



CIRCULAR

Date : 21-03-2025

Board of Studies (BoS) Meeting Notification

The Department of ECE is conducting a Board of Studies (BoS) meeting on **1st April and 2nd April, 2025**, from **10:00 AM to 5:00 PM** in the **Embedded Systems Laboratory (VTF-07)**. The meeting schedule, agenda points, and invited members are as follows:

Meeting Schedule

- **April 1, 2025** – B.Tech (ECE) BoS Meeting.
- **April 2, 2025** – B.Tech (EE - VLSI D&T) and M.Tech (VLSI) BoS Meeting.

Agenda Points

1. Discussion on the B.Tech (ECE) C-25 Curriculum.
2. Discussion on the B.Tech (EE - VLSI D&T) and M.Tech (VLSI) C-25 Curriculum.
3. Curriculum structure with credits, credits distribution (L-T-P-SL-C)
4. 2 Modules, Modulw-1 is fundamental with 2-units and Module-2 is Application-oriented with 3 units.
5. Assessment Methods (Formative and Summative)
6. Grading Schemes.
7. Department Elective and Honour courses (streams/pools).
8. Open Elective and Minor courses (streams/pools).
9. Information related to NPTEL courses for the Academic Year 2025-26.
10. Creative work-in-Liu-Course work
11. SDG Mapping and incorporation of IKS components
12. Consideration of new program outcomes (POs) as prescribed by the NBA
13. Any Other Related points.

Invited BoS Members

The following **internal and external** BoS members are invited to participate in the meeting:

S. No	Name	Designation & Address	Role
1	Dr. N. Usha Rani	Dean, SEECE VFSTR Deemed to be University Mobile: +91 94400 20660 Mail-id: dean_seec@vignan.ac.in drnur_ece@vignan.ac.in	Chair Person
2	Dr. P. Sambaiah	HoD, ECE VFSTR Deemed to be University Mobile: +91 99594 26768 Mail-id: hodece@vignan.ac.in sp_ece@vignan.ac.in	Nominee (Dean-SEECE)
3	Dr. M. V. Karthikeyan	Director, IIIT, Kanchipuram Mobile: +91 9897021157 Mail-id: kartik@ieee.org	External Member (Academia)
4	Dr. Patri. Srihari Rao	Prof. NIT, Warangal Mobile: +91 94413 42324 Mail-id: patri@nitw.ac.in	Invited Member (Academia)
5	Mr. Satish Dhawan	Design Manager, Ananth Technologies, Hyderabad Mobile: +91 9000661723 Mail-id: satish.vadlamudi@ananthtech.com	External Member (Industry)
6	Er. Hari Babu	CDAC, Bangalore Mobile: +91 97398 50115 Mail-id: hari@cdac.in	Invited Member (Industry)
7	Dr. B. Seetha Ramanjaneyulu	Professor, ECE Department, VFSTR Deemed to be University Mobile: +91 94913 38854 Mail-id: drbsr_ece@vignan.ac.in	Internal Member
8	Dr. M.S.S. Rukmini	Professor, ECE Department, VFSTR Deemed to be University Mobile: +91 98662 81571 Mail-id: drmsr_ece@vignan.ac.in	Internal Member
9	Dr. Sk. Jakeer Hussain	Professor, ECE Department, VFSTR Deemed to be University Mobile: +91 98668 75459 Mail-id: dean_pm@vignan.ac.in	Internal Member
10	Dr. T. Pitchaiah	Professor, ECE Department, VFSTR Deemed to be University Mobile: +91 94913 38854 Mail-id: drtp_ece@vignan.ac.in	Internal Member
11	Dr. M. Sarada	Professor, ECE Department, VFSTR Deemed to be University Mobile: +91 94412 27700 Mail-id: drms_ece@vignan.ac.in	Internal Member
12	Dr. Y. Ravi Sekhar	Professor, ECE Department, VFSTR Deemed to be University Mobile: +91 92434 40775 Mail-id: dryrs_ece@vignan.ac.in	Internal Member

13	Dr. M. Pachiyannan	Assoc. Professor, ECE Department, VFSTR Deemed to be University Mobile: +91 94412 27700 Mail-id: drmp_ece@vignan.ac.in	Nominee (Dean- R&D)
14	Dr. M. Subba Rao	Assoc. Professor, ECE Department, VFSTR Hyderabad off Campus, Mobile: +91 98857 67652 Mail-id: msr_eee@vignan.ac.in	Internal Member (Off Campus)
15	Dr. P. Krishna Chaitanya	Assoc. Professor, ECE Department, VFSTR Deemed to be University Mobile: +91 79899 62496 Mail-id: pkc_ece@vignan.ac.in	Member Secretary – B. Tech (ECE)
16	Dr. Ashutosh Kumar Dixit	Asst. Professor, ECE Department, VFSTR Deemed to be University Mobile: +91 94531 34716 Mail-id: drad_ece@vignan.ac.in	Member Secretary – B. Tech (VLSI)
17	Dr. Satyajeeth Sahoo	Asst. Professor, ECE Department, VFSTR Deemed to be University Mobile: +91 86084 89769 Mail-id: drss_ece@vignan.ac.in	Member Secretary – M. Tech (VLSI)

Invited Members from the ECE Department:

S.No	Name	Designation	Role
1	Dr. Manish Kumar Rai	Asst. Prof	Internal Invitee
2	Dr. B. Jaya Lakshmi	Asst. Prof	Internal Invitee


