 1. William T.M – Automotive Electronic Systems, Heiemann Ltd., London ,1978. 2. Nicholas Navet – Automotive Embedded System Handbook, CRC Press, 2009. 3. BOSCH Automotive Handbook, Wiley Publications, 8th Edition, 2011. 4. Co-Verification of hardware & software for ARM SoC Design – Jason.R.Andrews, Newnes Publications, 2004. 5. Hardware Software co-design of embedded systems, F.Balarin, Kluwer Academic Publishers, 1987. 		



Lab:

1. Demonstration of cut section modules: Engine, Transmission , Steering, Braking, Suspension - Automobile dept.
2. Electronic engine control system: Injection and Ignition control system Transmission trainer modules
3. Modeling an engine Vehicle model simulation with Simulink using PI CONTROLLER
4. Basic gate logic simulation and modeling using Simulink and realization on the hardware platform.
5. Seat belt warning system simulation and modeling using Simulink and realization on the hardware platform. Vehicle speed control based on the gear input simulation and modeling using Simulink and realization on the hardware platform.
6. Throttle control modeling and simulation using Simulink and realization on the hardware platform.
7. Accelerator pedal interfacing software modeling and simulation using Simulink and realization on the hardware platform.
8. Develop matlab code for stepper motor control and convert it to Simulink model and port it to embedded hardware

Program: Digital Electronics		
Course Title: Automotive Communication		Course Code: 17EDEC802
L-T-P: 3-0-0	Credits: 3	Contact Hrs: 3
CIA Marks: 50	SEE Marks: 50	Total Marks: 100
Teaching Hrs: 40	Exam Duration: 3 hrs	
Content		Hrs
Chapter No. 1: Controller Area Network Introduction to CAN, Basic Concepts, Message Transfer, Frame Types, Message Validation, Error Handling, Fault Confinement, Bit Timing Requirements, Increasing Can Oscillator Tolerance, Protocol Modifications.		15 hrs
Chapter No. 2: Local Interconnect Network Overview of LIN protocol, LIN Workflow ,LIN Physical Layer ,LIN Communication, Synchronization of the LIN nodes, LIN Message & Scheduling, Message Types, Status & Network Management, Introduction to LIN slave diagnostics , Introduction to LIN slave configuration.		5 hrs
Chapter No. 3: Flexray Communication protocol Introduction to Fleray, Basic Concepts, Message Transfer, Static and dynamic data transmission, Flexray BUS, FlexRay controller states, Frame Types, Message Validation, Error Handling, Fault Confinement, Bit Timing Requirements, Fault tolerant and time triggered services implemented in hardware.		5 hrs
Chapter No. 4: Media oriented system transport protocol Technology background, MOST25, MOST50, MOST150, MOST topology, different masters in MOST network, control channel, synchronous channel, asynchronous channel, MOST application frame work, addressing scheme, frame formats,		5 hrs
Chapter No. Chapter 5: Keyword 2000 protocol Overview of KWP protocol, KWP Workflow , Physical topology ,message structure, frame format,		5 hrs
Chapter No. Chapter 6: SENT, I2C, SPI and UART Overview about SENT , I2C, SPI and UART, frame formats, application of I2C, SPI, SENT and UART in automotive.		5 hrs
Text Books (List of books as mentioned in the approved syllabus)		



KLE Technological
University
Creating Value
Leveraging Knowledge

School of Electronics & Communication
Engineering
PG – Digital Electronics

Ronald K. Jurgen, Infotainment systems, 2007, SAE International, 2007

KLE Society's
KLE Technological University, Hubballi

Course Feedback

(To be filled by each Student at the time of Course Completion)

Dear Students,

Please give us your views on this Course so that the course quality can be improved. You are encouraged to be frank and constructive in your comments.

Course Teacher

Department _____ SoECE _____ Name of the Teacher _____ Venkatesh Mane _____

Course Title _____ Automotive Electronics and Communication _____ Course code: 19EDEC701 Semester _____ II _____

a. The design of the course	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
The course objectives were clear	√				
The course contents met with your expectation	√				
The course work load was manageable		√			
The lecture sequence was well planned to meet learning outcomes		√			
The contents were illustrated with adequate examples	√				
The course exposed you to new knowledge and practice	√				
The level of the course was moderate		√			

b. The conduct of the course	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
The lectures were easy to understand & ideas and concepts presented clearly	√				
The teaching aids were effectively used		√			
The course material handed out was adequate	√				
Were objectives of the course realized?		√			
The overall environment in the class was conducive to learning	√				

c. Learning Resources	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
Learning materials (Lesson Plans, Course Notes etc.) were relevant and useful	√				
Recommended reading Books etc. were relevant and appropriate	√				
The provision of learning resources in the library was adequate and appropriate	√				

d. Assessment	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
The method of assessment were reasonable	√				
Feedback on CIE assessment was timely	√				
Feedback on CIE assessment was helpful	√				

Suggestions for improvement:

Overall rating of the course: (√ tick mark the appropriate)

90% -100% 80% - 90% 70% - 80% 60% - 70% 50% - 60% Below 50%



Signature

Date: 14/12/2018

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The course material handed out was adequate	(=)				
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The overall environment in the class was conducive to learning	(=)				

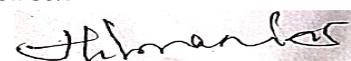
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Feedback on CIE assessment was timely	(=)				
Feedback on CIE assessment was helpful	(=)				

Suggestions for improvement:

Overall rating of the course: (√tick mark the appropriate)

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Signature

Date: 14/12/2018

Alumni Survey Form

Dear proud alumni ,

The following are the list of skills and competencies that engineering graduates should have. We seek your participation in the Alumni Survey conducted to know your satisfaction with the *level of competency* you have achieved as a result of your education at the Institution and also able to practice the same. For each question, indicate your answer with symbol "A" in the appropriate column/box. All individual responses will be kept confidential. Only statistically analyzed results from the entire population will be shared.

Regards,

Head of the department/School

S.No	Competencies	Level of Competency			
		Completely Dissatisfied	Dissatisfied	Satisfied	Completely Satisfied
1	Engineering knowledge :				
	Ability to apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialization for the solution of engineering problems			A	
2	Problem analysis:				
	Ability to identify, characterize and formulate a solution plan for solving engineering problems				A
	Ability to execute a solution process and analyse results				A
3	Design/Development of Solutions:				
	Ability to design components, systems or processes that meet specified needs, following appropriate engineering design process			A	
	Conduct investigations of complex problems:				
	Ability to conduct investigations or tests through design of experiments to understand and solve engineering problems				A
	Ability to critically analyse and interpret data to reach valid conclusions				A
5	Modern tool usage:				
	Ability to identify / create and use appropriate modern engineering and IT tools, techniques and resources to solve engineering problems				A



Alumni Survey Form

6	The engineer and society:					A
	Demonstrate an understanding of professional engineering regulations, legislation and standards					
7	Environment and sustainability:					
	Ability to understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development					A
8	Ethics:					
	Ability to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice					A
9	Individual and team work:					
	Ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings					A
10	Communication:					
	Ability to comprehend technical literature and prepare effective reports and design documents					A
	Demonstrate competence in listening, speaking, and presentation					A
11	Project management and finance:					
	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments					A
12	Life-long learning:					
	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change					A
13	Modeling and Design					
	An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.					A
14	Construction of software system					
	An ability to apply design and development principles in the construction of software systems of varying complexity.					A



Alumni Survey Form

Indicate your Answer with symbol "A" in the appropriate box.

1) How would you rate your overall satisfaction with your preparation to become an engineer?

Not Satisfied Little Satisfied Satisfied Very Satisfied

2) In general, the department has provided a _____ quality academic program?

Poor OK Good Very Good

Name: <i>Anita G. H.</i>	Branch: <i>E&C</i>
E-mail id: <i>12anitagh@gmail.com</i>	Batch: <i>2015-2019</i>
Name of the company:	
Correspondence Address: <i>Plot no. 51, Shanti Nagar, Bagalkot, 587101</i>	
Signature: <i>Anita</i>	

Alumni Survey Form

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Regards,

Head of the department/School

S.No	Competencies	Level of Competency			
		Completely Dissatisfied	Dissatisfied	Satisfied	Completely Satisfied
1	Engineering knowledge :				
	Ability to apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialization for the solution of engineering problems			✓	
2	Problem analysis:				
	Ability to identify, characterize and formulate a solution plan for solving engineering problems			✓	
	Ability to execute a solution process and analyse results			✓	
3	Design/Development of Solutions:				
	Ability to design components, systems or processes that meet specified needs, following appropriate engineering design process			✓	
	Conduct investigations of complex problems:				
5	Ability to conduct investigations or tests through design of experiments to understand and solve engineering problems			✓	
	Ability to critically analyse and interpret data to reach valid conclusions			✓	
	Modern tool usage:				
	Ability to identify / create and use appropriate modern engineering and IT tools, techniques and resources to solve engineering problems			✓	



Alumni Survey Form

6	The engineer and society:				
	Demonstrate an understanding of professional engineering regulations, legislation and standards			✓	
7	Environment and sustainability:				
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9	Individual and team work:				
	Ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings				✓
10	Communication:				
	Ability to comprehend technical literature and prepare effective reports and design documents				✓
	Demonstrate competence in listening, speaking, and presentation			✓	
11	Project management and finance:				
	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments			✓	
12	Life-long learning:				
	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change			✓	
13	Modeling and Design				
	An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.			✓	
14	Construction of software system				
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Alumni Survey Form

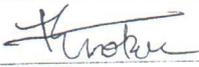
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Not Satisfied Little Satisfied Satisfied Very Satisfied

2) In general, the department has provided a _____ quality academic program?

Poor OK Good Very Good

Name: <u>Yash. Deepak. Khoskele</u>	Branch: <u>ELC</u>
e-mail id: <u>yashkhoskele@gmail.com</u>	Batch: <u>4th</u>
Name of the company: <u>Reliance Jio Infocomm Limited (RJIL)</u>	
Correspondence Address: <u>Ragati Colony, near diamond hotel, Khoskele Mala, Sangli, Maharashtra.</u>	
Signature: <u></u>	

Alumni Survey Form

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Alumni Survey Form

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9	Individual and team work:				
	Ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings			A	
10	Communication:				
	Ability to comprehend technical literature and prepare effective reports and design documents				A
	Demonstrate competence in listening, speaking, and presentation				A
11	Project management and finance:				
	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments			A	
12	Life-long learning:				
	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change			A	
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Alumni Survey Form

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Not Satisfied Little Satisfied Satisfied Very Satisfied

2) In general, the department has provided a _____ quality academic program?

Poor OK Good Very Good

Name: **SONAL . M . PRASAD**

Branch: **ECE**

e-mail id: **sonal.nitchu@gmail.com**

Batch: **2015-19**

Name of the company: **NA**

Correspondence Address: **H.No: 01/11, JSW Township,
P.O. Vidyanagar, For Vidyanagar,
Toranagallu, Ballari
583275**

Signature: 

Alumni Survey Form

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Regards,
Head of the department/School

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Not Satisfied Little Satisfied Satisfied **A** Very Satisfied

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Poor OK Good Very Good **A**

Name: VARSHA KOSAMANI	Branch: EC
mail id: varsha.vmh@gmail.com	Batch: 2018 - 2019
Name of the company: PricewaterhouseCoopers.	
Correspondence Address: 25, Anugraha, Vijaynagar, Sadhankhori Dharwad.	
Signature: <u>Varsha</u>	

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	Ability to execute a solution process and analyse results			A	
3	Design/Development of Solutions:				
	Ability to design components, systems or processes that meet specified needs, following appropriate engineering design process				A
	Conduct investigations of complex problems:				
	Ability to conduct investigations or tests through design of experiments to understand and solve engineering problems				A
	Ability to critically analyse and interpret data to reach valid conclusions				A
5	Modern tool usage:				
	Ability to identify / create and use appropriate modern engineering and IT tools, techniques and resources to solve engineering problems			A	



Alumni Survey Form

6	<u>The engineer and society:</u>				
	Demonstrate an understanding of professional engineering regulations, legislation and standards				A
7	<u>Environment and sustainability:</u>				
	Ability to understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development				A
8	<u>Ethics:</u>				
	Ability to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice				A
9	<u>Individual and team work:</u>				
	Ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings			A	
10	<u>Communication:</u>				
	Ability to comprehend technical literature and prepare effective reports and design documents			A	
	Demonstrate competence in listening, speaking, and presentation				A
11	<u>Project management and finance:</u>				
	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments				A
12	<u>Life-long learning:</u>				
	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change				A
13	<u>Modeling and Design</u>				
	An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.			A	
14	<u>Construction of software system</u>				
	An ability to apply design and development principles in the construction of software systems of varying complexity.			A	

Alumni Survey Form

Indicate your Answer with symbol "A" in the appropriate box.

1) How would you rate your overall satisfaction with your preparation to become an engineer?

Not Satisfied Little Satisfied Satisfied Very Satisfied

2) In general, the department has provided a _____ quality academic program?

Poor OK Good Very Good

Name: Shweta Pralhad Mujumdar	Branch: Electronics and Communication
E-mail id: shweta.mujumdar24@gmail.com	Batch: 2015-2019
Name of the company: Price Waterhouse Coopers (PWC)	
Correspondence Address: Service Delivery Center (SDC), Challenghatta, Bangalore.	
Signature: 	



KLE Society's
B V Bhoomaraddi College of
Engineering & Technology, Hubli

Employers Feedback form

Dear Sir/Madam,

We seek your kind participation in this process of collecting feedback about our graduates serving in your organization. Your inputs will be helping us to make required modifications in the existing curriculum, pedagogy to enhance the competencies of the graduating engineers. For each question, indicate your opinion with a tick mark in the appropriate column. All individual responses will be kept confidential. Only statistically analyzed results from the entire population will be shared.

Regards,

Head of the Department/School

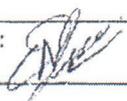
Please rank the following qualities: 5 = excellent, 4 = high, 3 = good, 2 = average, 1 = low, NA= Not Applicable

S.No.	Qualities	1	2	3	4	5	NA
1	Ability to apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialization for the solution of engineering problems					✓	
2	Ability to identify, characterize and formulate a solution plan for solving engineering problems					✓	
3	Ability to execute a solution process and analyze results					✓	
4	Ability to design components, systems or processes that meet specified needs, following appropriate engineering design process			✓			
5	Ability to conduct investigations or tests through design of experiments to understand and solve engineering problems					✓	
6	Ability to critically analyse and interpret data to reach valid conclusions				✓		
7	Ability to identify / create and use appropriate modern engineering and IT tools, techniques and resources to solve engineering problems				✓		
8	Demonstrate an understanding of professional engineering regulations, legislation and standards				✓		
9	Ability to understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development				✓		

Employers Feedback form

10	Ability to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice					✓	
	Qualities	1	2	3	4	5	NA
11	Ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings					✓	
12	Ability to comprehend technical literature and prepare effective reports and design documents				✓		
13	Demonstrate competence in listening, speaking, and presentation					✓	
14	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments				✓		
15	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change				✓		
16	An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.				✓		
17	An ability to apply design and development principles in the construction of software systems of varying complexity.				✓		

Space for comments:

Name of the organization: JUNIPER NETWORKS INDIA PVT LTD	
Address: Elmatti - Exora Business Park, Armani Belandure Khune Village, Marathalli Outer Ring Road Bangalore 103	
Name of the contact person: <i>Dr. Karan Naik Jessai</i>	
e-mail id: <i>odessai@juniper.net</i>	Signature & seal: 

Employers Feedback form

Dear Sir/Madam,

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Please rank the following qualities: 5 = excellent, 4 = high, 3 = good, 2 = average, 1 = low, NA= Not Applicable

S.No.	Qualities	1	2	3	4	5	NA
1	Ability to apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialization for the solution of engineering problems			X			
2	Ability to identify, characterize and formulate a solution plan for solving engineering problems			X			
3	Ability to execute a solution process and analyze results			X			
4	Ability to design components, systems or processes that meet specified needs, following appropriate engineering design process			X			
5	Ability to conduct investigations or tests through design of experiments to understand and solve engineering problems		X				
6	Ability to critically analyse and interpret data to reach valid conclusions		X				
7	Ability to identify / create and use appropriate modern engineering and IT tools, techniques and resources to solve engineering problems				X		
8	Demonstrate an understanding of professional engineering regulations, legislation and standards						NA
9	Ability to understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development						NA

Employers Feedback form

10	Ability to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice			X			
	Qualities	1	2	3	4	5	NA
11	Ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings				X		
12	Ability to comprehend technical literature and prepare effective reports and design documents				X		
13	Demonstrate competence in listening, speaking, and presentation			X			
14	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments			X			
15	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change						NA
16	An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.			X			
17	An ability to apply design and development principles in the construction of software systems of varying complexity.				X		

Space for comments: In general, students have prepared well for the interview and the test conducted, but when the scope changes they were not able to speed it up as the core or basic were missing instead end results are known as a standard or some steps are skipped to solve earlier.

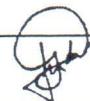
Name of the organization: Cadence Design Systems

Address: Bangalore

Name of the contact person: *Judis SA*

e-mail id: *judis@cadence.com*

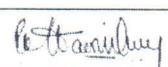
Signature & seal:



Employers Feedback form

10	Ability to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice				☺		
	Qualities	1	2	3	4	5	NA
11	Ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings				☺		
12	Ability to comprehend technical literature and prepare effective reports and design documents				☺		
13	Demonstrate competence in listening, speaking, and presentation				☺		
14	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments				☺		
15	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change				☺		
16	An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.					☺	
17	An ability to apply design and development principles in the construction of software systems of varying complexity.			☺			

Space for comments: I am pretty much happy with the Quality of the engineers hired from BVP College of Engg, Hubli.