Dr. P. Krishna Chaitanya
Member Secretary


Dr .N. Usha Rani
Chairperson

Annexure – V



DEPARTMENT OF ECE

Date: 01.04.2025 & 02.04.2025

Minutes of Board of Studies Meeting

Board of Studies (BoS) meeting of B.Tech. ECE, B. Tech EE - VLSI (Design and Technology) and M. Tech VLSI programmes was conducted from 01.04.2025 to 02.04.2025 in blended mode from 10.30 AM to 1.00 PM. (Embedded Systems Laboratory (VTF-07), third floor, H Block, VFSTR and virtual meeting mean link may mention like https://teams.microsoft.com/join/19%3ameeting_ZDY2YzE1YmYtNjNlZC00ZTcxLTNmOWUtZTA2NGlwNjg4MzQ3%40thread.v2/0?context=%7b%22Tid%22%3a%223b0993d8-31db-4db6-b617-64ac193c7ace%22%2c%22Oid%22%3a%224e5f452c-1e37-411f-99c9-5bfff849fadf%22%7d

Agenda of the BoS Meeting:

1. To Discuss and finalize the curriculum structure and credits distribution of B.Tech. ECE, B. Tech EE - VLSI (Design and Technology) and M. Tech VLSI Programmes for the regulation 2025 (R25-C25).
2. To Discuss and finalize the elective courses list (Department/ Open/ Minor / Honour) and stream of B.Tech. ECE, B. Tech EE - VLSI (Design and Technology) and M. Tech VLSI Programmes for the regulation R25-C25.
3. To Discuss about the SDG and IKS components in the syllabus.
4. To approve the R25-C25 curriculum, syllabus and assessment schemes of B.Tech. ECE, B. Tech EE - VLSI (Design and Technology) and M. Tech VLSI Programmes and recommend to the Academic council.
5. Any other points with the permission of Chairperson.

The following members were present either thorough offline or online.

S.No.	Name and Designation of the Member	Position	Signature
1.	Dr. N. Usha Rani, Dean, SEECE, VFSTR	Chairperson	
2.	Dr. M. V. Karthikeyan, Director, IIIT, Kanchipuram	External Member (Academic)	
3.	Dr. Patri. Srihari Rao, Prof. NIT, Warangal	Invited Member (Academia)	
4.	Mr. Satish Dhawan, Design Manager, Ananth Technologies	External Member (Industry)	

5.	Er. Hari Babu, Sr. Scientist, CDAC, Bangalore	Invited Member (Industry)	
6.	Prof. Shiv Govind Singh, Prof. & HoD IIT, Hyderabad	Invited Member (Academia)	Online
7.	Dr. Raju Mandapati, Member of Technical staff Global Foundries, Bangalore	Invited Member (Industry)	
8.	Dr. P. Sambaiah, HoD, ECE	Nominee (Dean-SEECE)	
9.	Dr. B. Seetha Ramanjaneyulu, Professor, ECE Department	Internal Member	
10.	Dr. M.S.S. Rukmini, Professor, ECE Department	Internal Member	
11.	Dr. Sk. Jakeer Hussain, Professor, ECE Department	Internal Member	
12.	Dr. T. Pitchaiah, Professor, ECE Department	Internal Member	
13.	Dr. M. Sarada, Professor, ECE Department	Internal Member	
14.	Dr. Y. Ravi Sekhar, Professor, ECE Department	Internal Member	
15.	Dr. M. Pachiyannan, Assoc. Professor, ECE Department	Nominee (Dean- R&D)	
16.	Dr. M. Subba Rao, Assoc. Professor, ECE Department	Internal Member (Off Campus)	
17.	Dr. P. Krishna Chaitanya, Assoc. Professor, ECE Department	Member Secretary – B. Tech (ECE)	
18.	Dr. Ashutosh Kumar Dixit, Asst. Professor, ECE Department	Member Secretary – B. Tech (VLSI)	
19.	Dr. Satyajeeth Sahoo, Asst. Professor, ECE Department	Member Secretary – M. Tech (VLSI)	

Chairperson Dr. N. Usha Rani, Professor and Dean, SEECE, Department of ECE, VFSTR initiated the meeting by welcoming and introducing the external members and invitees to the internal members. Chairperson presented about the *NEP 2020 Compliant Regulation - R25-C25* which emphasis on creating *learning centric* (continuous learning and continuous assessment model), offering B.Tech., B.Tech. with Honours / Research Honours / Minor / Add-on Diploma, providing lateral entry and honourable exit.

The following points were discussed in the BoS meeting:

1. Regulation R25-C25.
2. Curriculum structure with credits, credits distribution (L-T-P-SL).
3. Significance of self-learning (SL)
4. 2 Modules, Module-1 is fundamental with 2 units and Module-2 is fundamental with 2 units.
5. Assessment methods (Formative & Summative).

6. Grading Schemes.
7. Department Elective and Honour courses (streams/pools).
8. Open Elective and Minor courses (streams/pools).
9. Information related to NPTEL courses for the Academic Year 2025-26.
10. Creative work-in-Lieu-Course work
11. SDG Mapping and incorporation of IKS components
12. Consideration of new program outcomes (POs) as prescribed by the NBA

Approval of Regulation R25-C25 Curriculum:

Approved the introduction and adoption of Regulation R25-C25 for the B.Tech in ECE, EE-VLSI (D&T) and M.Tech in VLSI programs with the following:

- Self-Learning (SL) as a structured component in the curriculum.
- Course design consisting of two modules:
 1. Module 1: Two fundamental units
 2. Module 2: Three application-oriented units
- Assessment methods encompassing formative (60%) and summative (40%) evaluations.