Name of the organization: Central Engineering Applied Materials India Inventor 1st Floor, ITPB Whitefield Road, Bangalore 560066	
Name of the contact person: Hanish Kumar P K	
e-mail id: Hanish_Kumar@amat.com	Signature & seal: 

Employers Feedback form

Dear Sir/Madam,

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Regards,

Head of the Department/School:

Please rank the following qualities: 5 = excellent, 4 = high, 3 = good, 2 = average, 1 = low, NA= Not Applicable

S.No.	Qualities	1	2	3	4	5	NA
1	Ability to apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialization for the solution of engineering problems					☑	
2	Ability to identify, characterize and formulate a solution plan for solving engineering problems					☑	
3	Ability to execute a solution process and analyze results				☑		
4	Ability to design components, systems or processes that meet specified needs, following appropriate engineering design process				☑		
5	Ability to conduct investigations or tests through design of experiments to understand and solve engineering problems				☑		
6	Ability to critically analyse and interpret data to reach valid conclusions			☑			
7	Ability to identify / create and use appropriate modern engineering and IT tools, techniques and resources to solve engineering problems					☑	
8	Demonstrate an understanding of professional engineering regulations, legislation and standards			☑			
9	Ability to understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development				☑		

Employers Feedback form

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S.No.	Qualities	1	2	3	4	5	NA
1	Ability to apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialization for the solution of engineering problems					✓	
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9	Ability to understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development				✓		

Employers Feedback form

		1	2	3	4	5	NA
10	Ability to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice					✓	
	Qualities						
11	Ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings				✓		
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13	Demonstrate competence in listening, speaking, and presentation				✓		
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15	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change				✓		
16	An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.					✓	
17	An ability to apply design and development principles in the construction of software systems of varying complexity.				✓		

Space for comments: —

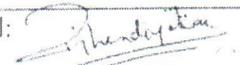
Name of the organization: SANKALP SEMICONDUCTOR PVT LTD

Address: NAVANAGAR, HUBLI - 580025

Name of the contact person: ASHWINI G

e-mail id: ashwini.gajanan@sankalpseni.com

Signature & seal:






KLE Society's
 BV Bhoomaraddi College of
 Engineering & Technology, Hubli

Employers Feedback form

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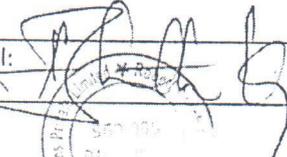
Please rank the following qualities: 5 = excellent, 4 = high, 3 = good, 2 = average, 1 = low. NA= Not Applicable

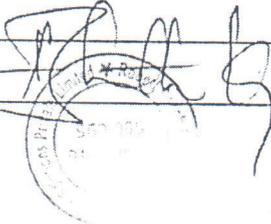
S.No.	Qualities	1	2	3	4	5	NA
1	Ability to apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialization for the solution of engineering problems		✓				
2	Ability to identify, characterize and formulate a solution plan for solving engineering problems		✓	✓			
3	Ability to execute a solution process and analyze results						
4	Ability to design components, systems or processes that meet specified needs, following appropriate engineering design process			✓			
5	Ability to conduct investigations or tests through design of experiments to understand and solve engineering problems			✓			
6	Ability to critically analyse and interpret data to reach valid conclusions			✓			
7	Ability to identify / create and use appropriate modern engineering and IT tools, techniques and resources to solve engineering problems			✓			
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9	Ability to understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development				✓		

Employers Feedback form

		1	2	3	4	5	NA
10	Ability to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice			✓			
	Qualities						
11	Ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings			✓			
12	Ability to comprehend technical literature and prepare effective reports and design documents			✓			
13	Demonstrate competence in listening, speaking, and presentation			✓			
14	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments			✓			
15	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change			✓			
16	An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.				✓		
17	An ability to apply design and development principles in the construction of software systems of varying complexity.				✓		

Space for comments:

Name of the organization:	Robert Bosch Engineering & Business Solutions Private Limited	
Address:		
Name of the contact person:	Bhanu K	
e-mail id:	bhanu.kalcarah@in.bosch.com	Signature & seal: 





Placement Cell KLE TU,Hubballi -formerly BVBCET <placement@kletech.ac.in>

Request for "Employer Feedback" -- Continental

Thimmaiah S, Rithin <rithin.thimmaiah.s@continental-corporation.com>
To: "Placement Cell, KLE Technological University, Hubballi (formerly BVBCET)" <placement@kletech.ac.in>
Cc: "Panicker, Rajesh" <rajesh.panicker@continental-corporation.com>

Tue, Jun 25, 2019 at 3:05 PM

Dear Kerure Sir,

We have received positive feedback in terms of the students' commitment and attitude. They have been able to cope well with our culture and have been performing well in the responsibilities that are assigned to them.

Regards

Rithin

[Quoted text hidden]



KLE Society's
B V Bhoomaraddi College of
Engineering & Technology, Hubli

Employers Feedback form

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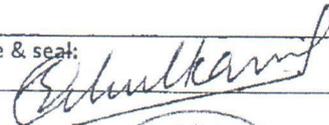
S.No.	Qualities	1	2	3	4	5	NA
1	Ability to apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialization for the solution of engineering problems						✓
2	Ability to identify, characterize and formulate a solution plan for solving engineering problems						✓
3	Ability to execute a solution process and analyze results					✓	
4	Ability to design components, systems or processes that meet specified needs, following appropriate engineering design process					✓	
5	Ability to conduct investigations or tests through design of experiments to understand and solve engineering problems					✓	
6	Ability to critically analyse and Interpret data to reach valid conclusions				✓		
7	Ability to identify / create and use appropriate modern engineering and IT tools, techniques and resources to solve engineering problems					✓	
8	Demonstrate an understanding of professional engineering regulations, legislation and standards					✓	
9	Ability to understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development						✓

Employers Feedback form

10	Ability to apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice					✓	
	Qualities	1	2	3	4	5	NA
11	Ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings					✓	
12	Ability to comprehend technical literature and prepare effective reports and design documents					✓	
13	Demonstrate competence in listening, speaking, and presentation					✓	
14	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments				✓		
15	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change					✓	
16	An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.					✓	
17	An ability to apply design and development principles in the construction of software systems of varying complexity.					✓	

Space for comments:

Name of the organization:	INFORMATICA	
Address:	NO 66/1, BAGMANE COMMERZ Ø2 BAGMANE TECH PARK C V RAMAN NAGAR, BENGALURU-560093	
Name of the contact person:	RAHUL KULKARNI	
e-mail id:	RKULKARNI@INFORMATICA.COM	Signature & seal:




DE - 1.4.1 - SA



Lesson Delivery Plan, Execution Status and Progress Monitoring

Name of the Staff Member: _____ Subject: **Automotive Electronics and Communication(19EDEC701)** Year :2019-20
Hrs required as per Syllabus:50 Hrs Available as per COE: 50 Hrs Additional Classes required (if any): _____

Lesson Delivery Plan		Execution Status		Progress Monitoring	
Chapter No. Title: 1. Automotive Systems, Design cycle and Automotive industry overview					
Planned Start Date:		Planned Completion Date:		Planned Hrs: 09	Engaged Hrs:
Class No	Portion to be covered per hour	Engaged Date	Extra	Experiences worth noting	Review (HOS)
1	Overview of Automotive industry, Automotive Supply chain	18/2		} Successfully Completed as per plan	
2	V/A model of development	18/2			
3	Vehicle functional domains	20/2			
4	Automotive Mechanical systems: Engine	20/2			
5	Transmission systems	25/2			
6	Braking and Suspension systems	25/2			
7	ECU Design cycle	27/2			
8	Electronic Control Unit	27/2			
9	Electronic Control Unit	31/2			
Chapter No. Title: 2. Embedded system in Automotive Applications & Automotive safety systems					
Planned Start Date:		Planned Completion Date:		Planned Hrs:10	Engaged Hrs:
10	Review of microprocessor, microcontroller and digital signal processor with automotive context	3/3		} Real time examples of ECUs are given	
11	Criteria to choose the right microcontroller/processor for various automotive applications	5/3			
12	Architectural attributes of Automotive grade processors	5/3			
13	EMS: Engine control functions, Fuel control, Electronic systems in	10/3			



Engines				
14	Development of control algorithm for EMS, Look-up tables and maps, Procedure to generate maps, Fuel maps/tables, Ignition maps/tables, Engine calibration, Torque table, Dynamometer testing	10/3		} Bosch videos on EMS are shown
15	Active safety systems-ABS,TCS and ESP	12/3		
16	Cruise control and ACC	12/3		
17	Electronic suspension system, Brake assist system	17/3		
18	Electronic suspension system, Brake assist system	17/3		
19	Electronic suspension system, Brake assist system	19/3		

Chapter No. Title: 3. Automotive Sensors and Actuators

Planned Start Date: _____ **Planned Completion Date:** _____ **Planned Hrs: 9** **Engaged Hrs:** _____