B.Tech, ECE Course-Specific Suggestions and Recommendations by BoS Members on 01/04/2025

1. **Research Credit Component:** BoS External Expert Dr. P. Srihari Rao recommended that, under the Research/Work-in-Lieu credit system, greater emphasis should be given to patent filing and intellectual property creation, in addition to publications.
2. **Semiconductor Physics and Devices (SPD):** Dr. P. Srihari Rao suggested that in Module-1, Unit-1 of the SPD course, the syllabus contents need to be further elaborated to ensure stronger conceptual clarity in semiconductor fundamentals.
3. **Analog Circuits:** BoS External Expert recommended that Feedback Amplifier Topologies and Multistage Amplifiers should be explicitly included either in the Semiconductor Physics and Devices course or in the Analog Electronics/Analog Circuits course.
4. **Communication Systems:** A BoS External Expert advised that the Module-2 contents of the Communication Systems course should be expanded and detailed to ensure adequate coverage of core concepts.
5. **Microcontrollers:** A BoS External Expert advised that the syllabus should cover microcontrollers starting from basic architecture and programming concepts to advanced controllers, ensuring progression from fundamentals to modern embedded platforms.

6. **Electromagnetics and Transmission Lines:** observed that an excessive number of reference books had been listed and suggested removing the reference book listed under Sl. No. 4 while retaining only standard and relevant texts.
7. **Signals and Systems:** This as a **cornerstone subject** for ECE, forming the theoretical base for DSP, communication, control systems, and signal analysis.
8. **Digital Electronics:** Members appreciated its strong lab orientation and relevance to VLSI, embedded systems, and processor design.
9. **Network Theory:** Recognized as essential for circuit modelling, system analysis, and electrical network understanding, supporting advanced electronics courses.
10. **Digital Signal Processing:** Emphasized its modern relevance in AI, biomedical signal analysis, image processing, and wireless communication.
11. **Antenna Theory : Analysis and Design:** Recognized as vital for wireless, satellite, radar, and 5G communication systems with good design exposure.
12. **CMOS VLSI Design:** Members appreciated alignment with semiconductor industry needs, chip design trends, and fabrication technologies.
13. **Data Communications and Computer Network:** The experts recalled its importance in data communication, IoT ecosystems, and networked embedded systems.
14. **Microwave Engineering:** Appreciated for its role in RF systems, radar, satellite links, and modern wireless infrastructure.
15. **Industry Interface (I²) Course:** Members strongly appreciated this component for industry exposure, hands-on training, and real-world problem solving.
16. External Expert suggested that the Chemistry course may be removed and, in its place, a department-specific professional core course may be introduced to strengthen domain knowledge in ECE.
17. **Department Electives:** A BoS External Expert suggested introducing elective courses related to 5G and advanced wireless communication technologies, subject to feasibility.
18. **Optical Fibre Communication:** A BoS External Expert recommended including the textbook authored by Herold Kolimbiris as an additional reference in the Optical Fiber Communication course.
19. **Honors:** The flexibility offered through this system and experts highly appreciated for promoting advanced learning in specializations.

20. **Open Electives:** Recognized as beneficial for broadening knowledge, interdisciplinary and supporting holistic engineering education.

Observations and Key Recommendations Incorporated in the R25-C25 Curriculum:

The following observations and recommendations were made during the curriculum review process, many of which have been implemented in the revised R25-C25 curriculum:

1. Curriculum Restructuring

A comprehensive restructuring has been carried out to promote continuous learning and assessment. The curriculum is now modular in nature, emphasizing phased learning and evaluation across all courses.

2. Honors / Specialization and Minor Programs

The curriculum now enables students to pursue an Honors/Specialization degree or a Minor degree through the addition of 16 extra credits via specially designed courses, thereby encouraging academic depth and interdisciplinary exposure.

3. Curriculum Structure and Course Listings

The complete curriculum structure, including the list of professional core, departmental electives, open electives, Minor, Honors, and NPTEL-integrated courses for both B.Tech. and M.Tech. programs, is presented in Appendix I.

4. Skill-Oriented Course Design

The revised curriculum integrates courses aimed at enhancing employability, entrepreneurial abilities, and skill development. Details are provided in Appendix II.

5. Syllabus Revision Summary

- ✓ Percentage of change in Professional Core & Basic Science (Mandatory Courses from second Year) is R25-C25 from R22-C24 is **19%**
- ✓ Percentage of change in Department Electives R25-C25 from R22-C24 is **48%**
- ✓ Percentage of change in Honors R25-C25 from R22-C24 is **58%**
- ✓ Excluding Honors the total percentage of change from second year to final year is 33% , as outlined in Appendix III.

6. New Course Framework

Significant content changes across courses have led to their reclassification as new courses, detailed in Appendix IV.

7. Indian Knowledge System (IKS) Integration

Relevant IKS components have been incorporated into applicable courses. A summary of courses with IKS integration is provided in Appendix V.

8. Sustainable Development Goals (SDG) Mapping

Discussed embedding SDGs to nurture ethical, sustainable, and socially responsible engineers. Reinforcement of SDG integration to build globally conscious and environmentally aware professionals.

9. In the R-25 Regulations, an extensive discussion was held on formative and summative assessments, and the expert committee members approved the same.

B.Tech, EE-VLSI(D&T) Course-Specific Suggestions and Recommendations by BoS Members on 02/04/2025

At the starting the detail discussion happened on the finalization of the structure of the B. Tech VLSI. By the through discussion the following points has been finalised

Professional core:

1. In both B. Tech ECE subjects & B. Tech VLSI subjects: SPD & EDC syllabus should be same & CS and EMTL should be same
2. Suggested to change the computer architecture and organization as Microcontroller
3. In 3-1 Sem Instead of IC applications need to add the Analog IC design
4. In 3-1 Sem Instead of VLSI Technology replaced by Digital IC design
5. Instead of Mixed Signal Design need to replace by Scripting language in 3-2
6. External members are suggested to add the standard book Electronic devices and circuits by – Milliman & Charles. D
7. In scripting language course external members are suggested if syllabus is heavy then need to remove the TK topic

Department Electives

1. In 3-1, Suggested to add the DSP in department elective-2
2. Verification Using System Verilog need to add the department Elective -3 in 3-2 Sem
3. Advanced Digital System Design need to add the department Elective -4 in 3-2 Sem
4. CMOS RFIC Design/ System-on-Chip (SoC)Design/ASIC Design are suggested as department Elective 5, in 4-1
5. Photonics and Optical Circuits/Compound Semiconductor Devices/ AI in VLSI Design are offered as department Elective 6
6. In photonics & optical circuits course Module1- UNIT2 syllabus content is very large need to reduce the topics
7. Need to add the photonics & optical circuits QUANTUM ELECTRONICS by Amnon Yariv
8. In CMOS RFIC Design course need to expand the syllabus content

Honors

1. Analog IC design subject is same name as in M.Tech, so in b.Tech changed to ANALOG CMOS ICs DESIGN
2. Recommended to add the, SOC course in honors for 4-1
3. VLSI Testing/Nano Electronic Device Modelling should be added in Honors,3-1 sem.
4. In nano electronic devices course need to Make T=0 & add “P”
5. Mixed Signal Design/ Thin Films Characterization/Photovoltaic Devices and Energy Conversion these courses are offered in Honors in 3-2
6. Hardware security/Low Power VLSI Design/ MEMS/NEMS should be added in 4-1 Honors courses
7. Suggested to Don't make MEMS subject mandatory for student's
8. IoT Architectures/ Neuromorphic Computing/Quantum Computing in VLSI need to add the honor course in 4-2
9. In ASIC design course to add 'P' & remove 'T'

10. In Thin film characterisation need to change the “P” to “T”.
11. In Neuro morphic course need to add the some more references

Key Points:

1. Use standard text books & use hand books as reference only
2. For all courses 2 or 3 are main text books, 4 or 5 textbooks for references
3. Dr. Karthikeyan sir Suggested to give the 2 to 3 lines course description for all subjects

M.Tech, VLSI Course-Specific Suggestions and Recommendations by BoS Members on 02/04/2025

- Prof. M. V. Karthikeyan and Er. Hari Babu recommended revisions to the following course titles to better reflect contemporary terminology and academic clarity, while retaining the other titles unchanged:
 1. Analog IC Design as Analog CMOS IC Design
 2. Digital IC Design as Digital CMOS IC Design
 3. Microchip Fabrication Technology as IC Process Technology
 4. Scripting Languages as PERL and TCL for System Design and Verification
 5. Mixed Signal Design as CMOS Mixed Signal IC Design
 6. ASIC Design as Chip Design
 7. Nano Electronics Device Modelling as Nano Technology
- Prof. Patri. Srihari Rao and Mr. Satish Dhawan suggested the following advanced topics to be included to deepen conceptual understanding and align with ongoing research trends: Boltzmann Transport Equation (BTE) and its simplifications, Equilibrium and non-equilibrium analysis of PN junctions, Heterojunctions and quantum effects in diode behaviour in the syllabus of Semiconductor Device Modelling. Furthermore, to reflect the current industry focus on energy-efficient systems and signal integrity, the following topics are recommended: Low Power Design Techniques for portable and battery-operated devices, Noise Analysis, including Power Supply Rejection Ratio (PSRR) in the syllabus of Analog CMOS IC Design.
- Prof. M. V. Karthikeyan and Er. Hari Babu suggested to incorporate current fabrication research and sustainability efforts: Emerging materials and doping techniques, Sustainability considerations in IC fabrication, Advanced lithography methods including EUV and multi-patterning, Relevance of 2D materials and wide bandgap semiconductors in the syllabus of IC Process Technology. Furthermore, incorporation of practical and industry-aligned content is recommended, including: VLSI design automation workflows, Scripting for chip design, verification automation, and test environment setup, Application in real-world design and testing scenarios for PERL and TCL for System Design and Verification.
- Prof. Patri. Srihari Rao suggested to enhance relevance in real-world analog system design, include: Band-pass, high-pass, and tunable filters for application areas: RF

front-ends, biomedical signal processing, and data converters in CMOS Mixed Signal IC Design.

- Er. Hari Babu suggested to strengthen practical design skills: emphasis on hands-on experience with UVM-based test benches, use of industry-standard simulation tools such as Mentor Questa and Synopsys VCS.
- Mr. Satish Dhawan and Er. Hari Babu suggested to add synthesis part in FPGA Based System Design from the perspective of industry needs, synthesis offers a number of strategic advantages that make it invaluable in real-world product development and deployment. Furthermore, they suggested to add communication protocols like I2C, UART, and AMBA which is highly important in Advanced Digital System Design from an industry point of view because these protocols are the backbone of inter-device communication in modern embedded systems. Also, Prof. Patri. Srihari Rao suggested designing of real-time Finite State Machine (FSM) applications is highly relevant for employability in Advanced Digital System Design roles. FSMs are widely used in control logic, protocol handling, and reactive systems—core components of embedded and FPGA-based products across many industries.