20	Sensor characteristics, Sensor response, Sensor error, Redundancy of sensors in ECUs	19/3		} Successfully completed as per plan
21	Accelerometer (knock sensors), wheel speed sensors, Engine speed sensor	24/3		
22	Throttle position sensor, Temperature sensor, Mass air flow (MAF) rate sensor	24/3		
23	Exhaust gas oxygen concentration sensor	21/3		
24	Crankshaft angular position/RPM sensor, Manifold Absolute Pressure (MAP) sensor	31/3		
25	Crankshaft angular position/RPM sensor, Manifold Absolute Pressure (MAP) sensor	2/4		
26	Engine control actuators	2/4		
27	Solenoid actuator, Exhaust Gas Re-circulation Actuator.	7/4		
28	Solenoid actuator, Exhaust Gas Re-circulation Actuator-2	7/4		

Chapter No. Title: 4. Automotive communication protocols

Planned Start Date: _____ **Planned Completion Date:** _____ **Planned Hrs: 10** **Engaged Hrs:** _____

29	Introduction to vehicle network architecture	9/9	
30	Event driven and Time triggered communication strategies	9/9	



31	Need and working principle CAN communication protocol	16/4		} CAN features are discussed extensively and also demo of CAN network shown
32	CAN arbitration and fault confinement of CAN	16/4		
33	CAN features	21/4		
34	Error handling	21/4		
35	Bit timing	23/4		
36	Working principle of LIN communication protocol	23/4		
37	Working principle of FLEXRAY communication protocol	28/4		
38	Working principle of MOST communication protocol.	28/4		

Chapter No. Title: 5. Advanced Driver Assistance Systems (ADAS) and Functional safety standards

Planned Start Date:		Planned Completion Date:		Planned Hrs: 05	Engaged Hrs:
39	Advanced Driver Assistance Systems (ADAS)	30/4		} completed as per plan	
40	Lane Departure Warning, Collision Warning, Automatic Cruise Control	30/4			
41	Pedestrian Protection, Headlights Control, Connected Cars technology and trends towards Autonomous vehicles.	5/5			
42	Functional Safety: Need for safety standard-ISO 26262, safety concept	5/5			
43	Safety process for product life cycle, safety by design, validation	7/5			

Chapter No. Title: 6. Diagnostics

Planned Start Date:		Planned Completion Date:		Planned Hrs: 05	Engaged Hrs:
44	Fundamentals of Diagnostics: Basic wiring system and Multiplex wiring system, Preliminary checks and adjustments, Self-diagnostic system	7/5		} completed as per plan	
45	Fault finding and corrective measures, Electronic transmission checks and Diagnosis	12/5			
46	Diagnostic procedures and sequence, On board and off board diagnostics in Automobiles	12/5			
47	OBDII, Concept of DTCs, DLC, MIL, Freeze Frames, History memory, Diagnostic tools	14/5			
48	Diagnostic protocols : KWP2000 and UDS	14/5			
49	Diagnostic protocols : KWP2000 and UDS	21/5			
50	Diagnostic protocols : KWP2000 and UDS	21/5			



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Whether the schedule for the subject was satisfactory?	y	n	Remarks:
Whether the content was correlated with exam pattern?	y	n	
Whether any new practices were adopted?	y	n	

Consolidated Report:

1) Syllabus covering automobile fundamentals needs to be incorporated
 2) Need of communication protocols aspects to be included so that communication techniques to handle increasing complexity of vehicles n/w is addressed.

No. of classes planned	No. of classes engaged
50	50

Signature of the staff member

KLE Society's
 KLE Society's KLE Technological University
 SCHOOL OF ELECTRONICS and COMMUNICATION ENGINEERING

LESSON -PLAN REVISION NOTE

Semester : II

Course : PG

From: To: Subject & Code: Automotive Electronics (19EDEC701)

Year	Change Summary	Author	Reviewed by	Approved by	Date
	<p>As per the feedback from technical experts from BOSCH and KPIT</p> <p>There are many job opportunities under Automotive communication protocols.</p> <p>In depth knowledge is essential for post graduate students in the Automotive communication domain.</p> <p>Hands-on sessions on CAN and LIN is very essential, as these protocols are widely used the Automotive Industry</p>	Venkatesh Mane	Dr. Nalini C Iyer	Dr. Nalini C Iyer	

Reference Documents (Tick \checkmark):

- Lesson Plan Review Report
- Previous Lesson Plan
- Syllabus
- Results
- Any other (Give details)

N C Iyer
Head of School
Electronics & Communication Engg
KLE Technological University

School of Electronics and Communication**1.4.1 Structured feedback for design and review of Syllabus****Course: Automotive Electronics and Communication****Course code: 19EDEC701**

Consolidated Report based on feedback taken from stake holders (employers, alumni, teachers and students) and analysis

Employers Feedback:

- Handling fast-growing electronics/electrical complexity associated with the system becomes easy by having proper knowledge of automotive fundamentals.
- Increasing complexity of the vehicle network requires adequate understanding of communication aspects.
- Enhance ability to apply design principles in the development of hardware and software systems of varying complexity using state of art tools for the development of electronic systems.
- Ability for implementation of effective and reliable communication as well as security features to the system.

Teachers Feedback (Pre-BoSMoM):

- The courses Automotive Electronics and Automotive Communication may be combined and replaced with Automotive Electronics and Communication as the course. The Course Automotive Electronics and Communication provides a thorough understanding of the automotive systems, vehicle dynamics, electrical and electronic systems (Embedded Systems) used in automobiles.
- There is a need to develop the ability to analyze, simulate, design and verify electronic systems for controlling mechanical systems in automobiles.
- Development of abilities to test and validate automotive electronic systems using modern software/ hardware tools.
- Need to conceptualize automotive electronic technologies for future.

Students Feedback:

- To focus on latest technological trends and development.
- Formulation of application oriented examples.

Alumni Feedback:

Recommended for co-delivery by industry experts.


Head of School
Electronics & Communication Engg
KLE Technological University



KLE Technological
University
Creating Value
Leveraging Knowledge

School of Electronics & Communication
Engineering

PG – Digital Electronics

Pre - Board of Studies Meeting
of
School of Electronics and Communication Engineering
Hubballi, Karnataka
5th April 2019

KLE Technological University
(Established under Karnataka Act No.22, 2013)



Action Report based on feedback analysis in Pre-boS

The following are the action items proposed during Pre - Board of Studies meeting of SoECE, KLE Technological University, Hubballi which was held on 5th April 2019.

Item No	Description	Action Taken
Pre-BoS	<p>Faculty Discussion: Based on the discussions regarding the inputs from all stake holders, following action item as agreed upon by everyone were finalized and the same was circulated to all the faculty members on 5th April 2019. Persons responsible for these action items have already initiated the actions, which will be shared in the BoS meeting.</p> <p>Action Item No.1: Suggested course with Project based learning emphasis</p> <p>1) Automotive Electronics and Communication</p>	<p>Based on the feedback from Stake holders and discussion it is proposed to combine the courses Automotive Electronics and Automotive Communication to a new course Automotive Electronics and Communication to cover depth in one domain and ECU abstraction for building applications to support the vehicle functions. Course prepares students to be industry ready with hands on using standard tools and industry mentored projects.</p>


Dr.Nalini C Iyer

Chairperson, BoS,
SoECE



Action taken for Automotive Electronics and Communication:

Minutes of BoS (Approval):

In the BOS meeting, it was resolved to combine the courses **Automotive Electronics and Automotive Communication** to a new course **Automotive Electronics and Communication** with contents change focusing one domain.

Enclosure: Minutes of BOS meeting.

NLS
Head of School
Electronics & Communication
KLE Technological University



KLE Technological
University
Creating Value
Leveraging Knowledge

Minutes
5th Board of Studies Meeting
of
School of Electronics and Communication Engineering
Hubballi, Karnataka
13th April 2019

KLE Technological University
(Established under Karnataka Act No.22, 2013)


REGISTRAR
KLE Technological University
HUBBALLI-580 031





School of Electronics & Communication Engineering
KLE Tech University
BVBCET Campus, Hubballi -31

The following are the minutes of the Board of Studies meeting of SoECE, KLE Technological University, Hubballi which was held on 13th April 2019 at 9:30 am at the in Senate Hall of University.

The following members were present.