Additional Recommendations and Approvals on both days of BoS meeting

- Departmental Electives and Honors Courses are well integrated into well-defined streams or pools.
- Open Electives and Minor Programs allow interdisciplinary learning through defined streams/pools.
- Approved the list of updated Program Outcomes (POs) as per the latest NBA guidelines.
- Recommended adoption of the T-Shaped Learning Philosophy to foster both depth and breadth in student competencies.
- Approved the inclusion of Creative Work-in-Lieu credits to support self-directed and project-based learning.
- Pre-semester bridge courses planned to strengthen foundational skills prior to semester commencement.
- Revised credit allocation assigning 30 out of 160 credits to Basic Sciences in the first year.
- Common first-year curriculum designed to address both MPC and BiPC student backgrounds.
- The Choice-Based Credit System (CBCS) now constitutes 47 credits (~29.3%) of the program.
- Launch of field-based projects beginning in the second year and continuing into the third year.
- Mandatory 75% course-wise attendance requirement for eligibility in assessments.

Recommendations and Approvals After Discussion on both days of BoS meeting:

1. BoS Members approved the revised regulations, curriculum structure, syllabus, and assessment schemes of B.Tech in ECE and EE- VLSI (D&T) & M.Tech in VLSI degree programmes in alignment with NEP 2020.
2. The details of elective courses (Department / Open / Minor / Honour) of B.Tech., and M.Tech Programmes for the regulation R25-C25 are approved.
3. NPTEL courses are approved for the Academic Year 2025–26.
4. SDG mapping and incorporation of the IKS components in the syllabus are approved.
5. Curriculum restructuring and course revisions.
6. Standardization of course structures.
7. Strengthening research orientation.
8. Enhancement of communication and ethical competency.
9. Result analysis and implementation.

There being no further points for discussion, the Chairperson thanked all the external, internal, and invited members and announced that the meeting was concluded.



Dr. P. Krishna Chaitanya

Member Secretary



Dr. N. Usha Rani

Chairperson

DEPARTMENT OF ECE

APPENDIX I

B,Tech, ECE Programme : Curriculum Structure

II Year I Semester Structure

Course Code	Course Title	L	T	P	SL	C	Course category
	Probability Theory and Random Process	3	2	0	3	4	Basic Sciences
	Semiconductor Physics and Devices	2	0	2	2	3	Basic Sciences
	Data Structures	2	2	2	2	4	Basic Engineering
	Design Thinking and Engineering Orientation	0	0	2	0	1	Basic Engineering
	Signals and Systems	2	2	2	2	4	Professional Core-1
	Digital Electronics	2	2	2	2	4	Professional Core-2
	Network Theory	3	2	0	3	4	Professional Core-3
	Total					24	

II Year II Semester

Course Code	Course Title	L	T	P	SL	C	Course category
	Advanced Linear Algebra and PDE	2	2	0	2	3	Basic Sciences
	Industry – Interface (I^2) Course					1	Dept. Elective-1
	Open Elective-1					3	Open Elective-1
	Communication Systems	3	-	2	3	4	Professional Core-4
	Electromagnetic Waves and Transmission Lines	2	2	2	2	4	Professional Core-5
	Analog Electronics	2	2	2	2	4	Professional Core-6
	Microcontrollers	2	2	2	2	4	Professional Core-7
	Field Project	0	0	2	0	1	Project
	Total					24	

III Year I Semester

Course Code	Course Title	L	T	P	SL	C	Course category
	Soft Skills Laboratory	0	0	2	0	1	Humanities
	Quantitative Aptitude and Logical Reasoning	0	2	0	0	1	Humanities
	Dept. Elective-2					3	Dept. Elective-2
	Control Systems	2	2	0	2	3	Professional Core-8
	Digital Signal Processing	2	2	2	2	4	Professional Core-9
	Antenna Theory: Analysis and Design	3	0	2	3	4	Professional Core-10
	CMOS VLSI Design	3	0	2	3	4	Professional Core-11
	Sub-Total	11	12	08	11	20	
	Honours/Minors (Add-on)					4	Honours/Minors
	Total					24	

III Year II Semester

Course Code	Course Title	L	T	P	SL	C	Course category
	Professional Communication Skills	0	0	2	0	1	Humanities
	Dept. Elective-3					4	Dept. Elective-3
	Dept. Elective-4					4	Dept. Elective-4
	Open Elective-2					3	Open Elective-2
	Microwave Engineering	3	0	2	3	4	Professional Core-12
	Data Communications and Computer Networks	2	0	2	2	3	Professional Core-13
	Project	0	0	2	2	1	Project
	Sub-Total	11	06	12	13	20	
	Honours/Minors (Add-on)					4	Honours/Minors
	Total					24	

IV Year I Semester

Course Code	Course Title	L	T	P	SL	C	Course category
	Ethics for Engineers	1	2	0	1	2	Humanities
	Dept. Elective-5					4	Dept. Elective-5
	Dept. Elective-6					4	Dept. Elective-6
	Work-in-Lieu of Course – Research paper publications/patents/presentations/ global certifications					4*	Dept. Elective-7
	Open Elective-3					3	Open Elective-3
	Sub-Total					17	
	Honours/Minors (Add-on)					4	Honours/Minors
	Total					21	

IV Year II Semester

Course Code	Course Title	L	T	P	SL	C	Course category
	Project/Internship	0	2	22	0	12	Project/ Internship
	Sub-Total	0	2	22	0	12	
	Honours/Minors (Add-on)					4	Honours/Minors
	Total					16	

L=Lecture; T= Tutorial; P= Practical; SL= Self Learning; C=Credits

DEPARTMENT ELECTIVES

Course Code	Course Title	L	T	P	SL	C
AI & ML Stream						
	Digital Image Processing	2	0	2	2	3
	Data Science using Python	2	0	2	2	3
	Artificial Intelligence	2	2	2	2	4
	Machine Learning And Deep Learning	2	2	2	2	4
	Time Series Data Analysis	3	0	2	3	4
CSP Stream						
	Advanced Wireless Communication	2	2	2	2	4
	Modern Digital Communications	2	2	2	2	4
	Optical Fiber Communications	2	2	2	2	4
	Cellular and Mobile Communications	2	2	0	2	3
	Satellite Communications	3	2	0	3	4
IOT Stream						
	Embedded Operating Systems	3	0	2	3	4
	Internet of Things	2	2	2	2	4
	Linux for Embedded and Real-time Applications	2	0	2	2	3
	Sensors and Actuators for IOT	2	2	2	2	4
	Smart Instrumentation	3	0	2	3	4
RF & MW Stream						
	Radar System Design	3	0	2	3	4
	Smart Antennas	3	0	2	3	4
	Microwave Integrated Circuits	3	2	0	3	4
	Microwave Measurements	2	2	0	2	3
VLSI Stream						
	PERL and TCL Programming	3	0	2	3	4
	FPGA Based System Design	2	0	2	2	3
	Verification using System Verilog and UVM	3	0	2	3	4
	Advanced Digital System Design with HDL	2	2	2	2	4
	Testing of VLSI Circuits	3	0	2	3	4

HONORS

Course Code	Course Title	L	T	P	SL	C
AI & ML Stream						
	Advanced Data Science	3	0	2	3	4
	Computer Vision	2	0	2	2	3
	Advanced Machine Learning	2	2	2	2	4
	Reinforcement Learning	2	2	2	2	4
CSP Stream						
	5G Mobile Communications	3	0	2	3	4
	Software Defined Networking	3	0	2	3	4
	Fundamentals of Massive MIMO	3	0	2	3	4
	Multi Carrier Communications for 5G	3	0	2	3	4
IoT Stream						
	Cognitive Radio Networks	3	0	2	3	4
	Introduction to Industry 4.0 And Industrial Internet Of Things	2	2	2	2	4
	Multicore Architectures	3	2	0	3	4
VLSI Stream						
	Low Power VLSI Design	2	2	2	2	4
	Analog IC Design	3	0	2	3	4
	ASIC Design	3	2	0	3	4
	Digital IC Design	2	2	2	2	4
	Nano Electronic Devices Modelling	3	2	0	3	4


Member Secretary


Chairperson

DEPARTMENT OF ECE

APPENDIX II

List of Courses that Enables Employability or Entrepreneurship or Skill Development II Year I Semester Structure

S. No.	Course Code	Course Title	Year of Introduction	Employability / Entrepreneurship / Skill development
1		Probability Theory and Random Process	2025	Skill Development: Develops analytical and problem-solving skills required for signal analysis, communication systems, and statistical modeling.
2		Semiconductor Physics and Devices		Skill Development: Provides fundamental knowledge of semiconductor devices and develops technical skills required in electronics applications.
3		Data Structures	2025	Employability: Enhances programming, logical thinking, and computational problem-solving skills essential for software and embedded applications
4		Design Thinking and Engineering Orientation	2025	Entrepreneurship: Encourages innovation, creativity, and product-oriented thinking required for entrepreneurial development.
5		Signals and Systems	2025	Skill development: Builds analytical skills in signal processing and system analysis for core ECE applications.
6		Digital Electronics	2025	Employability: Provides practical knowledge of digital circuit design and enhances employability in electronics and VLSI industries.
7		Network Theory	2025	Skill development: Develops circuit analysis and electrical network problem-solving skills for advanced engineering applications.

II Year II Semester Structure

S. No.	Course Code	Course Title	Year of Introduction	Employability / Entrepreneurship / Skill development
1		Advanced Linear Algebra and PDE	2025	Skill Development: Strengthens mathematical and analytical skills required for solving engineering and communication problems
2		Industry – Interface (I ²) Course		Employability: Exposes students to industry practices and current technologies, improving industry readiness.
3		Open Elective-1	2025	Entrepreneurship/ Employability/ Skill Development: Provides interdisciplinary knowledge that supports innovation, technical competency, and career development.
4		Communication Systems	2025	Skill Development: Develops understanding of communication techniques and transmission systems used in modern communication networks.

5		Electromagnetic Waves and Transmission Lines	2025	Skill Development: Builds foundational knowledge in electromagnetic wave propagation and transmission systems.
6		Analog Electronics	2025	Employability: Provides practical exposure to analog circuit design and enhances employability in hardware industries
7		Microcontrollers	2025	Skill Development: Develops programming and interfacing skills required for embedded and automation systems.

III Year I Semester Structure

S. No.	Course Code	Course Title	Year of Introduction	Employability / Entrepreneurship / Skill development
1		Soft Skills Laboratory	2025	Skill Development: Enhances communication, teamwork, leadership, and presentation skills required in professional environments.
2		Quantitative Aptitude and Logical Reasoning		Employability: Improves aptitude and reasoning abilities essential for placements and competitive examinations.
3		Dept. Elective-2	2025	Entrepreneurship/ Employability/ Skill Development: Provides specialization in emerging technologies to improve innovation and employability.
4		Control Systems	2025	Skill development: Develops analytical and design skills related to automation and industrial control systems.
5		Digital Signal Processing	2025	Skill development: Enhances skills in digital signal analysis and filtering techniques used in communication and AI applications.
6		Antenna Theory : Analysis & Design	2025	Skill development: Develops antenna design and wireless communication skills for RF and satellite applications
7		CMOS VLSI Design	2025	Employability: Provides knowledge of integrated circuit design and improves employability in semiconductor industries.