SI No	Name	Designation	Position
1.	Dr. Nalini C.Iyer	Head of School, SoECE	Chairperson
2.	Dr. R M Bankar	Professor, SoECE	Member
3.	Dr. Uma Mudengudi	Professor, SoECE	Member
4.	Dr. Priyatamkumar	Professor, SoECE	Member
5.	Dr. Saroja S	Professor, SoECE	Member
6.	Prof. Ujwala Patil	Associate Professor, SoECE	Member
7.	Dr. D. Manjunath	Professor, Department of EC,IIT Bombay	Member
8.	Dr. Chetan Parekh	Professor, Department of EC,IIIT Bangalore	Member
9.	Mr. Praveen B P	Samsung India, Bangalore	Member
10.	Mrs. Padmini Naval Gund	RBEI, Bangalore	Member
11.	Mr. Sumit Bhat	Design Lead, Sankalp Semiconductor	Member
12.	Mr. Shivakumar Turmari	Tessolve Semiconductors, Bangalore	Member
13.	Dr. Sujata S Kotabagi	Professor, SoECE	Member
14.	Dr. R B Shettar	Professor, SoECE	Member
15.	Prof. Suneeta V B	Professor, SoECE	
16.	Prof. P. C. Nissimgoudar	Associate Professor, SoECE	
17.	Prof. R. M. Shet	Assistant Professor, SoECE	
18.	1. UG: Pranav K 2. UG: Niveditha J 3. PG1 :Vijaylakshmi 4. PG2: Saiarpita 5. PhD: Suhas Shirol		Student Members

The following members have sought leave of absence:

SI No	Name	Designation	Position
1.	Dr. D. Manjunath	Professor, Department of EC,IIT Bombay	Member
2.	Dr. Chetan Parekh	Professor, Department of EC,IIIT Bangalore	Member
3.	Mr. Shivakumar Turmari	Tessolve Semiconductors, Bangalore	Member
4.	Mr. Vivek Pawar	Sankalp Semiconductors, Hubballi	Member


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Agenda

Sl No	Particulars	Page No.
5.1	To welcome the BoS Members and present department achievements & initiatives	
5.2	To read and confirm the minutes of 4 th BoS meeting held on 7 th April 2018	
5.3	To confirm the action taken report on the minutes of the previous meeting held on 7 th April 2018	
5.4	To consider the Schemes and Syllabi of the undergraduate program B.E in Electronics & Communication and approve the same. a) Scheme approval of I to VIII Semester (2019-23) b) Syllabus approval of I / II Semester, Basic Electronics for Mechanical and Electrical stream course (2019-23) c) Scheme approval of III to VIII Semester (2018-22) d) Syllabus approval of III to VIII Semester (2018-22) e) Scheme approval of V to VIII Semester (2017-21) f) Syllabus approval of V to VIII Semester (2017-21) g) Scheme approval of VII and VIII Semester (2016-20) h) Syllabus approval of V and VIII Semester (2016-20) i) Scheme approval: Scheme 2018-22 in Minor Program j) Scheme approval: Scheme 2017-21 in Minor Program k) Syllabus approval: Scheme 2017-21 in Minor Program	
5.5	To consider the Schemes and Syllabi of the postgraduate program M.Tech in Digital Electronics and approve the same. a) Scheme approval of I to IV Semester (2019-21) b) Syllabus approval of I/II Semester (2019-21) c) Modification of Scheme of III/IV Semester (2018-20) d) Syllabus approval of III/IV Semester (2018-20)	
5.6	To consider the Schemes and Syllabi of the postgraduate program M.Tech in VLSI Design & Embedded Systems and approve the same. a) Scheme approval of I to IV Semester (2019-21) b) Syllabus approval of I/II Semester (2019-21) c) Modification of Scheme of III/IV Semester (2018-20) d) Syllabus approval of III/IV Semester (2018-20)	
5.7	Question Paper review and Discussion on attainment of POs and PSOs	
5.8	Vision, Mission, POs, PSOs of School of ECE and CAM and PAM	
5.9	Any other matter for discussion with the permission of the chair	


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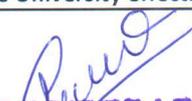


School of Electronics & Communication Engineering
KLE Tech University
BVBCET Campus, Hubballi -31

BoS 5.1 To welcome the BoS Members and present department achievements & initiatives

Resolution 4.1: The BoS members appreciated the initiatives of SoECE and lauded its achievements.

BoS 5.2	To read and confirm the minutes of 4th BoS meeting held on 7th April 2018		
	The following are the minutes of the Board of Studies meeting of SoECE, KLE Technological University, Hubballi, which was held on 7 th April 2018 at 10:30 am at the Senate Hall of the University. The following members were present.		
BoS 4.2	To read and confirm the minutes of 4th BoS meeting held on 7th April 2018		
	The following are the minutes of the Board of Studies meeting of SoECE, KLE Technological University, Hubballi, which was held on 7 th April 2018 at 10:30 am at the ED Studio of the School. The following members were present.		
	Sl No	Name	Designation
	1.	Dr. Nalini C.Iyer	Head of School, SoECE
	2.	Dr. R M Bankar	Professor, SoECE
	3.	Dr. Uma Mudengudi	Professor, SoECE
	4.	Dr. Priyatamkumar	Professor, SoECE
	5.	Dr. Anil Nandi	Professor, SoECE
	6.	Dr. Saroja S	Professor, SoECE
	7.	Prof. Ujwala Patil	Associate Professor, SoECE
	8.	Prof. Sanjay Eligar	Assistant Professor, SoECE
	9.	Dr. D. Manjunath	Professor, Department of EC,IIT Bombay
	10.	Dr. Chetan Parekh	Professor, Department of EC,IIT Bangalore
	11.	Dr. Lokesh Boregouda	Head Research, Samsung India, Bangalore
	12.	Dr. P Subbanna Bhat	Professor Emirates, KLE Tech
	13.	Mr. Vivek G Pawar	Founder & CEO, Sankalp Semiconductor
	14.	Mrs. Padmini Naval Gund	RBEI, Bangalore
	15.	Mr. Shiva Turmuri	Analog Devices, Bangalore
	16.	Mr. Sumit Bhat	Design Lead, Sankalp Semiconductor
	17.	Dr. Sujata S Kotabagi	Professor, SoECE
	18.	Dr. R B Shettar	Professor, SoECE
	19.	Prof. Suneeta V B	Professor, SoECE
	20.	Prof. P. C. Nissimgoudar	Associate Professor, SoECE
	21.	Prof. Rohini Hongal	Associate Professor, SoECE
	22.	Prof. R. M. Shet	Assistant Professor, SoECE
	23.	1. UG: Rohan D 2. UG: Sheetal 3. PG1 :Ravi 4. PG2: Pratima 5. PhD: Suhas Shirol	Student Members
	Item No	Description	
	BoS 4.1	To welcome the BoS Members and present department achievements & initiatives and discussed about the inputs from all stake holders (Annexure 5.1) Resolution 4.1: The BoS members appreciated the work done towards recognition of KLE Technological University as a State private University effective from 2015.	


REGISTRAR
KLE Technological University



BoS 4.2	To read and confirm the minutes of 4 th BoS meeting held on 7 th April 2018 Resolution 4.2: Minutes of the last meeting were read and confirmed by BoS.
BoS 4.3	To confirm the action taken report on the minutes of the previous meeting held on 7 th April 2018 Resolution 4.3: BoS confirmed the action taken report on the minutes of the previous meeting held on 7th April 2018 and suggestions were implemented.
BoS 4.4	<p>To consider the Schemes and Syllabi of the undergraduate program B.E in Electronics & Communication and approve the same.</p> <ul style="list-style-type: none"> a) Scheme of I to VIII Semester (2018-22) Batch b) Syllabus of I / II Semester, Basic Electronics for Mechanical and Electrical stream course (2018-22) Batch c) Scheme of III to VIII Semester (2017-21) Batch d) Syllabus of III to VIII Semester (2017-21) Batch e) Scheme of V to VIII Semester (2016-20) Batch f) Syllabus of V to VIII Semester (2016-20) Batch g) Modification of Scheme of VII and VIII Semester (2015-19) Batch h) Syllabus of VII and VIII Semester (2015-19) Batch <p>Discussion: Based on the discussions following action items as agreed upon by everyone were finalized and the same were circulated to all the members on 7th April 2018. Persons responsible for these action items have already initiated the actions, which will be shared in the next BoS meeting. The details of discussion are in Annexure 4.4</p> <p>Action Item No.1: Suggested new courses to strengthen basic concepts of Communication technology and programming</p> <ul style="list-style-type: none"> a) Mobile and Wireless Communication b) Microwave and Antennas c) Embedded Linux <p>Action Item No.2: Suggested new elective courses with Industry Collaboration for design and delivery</p> <ul style="list-style-type: none"> a) CMOS ASIC Design b) Physical Design Analog c) Embedded Intelligent Systems <p>Action Item No.3: Enhance programming skills: application to real world problem</p> <ul style="list-style-type: none"> a) Data structure applications lab b) C programming (Diploma) <p>Action Item No.4: Enhancing Research capabilities</p> <ul style="list-style-type: none"> a) Research Experience for Undergraduates <p>Action Item No.5: Enabling Industry Eco System</p> <ul style="list-style-type: none"> a) Institutional Research Project b) Internship Training c) Internship Project. <p>Resolution 4.4: Resolved to approve the Schemes and Syllabi of the undergraduate program B.E in Electronics & Communication:</p> <ul style="list-style-type: none"> a) Scheme of I to VIII Semester (2018-22) batch. b) Syllabus of I / II Semester, Basic Electronics for Mechanical and Electrical stream course (2018-22) batch. c) Scheme of III to VIII Semester (2017-21) batch. d) Syllabus of III to VIII Semester (2017-21) batch. e) Scheme of V to VIII Semester (2016-20) batch.

	<p>f) Syllabus of V to VIII Semester (2016-20) batch. g) Modification of Scheme of VII and VIII Semester (2015-19). h) Syllabus of VII and VIII Semester (2015-19) batch. i) Scheme for Minor program in electronics for (2017-21) Batch j) Scheme for Minor program in electronics for (2016-20) Batch k) Scheme for Minor program in electronics for (2016-20) Batch</p>
BoS 4.5	<p>To consider the Schemes and Syllabi of the postgraduate program M. Tech in Digital Electronics and approve the same.</p> <p>a) Scheme of I to IV Semester (2018-20) batch. b) Syllabus of I/II Semester (2018-20) batch. c) Modification of Scheme of III/IV Semester (2017-19) d) Syllabus of III/IV Semester (2017-19) batch.</p> <p>Discussion: Based on the discussions following action items as agreed upon by everyone were finalized and the same were circulated to all the members on 15th April 2017. Persons responsible for these action items have already initiated the actions, which will be shared in the next BoS meeting.</p> <p>Action Item No.1: Suggested new course to strengthen basic concepts and programming</p> <p>1) Advanced computer architecture and programming. 2) Autosar and infotainment</p> <p>Action Item No.2: Enabling Industry Eco System</p> <p>1) Project Phase -I/ Minor Project</p> <p>Resolution 4.6: Resolved to the Schemes and Syllabi of the postgraduate program M. Tech in Digital Electronics:</p> <p>a) Scheme of I to IV Semester (2018-20) batch. b) Syllabus of I/II Semester (2018-20) batch. c) Modification of Scheme of III/IV Semester (2017-19) batch. d) Syllabus of III/IV Semester (2017-19) batch.</p>
BoS 4.6	<p>To consider the Schemes and Syllabi of the postgraduate program M. Tech in VLSI Design and Embedded Systems and approve the same.</p> <p>a) Scheme of I to IV Semester (2018-20) b) Syllabus of I/II Semester (2018-20) c) Modification of Scheme of III/IV Semester (2017-19) d) Syllabus of III/IV Semester (2017-19)</p> <p>Discussion: Based on the discussions following action items as agreed upon by everyone were finalized and the same were circulated to all the members on 15th April 2017. Persons responsible for these action items have already initiated the actions, which will be shared in the next BoS meeting.</p> <p>Action Item No.1: Suggested new core course to strengthen basic concepts and programming</p> <p>1) Machine learning 2) Advanced computer architecture and programming.</p> <p>Action Item No.2: Suggested new electives courses to build background with application perspective</p> <p>1) System simulation and modeling 2) System on Chip</p>



	<p>Resolution 4.6: Resolved to the Schemes and Syllabi of the postgraduate program M. Tech in VLSI Design and Embedded Systems.</p> <p>a) Scheme of I to IV Semester (2018-20) batch b) Syllabus of I/II Semester (2018-20) batch c) Modification of Scheme of III/IV Semester (2017-19) d) Syllabus of III/IV Semester (2017-19) batch.</p>															
BoS 4.7	<p>Question Paper review Discussion: The Question Paper along with assessment patterns with respect to Bloom's Levels and PO-PSO-PI mapping was presented.</p> <p>Resolution 4.7: Resolved to approve the Question Paper Pattern</p>															
BoS 4.8	<p>Vision, Mission, POs and PSOs of School of ECE Discussion: The Vision, Mission, POs and PSOs of School of ECE were presented.</p> <p>Resolution 4.8: Resolved to approve the Vision, Mission, POs and PSOs of School of ECE</p>															
BoS 4.9	<p>Any other subject with the permission of the Chair Nil.</p>															
	<p>Resolution 5.2: Resolved to confirm the minutes of its 4th BoS meeting held on 7th April 2018</p>															
BoS 5.3	<p>To confirm the action taken report on the minutes of the previous meeting held on 7th April 2018 Resolution: 4.3 Resolved to confirm the action taken report on the minutes of its 4th BoS meeting held on 7th April 2018. The BoS members appreciated the new initiatives taken by SoECE.</p> <table border="1"> <thead> <tr> <th>Item No</th> <th>Description</th> <th>Action Taken</th> </tr> </thead> <tbody> <tr> <td>BoS 4.1</td> <td> <p>To welcome the BoS Members and present department achievements & initiatives and discussed about the inputs from all stake holders (Annexure 5.1) Resolution 4.1: The BoS members appreciated the work done towards recognition of KLE Technological University as a State private University effective from 2015.</p> </td> <td>Noted</td> </tr> <tr> <td>BoS 4.2</td> <td> <p>To read and confirm the minutes of 4th BoS meeting held on 7th April 2018 Resolution 4.2: Minutes of the last meeting were read and confirmed by BoS.</p> </td> <td>Noted</td> </tr> <tr> <td>BoS 4.3</td> <td> <p>To confirm the action taken report on the minutes of the previous meeting held on 7th April 2018 Resolution 4.3: BoS confirmed the action taken report on the minutes of the previous meeting held on 7th April 2018 and suggestions were implemented.</p> </td> <td>Noted</td> </tr> <tr> <td>BoS 4.4</td> <td> <p>To consider the Schemes and Syllabi of the undergraduate program B.E in Electronics & Communication and approve the same.</p> <p>a) Scheme of I to VIII Semester (2018-22) Batch b) Syllabus of I / II Semester, Basic Electronics for Mechanical and Electrical stream course (2018-22) Batch c) Scheme of III to VIII Semester (2017-21) Batch d) Syllabus of III to VIII Semester (2017-21) Batch e) Scheme of V to VIII Semester (2016-20) Batch f) Syllabus of V to VIII Semester (2016-20) Batch</p> </td> <td> <p>The BoS members noted the progress of the School and recommended action items and timeline.</p> <p>Action Item No.1: Suggested new courses to strengthen basic concepts of Communication technology and programming</p> <p>ATR: To understand how emerging technologies are changing the landscape responsible for making</p> </td> </tr> </tbody> </table>	Item No	Description	Action Taken	BoS 4.1	<p>To welcome the BoS Members and present department achievements & initiatives and discussed about the inputs from all stake holders (Annexure 5.1) Resolution 4.1: The BoS members appreciated the work done towards recognition of KLE Technological University as a State private University effective from 2015.</p>	Noted	BoS 4.2	<p>To read and confirm the minutes of 4th BoS meeting held on 7th April 2018 Resolution 4.2: Minutes of the last meeting were read and confirmed by BoS.</p>	Noted	BoS 4.3	<p>To confirm the action taken report on the minutes of the previous meeting held on 7th April 2018 Resolution 4.3: BoS confirmed the action taken report on the minutes of the previous meeting held on 7th April 2018 and suggestions were implemented.</p>	Noted	BoS 4.4	<p>To consider the Schemes and Syllabi of the undergraduate program B.E in Electronics & Communication and approve the same.</p> <p>a) Scheme of I to VIII Semester (2018-22) Batch b) Syllabus of I / II Semester, Basic Electronics for Mechanical and Electrical stream course (2018-22) Batch c) Scheme of III to VIII Semester (2017-21) Batch d) Syllabus of III to VIII Semester (2017-21) Batch e) Scheme of V to VIII Semester (2016-20) Batch f) Syllabus of V to VIII Semester (2016-20) Batch</p>	<p>The BoS members noted the progress of the School and recommended action items and timeline.</p> <p>Action Item No.1: Suggested new courses to strengthen basic concepts of Communication technology and programming</p> <p>ATR: To understand how emerging technologies are changing the landscape responsible for making</p>
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		<p>h) Syllabus of VII and VIII Semester (2015-19) batch.</p> <p>i) Scheme for Minor program in electronics for (2017-21) Batch</p> <p>j) Scheme for Minor program in electronics for (2016-20) Batch</p> <p>k) Scheme for Minor program in electronics for (2016-20) Batch</p>	<p>ATR: A course on Data Structure application is introduced to enhance rigor in building programming skills and to bridge the gap of applying the required data structures and algorithmic skills to solve complex real world problems. Emphasis is on use of industry standard coding and online coding platform.</p> <p>To impart programming skills for lateral entry(Diploma) students, a basic course on C programming is introduced.</p> <p>Action Item No.4: Enhancing Research capabilities. ATR: a course on Research Experience for Undergraduates is introduced to enable students to take part in the research mission in their future career during and beyond their academia</p> <p>Action Item No.5: Enabling Industry Eco System. ATR: A course on Institutional Research project (IRP) is introduced to provide students an exposure for solving a real time projects involving current technologies. Industry Internship training and project is introduced to enable students for the industry echo system while working on live projects.</p>
<p>BoS 4.5</p>		<p>To consider the Schemes and Syllabi of the postgraduate program M. Tech in Digital Electronics and approve the same.</p> <p>a) Scheme of I to IV Semester (2018-20) batch.</p> <p>b) Syllabus of I/II Semester (2018-20) batch.</p> <p>c) Modification of Scheme of III/IV Semester (2017-19)</p> <p>d) Syllabus of III/IV Semester (2017-19) batch.</p> <p>Discussion: Based on the discussions following action items as agreed upon by everyone were finalized and the same were circulated to all the members on 15th April 2017. Persons responsible for these action items have already initiated the actions, which will be shared in the next BoS meeting.</p> <p>Action Item No.1: Suggested new course to strengthen basic concepts and programming</p> <p>1) Advanced computer architecture and programming.</p> <p>2) Autosar and infotainment</p> <p>Action Item No.2: Enabling Industry Eco System</p>	<p>The BoS members noted the progress of the School and recommended action items and timeline.</p> <p>Action Item No.1: Suggested new course to strengthen basic concepts and programming ATR: A course on Advanced computer architecture and programming is introduced to give insights on the concepts of advance pipelining and trade off in design of modern computer systems for performance analysis.</p> <p>To acquire skills related to electrification, connectivity and infotainment to support the vehicle functions, and A standardized</p>