III Year II Semester Structure

S. No.	Course Code	Course Title	Year of Introduction	Employability / Entrepreneurship / Skill development
1		Professional Communication Skills	2025	Skill Development: Improves professional communication, technical writing, and presentation abilities.
2		Dept. Elective-3		Entrepreneurship/ Employability/ Skill Development: Enhances domain-specific technical knowledge and supports innovation-oriented learning.
3		Dept. Elective-4	2025	Entrepreneurship/ Employability/ Skill Development: Provides advanced technical exposure that supports research, entrepreneurship, and employment opportunities.
4		Open Elective-2	2025	Entrepreneurship/ Employability/ Skill Development: Offers interdisciplinary exposure to enhance technical competency

				and innovation skills.
5		Microwave Engineering	2025	Skill development: Develops technical skills related to microwave devices and high-frequency communication systems.
6		Data Communications and Computer Networks	2025	Employability: Provides practical knowledge of networking concepts and communication protocols required in IT industries.

IV Year I Semester Structure

S. No.	Course Code	Ethics	Year of Introduction	Employability / Entrepreneurship / Skill development
1		Dept. Elective-5	2025	Entrepreneurship/ Employability/ Skill Development: Enhances expertise in advanced technologies relevant to industry and research applications.
2		Dept. Elective-6		Entrepreneurship/ Employability/ Skill Development: Supports specialization and technical competency development in emerging engineering domains.
3		Work-in-Lieu of Course – Research paper publications/patents/presentations/global certifications	2025	Skill Development: Develops research, innovation, technical documentation, and professional certification skills.
4		Open Elective-3	2025	Entrepreneurship/ Employability/ Skill Development: Provides interdisciplinary learning opportunities that support innovation and career growth.

IV Year II Semester Structure

S. No.	Course Code	Course Title	Year of Introduction	Employability / Entrepreneurship / Skill development
1		Project/Internship	2025	Employability: Provides real-time industrial exposure and hands-on experience to improve professional and technical competency.


Member Secretary


Chairperson

DEPARTMENT OF ECE

APPENDIX III

Comparison of Course Contents between R25-C25 and R22-C22/C24 Curriculums

PROFESSIONAL CORE

S. No.	Course Code	Course Title	% of Changes	Justification for the changes
1.		Probability Theory and Random Process	20%	Approch towards more random process due to its applications in Communications
2.		Semiconductor Physics and Devices	40%	FET Concepts are included
3.		Signals and Systems	10%	Review of Basic Trigonometry etc. to breshup the fundamentals.
4.		Design Thinking and Engineering Orientation	0%	
5.		Digital Electronics	5%	Fundamental Concepts added as Rivision.
6.		Network Theory	0%	Fundamental Course, modification not needed
7.		Electro Magnetics and Transmission Lines	20%	Planar Transmition lines, as these concepts are become fundamentals in Microstrip Antennas.
8.		Analog Electronics	20%	IC723 Voltage Regulators added.
9.		Microcontrollers	80%	Fundamentals controllers and then advanced ARM Controllers are included.
10.		Communication Systems	50%	Merged Analog and Digital Communication Courses.
11.		Control Systems	20%	State Space Analysis is included
12.		Digital Signal Processing	0%	
13.		Antennas (Design & Analysis)	5%	MIMO Parameters removed
14.		CMOS VLSI Design	20%	Digital VLSI Concepts are included
15.		Microwave Engineering	0%	
16.		Data Communications and Computer Networks	0%	

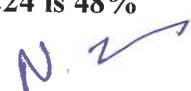
Pefcentage of change in Professional Core & Basic Science (Mandatory Courses from second Year) is R25-C25 from R22-C24 is 19%




DEPARTMENT ELECTIVES

S. No.	Course Code	Course Title	% of Changes	Justification for the changes
1.		Digital Image Processing	20%	Colour Image is included
2.		Data Science using Python	100%	New Course
3.		Artificial Intelligence	5%	Planning is included.
4.		Machine Learning And Deep Learning	60%	Data Science removed and Deep learning is included
5.		Time Series Data Analysis	40%	DL and State of Art approaches are included
6.		Advanced Wireless Communication	100%	New Course
7.		Modern Digital Communications	100%	New Course
8.		Optical Fiber Communications	20%	Optical Components are included
9.		Cellular and Mobile Communications	0%	
10.		Satellite Communications	0%	
11.		Embedded Operating Systems	100%	New Course
12.		Internet of Things	0%	
13.		Linux for Embedded and Real-time Applications	100%	New Course
14.		Sensors and Actuators for IOT	20%	Case Studies are included
15.		Smart Instrumentation	100%	New Course
16.		Radar System Design	0%	
17.		Smart Antennas	20%	Smart antennas for Wireless Communications is included
18.		Microwave Integrated Circuits	100%	New Course
19.		Microwave Measurements	80%	Anechoic Chamber Measurements are included in this course
20.		PERL and TCL Programming	10%	TK tools kits are added.
21.		FPGA Based System Design	0%	
22.		Verification using System Verilog and UVM	40%	Interfacing and Testbenches are included
23.		Advanced Digital System Design with HDL	100%	New Course
24.		Testing of VLSI Circuits	40%	Design Architectures and Fault Diagnosis are included.