		<p>1) Project Phase -I/ Minor Project</p> <p>Resolution 4.5: Resolved to the Schemes and Syllabi of the postgraduate program M. Tech in Digital Electronics:</p> <ol style="list-style-type: none"> Scheme of I to IV Semester (2018-20) batch. Syllabus of I/II Semester (2018-20) batch. Modification of Scheme of III/IV Semester (2017-19) batch. Syllabus of III/IV Semester (2017-19) batch. 	<p>interface for software components in the application layer, a course on Autosar and infotainment is introduced in collaboration with Bosch, Bangalore</p> <p>Action Item No.2: Enabling Industry Eco System</p> <p>Project Phase-I/ Minor Project is introduced to enable students for the industry echo system while working on live projects.</p>
	<p>BoS 4.6</p>	<p>To consider the Schemes and Syllabi of the postgraduate program M. Tech in VLSI Design and Embedded Systems and approve the same.</p> <ol style="list-style-type: none"> Scheme of I to IV Semester (2018-20) Syllabus of I/II Semester (2018-20) Modification of Scheme of III/IV Semester (2017-19) Syllabus of III/IV Semester (2017-19) <p>Discussion: Based on the discussions following action items as agreed upon by everyone were finalized and the same were circulated to all the members on 15th April 2017. Persons responsible for these action items have already initiated the actions, which will be shared in the next BoS meeting.</p> <p>Action Item No.1: Suggested new core course to strengthen basic concepts and programming</p> <ol style="list-style-type: none"> Machine learning Advanced computer architecture and programming. <p>Action Item No.2: Suggested new electives courses to build background with application perspective</p> <ol style="list-style-type: none"> System simulation and modeling System on Chip <p>Resolution 4.6: Resolved to the Schemes and Syllabi of the postgraduate program M. Tech in VLSI Design and Embedded Systems.</p> <ol style="list-style-type: none"> Scheme of I to IV Semester (2018-20) batch Syllabus of I/II Semester (2018-20) batch Modification of Scheme of III/IV Semester (2017-19) Syllabus of III/IV Semester (2017-19) batch. 	<p>The BoS members noted the progress of the School and recommended action items and timeline.</p> <p>Action Item No.1: Suggested new core course to strengthen basic concepts and programming</p> <p>ATR:</p> <p>Introduction of Machine learning course with Project-based learning which involves dynamic classroom approach in which students acquire a deeper knowledge through active investigation of real-world challenges and problems.</p> <p>To give insights on the concepts of advance pipelining and trade off in design of modern computer systems a course Advanced computer architecture and programming is introduced.</p> <p>Action Item No.2: Suggested new electives courses to build background with application perspective</p> <p>ATR:</p> <p>A course is introduced to give insights on the concepts and classification of modeling and simulation. To introduce students to the concepts of system integration on a single chip and their interconnections a course System on Chip is introduced.</p>
	<p>BoS 4.7</p>	<p>Question Paper review</p> <p>Discussion: The Question Paper along with assessment patterns with respect to Bloom's Levels and PO-PSO-PI mapping was presented.</p> <p>Resolution 4.7: Resolved to approve the Question Paper Pattern</p>	<p>QP Pattern is incorporated in all the courses.</p>



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BoS 4.8	<p>Vision, Mission, POs and PSOs of School of ECE Discussion: The Vision, Mission, POs and PSOs of School of ECE were presented.</p> <p>Resolution 4.8: Resolved to approve the Vision, Mission, POs and PSOs of School of ECE</p>	SoECE staff aligned to Vision, Mission, POs and PSOs .
BoS 4.9	Any other subject with the permission of the Chair Nil.	
<p>Resolution: 5.3 Resolved to confirm the action taken report on the minutes of its 4th BoS meeting held on 7th April 2018. The BoS members appreciated the new initiatives taken by SoECE</p>		
BoS 5.4	<p>To consider the Schemes and Syllabi of the undergraduate program B.E in Electronics & Communication and approve the same.</p> <ol style="list-style-type: none"> a) Scheme approval of I to VIII Semester (2019-23) b) Syllabus approval of I / II Semester, Basic Electronics for Mechanical and Electrical stream course (2019-23) c) Scheme approval of III to VIII Semester (2018-22) d) Syllabus approval of III to VIII Semester (2018-22) e) Scheme approval of V to VIII Semester (2017-21) f) Syllabus approval of V to VIII Semester (2017-21) g) Scheme approval of VII and VIII Semester (2016-20) h) Syllabus approval of V and VIII Semester (2016-20) i) Scheme approval: Scheme 2018-22 in Minor Program j) Scheme approval: Scheme 2017-21 in Minor Program k) Syllabus approval: Scheme 2017-21 in Minor Program <p>Discussion: Based on the discussions following action items as agreed upon by everyone were finalized and the same were circulated to all the members on 13th April 2019. Persons responsible for these action items have already initiated the actions, which will be shared in the next BoS meeting.</p> <p>Action Item No.1: New courses added: OOPS using C++, Biosensor Action Item No.2: Revised courses : CMOS VLSI Circuits, Internet of Things, Information Theory and coding and Signals and System</p> <p>Resolution 5.4: Resolved to approve the Schemes and Syllabi of the undergraduate program B.E in Electronics & Communication:</p> <ol style="list-style-type: none"> a) Scheme approval of I to VIII Semester (2019-23) b) Syllabus approval of I / II Semester, Basic Electronics for Mechanical and Electrical stream course (2019-23) c) Scheme approval of III to VIII Semester (2018-22) d) Syllabus approval of III to VIII Semester (2018-22) e) Scheme approval of V to VIII Semester (2017-21) f) Syllabus approval of V to VIII Semester (2017-21) g) Scheme approval of VII and VIII Semester (2016-20) h) Syllabus approval of V and VIII Semester (2016-20) i) Scheme approval: Scheme 2018-22 in Minor Program j) Scheme approval: Scheme 2017-21 in Minor Program 	
BoS 5.5	<p>To consider the Schemes and Syllabi of the postgraduate program M.Tech in Digital Electronics and approve the same.</p> <ol style="list-style-type: none"> a) Scheme approval of I to IV Semester (2019-21) b) Syllabus approval of I/II Semester (2019-21) c) Modification of Scheme of III/IV Semester (2018-20) 	


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	<p>d) Syllabus approval of III/IV Semester (2018-20)</p> <p>Discussion: Based on the discussions following action items as agreed upon by everyone were finalized and the same were circulated to all the members on 13th April 2019. Persons responsible for these action items have already initiated the actions, which will be shared in the next BoS meeting.</p> <p>Action Item No.1: Suggested new core courses to strengthen basic concepts and programming</p> <ol style="list-style-type: none">1. Automotive electronics and Communication <p>Resolution 5.5: Resolved to approve the following Schemes and Syllabi of the postgraduate program M. Tech in Digital Electronics subjected to implementation of action points listed above.</p> <ol style="list-style-type: none">a) Scheme approval of I to IV Semester (2019-21)b) Syllabus approval of I/II Semester (2019-21)c) Modification of Scheme of III/IV Semester (2018-20)d) Syllabus approval of III/IV Semester (2018-20)
BoS 5.6	<p>To consider the Schemes and Syllabi of the postgraduate program M.Tech in VLSI Design and Embedded Systems and approve the same.</p> <ol style="list-style-type: none">a) Scheme approval of I to IV Semester (2019-21)b) Syllabus approval of I/II Semester (2019-21)c) Modification of Scheme of III/IV Semester (2018-20)d) Syllabus approval of III/IV Semester (2018-20) <p>Discussion: Based on the discussions following action items as agreed upon by everyone were finalized and the same were circulated to all the members on 13th April 2019. Persons responsible for these action items have already initiated the actions, which will be shared in the next BoS meeting.</p> <p>Action Item No.1: Suggested new core courses to strengthen basic concepts and programming</p> <ol style="list-style-type: none">1. Automotive electronics and Communication2. AUTOSAR and Infotainment <p>Resolution 5.6: Resolved to the Schemes and Syllabi of the postgraduate program M. Tech in in VLSI Design and Embedded Systems subjected to implementation of action points listed above.</p> <ol style="list-style-type: none">a) Scheme approval of I to IV Semester (2019-21)b) Syllabus approval of I/II Semester (2019-21)c) Modification of Scheme of III/IV Semester (2018-20)d) Syllabus approval of III/IV Semester (2018-20)
BoS 5.7	<p>Question Paper review</p> <p>Discussion: The Question Paper along with assessment patterns with respect to Bloom's Levels and PO-PSO-PI mapping were presented.</p>
BoS 5.8	<p>Vision, Mission, POs, PSOs, CAM and PAM of School of ECE</p> <p>Discussion: The Vision, Mission, POs, PSOs, CAM and PAM of School of ECE were presented.</p>
BoS 5.9	<p>Any other subject with the permission of the Chair</p> <p>Nil.</p>

The Chairperson thanked all the members for the fantastic contributions


Dr. Nalini C Iyer
Chairperson, BoS, SoECE


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Annexure 5.1

Discussion Item

Employers Feedback:

- Able to generate a diverse set of alternative design solutions for the given application.
- Enhance ability to identify and formulate problem in designing electronic system for real world applications.
- Enhance basic programming skills, to apply and realize real world problems.

Teachers Feedback (Pre-BoS MoM):

- To focus on latest technological trends and development.
- Formulation of application oriented examples
- Focus on problem solving using programming skills and use of online platform.

Students Feedback:

- Focus on real time applications.
- Hands on using EDA tools with Integrated Development Environment (IDEs).

Alumni Feedback:

- Industry Specific Skills for employability.
- Depth of programming and analysis.

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Annexure 5.4

Discussion Item	Course
BE (ECE)	
1. Integrated theory and laboratory approach is adopted to bridge the gap between understanding theoretical concepts and realising the same using EDA Tools with separate credits for theory and labs.	CMOS-19EECC301 Revised- Delivery
2. A course on Object Oriented Programming to aid the students for heterogeneous computing in real time context is introduced using C++.	OOPS using C++-19EECE302 Added- New course
3. To emphasize the basic principles of bio sensing in terms of photonic/ optical responses and demonstrate the same using simulation and modelling tools, a course on biosensor is introduced with experiential learning.	Biosensor-19EECE416 Added-New course
4. Network of physical objects that are embedded with sensors, software, and other communication protocols for connecting and exchanging data with other devices and systems over the internet is introduced in the course with separate credits for course project.	Internet of things-19EECE401 Revised- Delivery
5. To introduce the principles and applications of information theory with coding techniques for performance analysis of communication channel, modelling and simulation using MATLAB/Simulink followed by a course project is introduced with separate credits for course project.	Information Theory and coding- 19EECE402 Revised- Delivery
6. Context based learning for the most fundamental course in communication domain is introduced in the course Signals and Systems through Co-teaching. Mathematical concepts are mapped with physical interpretation of signal processing towards better learning .	Signals and Systems19EECC202 Revised- Delivery
M.Tech Digital Electronics	
1. Electronics and technology advances are changing the automotive industry forcing engineers to acquire new skills in connectivity, electrification and infotainment	Automotive Electronics and Communication-19EDEC701, Added- New course
2. Electronics and technology advances are changing the automotive industry forcing engineers to acquire new skills in connectivity, electrification and infotainment .	AUTOSAR and Infotainment- 19EDEC702 Added- New course
3. IoT- A unique technology transition that is impacting human lives and will have huge implications for business of logistics.	Internet of Things-19EDEC703 Added- New course
M.Tech VLSI Design and Embedded Systems	
1. Electronics and technology advances are changing the automotive industry forcing engineers to acquire new skills in connectivity, electrification and infotainment .	Automotive Electronics and Communication-19EEVC701 Added- New course
2. Electronics and technology advances are changing the automotive industry forcing engineers to acquire new skills in connectivity, electrification and infotainment .	AUTOSAR and Infotainment- 19EEVE707 Added- New course


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Program: Digital Electronics		
Course Title: Automotive Electronics and Communication		Course Code: 19EDEC701
L-T-P: 4-0-1	Credits: 5	Contact Hours: 5 hrs
ISA Marks: 50	ESA Marks: 50	Total Marks: 100
Teaching Hours: 50	Examination Duration: 3 hrs	
Chapter No: 1. Automotive Systems, Design cycle and Automotive industry overview		9 hrs
Overview of Automotive industry, Vehicle functional domains and their requirements, automotive supply chain, global challenges. Role of technology in Automotive Electronics and interdisciplinary design. Introduction to modern automotive systems and need for electronics in automobiles and application areas of electronic systems in modern automobiles, Introduction to power train, Automotive transmissions system ,Vehicle braking fundamentals, Steering Control, ,Overview of Hybrid Vehicles, ECU Design Cycle : Types of model development cycles(V and A) , Components of ECU, Examples of ECU on Chassis, Infotainment, Body Electronics and cluster.		
Chapter No: 2. Embedded system in Automotive Applications & Automotive safety systems		10 hrs
Automotive grade microcontrollers: Architectural attributes relevant to automotive applications, Automotive grade processors ex: Renesas, Quorivva, and Infineon. EMS: Engine control functions, Fuel control, Electronic systems in Engines , Development of control algorithm for EMS, Look-up tables and maps, Need of maps, Procedure to generate maps, Fuel maps/tables, Ignition maps/tables, Engine calibration, Torque table, Dynamometer testing Safety Systems in Automobiles: Active and Passive safety systems: ABS, TCS, ESP, Brake assist, Airbag systems etc.		
Chapter No: 3. Automotive Sensors and Actuators		9 hrs
Sensor characteristics, Sensor response, Sensor error, Redundancy of sensors in ECUs, Avoiding redundancy, Smart Nodes, Examples of sensors: Accelerometer (knock sensors), wheel speed sensors, Engine speed sensor, Vehicle speed sensor, Throttle position sensor, Temperature sensor, Mass air flow (MAF) rate sensor, Exhaust gas oxygen concentration sensor, Throttle plate angular position sensor, Crankshaft angular position/RPM sensor, Manifold Absolute Pressure (MAP) sensor. Actuators: Engine Control Actuators, Solenoid actuator, Exhaust Gas Recirculation Actuator.		
Chapter No: 4. Automotive communication protocols		10 hrs
Overview of Automotive communication protocols : need for communication in Automotive, overview of vehicle network architecture, need for CAN in Automotive, CAN Bus logic ,CAN frame formats, CAN bus fault confinement, LIN , Flex Ray, MOST.		
Chapter No: 5. Advanced Driver Assistance Systems (ADAS) and Functional safety standards		7 hrs
Advanced Driver Assistance Systems (ADAS): Examples of assistance applications: Lane Departure Warning, Collision Warning, Automatic Cruise Control, Pedestrian Protection, Headlights Control, Connected Cars technology and trends towards Autonomous vehicles. Functional Safety: Need for safety standard-ISO 26262, safety concept, safety process for product life cycle, safety by design, validation.		
Chapter No: 6. Diagnostics		5 hrs
Fundamentals of Diagnostics: Basic wiring system and Multiplex wiring system, Preliminary checks and adjustments, Self-diagnostic system. Fault finding and corrective measures, Electronic transmission checks and Diagnosis, Diagnostic procedures and sequence, On board and off board diagnostics in Automobiles, OBDII, Concept of DTCs, DLC, MIL, Freeze Frames, History memory, Diagnostic tools, Diagnostic protocols: KWP2000 and UDS.		
Text books: 1. William B. Ribbens, Understanding Automotive Electronics, 6, Newnes Publications, 2003 2. Denton.T , Automobile Electrical and Electronic Systems, Edward Arnold , 1995		
References:		



1. William T.M , Automotive Electronic Systems, Heiemann Ltd., London , 1978
2. Nicholas Navet , Automotive Embedded System Handbook, CRC Press , 2009

Lab:

1. Demonstration of cut section modules: Engine, Transmission , Steering, Braking, Suspension - Automobile dept.
2. Electronic engine control system: Injection and Ignition control system Transmission trainer modules
3. Modeling an engine Vehicle model simulation with Simulink using PI CONTROLLER
4. Basic gate logic simulation and modeling using Simulink and realization on the hardware platform.
5. Seat belt warning system simulation and modeling using Simulink and realization on the hardware platform. Vehicle speed control based on the gear input simulation and modeling using Simulink and realization on the hardware platform.
6. Throttle control modeling and simulation using Simulink and realization on the hardware platform.
7. Accelerator pedal interfacing software modeling and simulation using Simulink and realization on the hardware platform.
8. Develop matlab code for stepper motor control and convert it to Simulink model and port it to embedded hardware