Percentage of change in Department Electives R25-C25 from R22-C24 is 48%

HONORS

S. No.	Course Code	Course Title	% of Changes	Justification for the changes
1.		Advanced Data Science	100%	New Course is Included to increase job/research potentiality.
2.		Computer Vision	100%	New Course is Included to increase job/research potentiality.
3.		Advanced Machine Learning	100%	New Course is Included to increase job/research potentiality.
4.		Reinforcement Learning	100%	New Course is Included to increase job/research potentiality.
5.		5G Mobile Communications	100%	New Course is Included to increase job/research potentiality.
6.		Software Defined Networking	100%	New Course is Included to increase job/research potentiality.
7.		Fundamentals of Massive MIMO	10%	Capacity Building Tools are included
8.		Multi Carrier Communications for 5G	100%	New Course is Included to increase job/research potentiality.
9.		Cognitive Radio Networks	0%	
10.		Introduction to Industry 4.0 And Industrial Internet of Things	0%	
11.		Multicore Architectures	100%	New Course is Included to increase job/research potentiality.
12.		Low Power VLSI Design	0%	
13.		Analog IC Design	10%	Noise components are included
14.		ASIC Design	15%	Tradeoff issues are included
15.		Digital IC Design	0%	
16.		Nano Electronic Devices Modelling	100%	New Course is Included to increase job/research potentiality.

Percentage of change in Honors R25-C25 from R22-C24 is 58%




DEPARTMENT OF ECE

APPENDIX IV

List of New Courses in the R25-C25 Curriculum

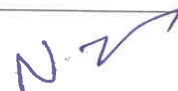
PROFESSIONAL CORE

S. No.	Course Code	Course Title	% of Change	Justification for the Changes
1.		Probability Theory and Random Process	20%	Approach towards more random process due to its applications in Communications
2.		Semiconductor Physics and Devices	40%	FET Concepts are included
3.		Electro Magnetics and Transmission Lines	20%	Planar Transmission lines, as these concepts are become fundamentals in Microstrip Antennas.
4.		Analog Electronics	20%	IC723 Voltage Regulators added.
5.		Microcontrollers	80%	Fundamentals controllers and then advanced ARM Controllers are included.
6.		Communication Systems	50%	Merged Analog and Digital Communication Courses.
7.		Control Systems	20%	State Space Analysis is included
8.		CMOS VLSI Design	20%	Digital VLSI Concepts are included




DEPARTMENT ELECTIVES

S. No.	Course Code	Course Title	% of Change	Justification for the Changes
1.		Digital Image Processing	20%	Colour Image is included
2.		Data Science using Python	100%	New Course
3.		Machine Learning And Deep Learning	60%	Data Science removed and Deep learning is included
4.		Time Series Data Analysis	40%	DL and State of Art approaches are included
5.		Advanced Wireless Communication	100%	New Course
6.		Modern Digital Communications	100%	New Course
7.		Optical Fiber Communications	20%	Optical Components are included
8.		Embedded Operating Systems	100%	New Course
9.		Linux for Embedded and Real-time Applications	100%	New Course
10.		Sensors and Actuators for IOT	20%	Case Studies are included
11.		Smart Instrumentation	100%	New Course
12.		Smart Antennas	20%	Smart antennas for Wireless Communications is included
13.		Microwave Integrated Circuits	100%	New Course
14.		Microwave Measurements	80%	Anechoic Chamber Measuremnets are included in this course
15.		Verification using System Verilog and UVM	40%	Interfacing and Testbenches are included
16.		Advanced Digital System Design with HDL	100%	New Course
17.		Testing of VLSI Circuits	40%	Design Architectures and Fault Diagnosis are included.

HONORS

S. No.	Course Code	Course Title	% of Changes	Justification for the changes
1.		Advanced Data Science	100%	New Course is Included to increase job/research potentiality.
2.		Computer Vision	100%	New Course is Included to increase job/research potentiality.
3.		Advanced Machine Learning	100%	New Course is Included to increase job/research potentiality.
4.		Reinforcement Learning	100%	New Course is Included to increase job/research potentiality.
5.		5G Mobile Communications	100%	New Course is Included to increase job/research potentiality.
6.		Software Defined Networking	100%	New Course is Included to increase job/research potentiality.
7.		Multi Carrier Communications for 5G	100%	New Course is Included to increase job/research potentiality.
8.		Multicore Architectures	100%	New Course is Included to increase job/research potentiality.
9.		Nano Electronic Devices Modelling	100%	New Course is Included to increase job/research potentiality.



DEPARTMENT OF ECE

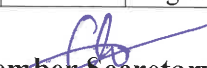
APPENDIX V

I. Details of IKS Components Incorporated in R25-C25 Curriculum

Course Type	Total number of Courses	Number of Courses Incorporating IKS	Percentage
Basic Sciences	3	1	33%
Professional Core	13	1	7%
Department Electives	24	4	17%
Open Electives	0	0	0%
Minors	0	0	0%
Honours	16	0	0%
Total	55	6	11%

II. List of Courses in the R25-C25 Curriculum Incorporating IKS

S. No.	Course Code	Course Title	Type of course	Module (Unit)	IKS Components Incorporated
1.		Advanced Linear Algebra and PDE	Basic Sciences	M1 (Practices)	Vichāra to deduce solutions to partial differential equations.
2.		Antenna Theory: Analysis and Design	Professional Core	M1 (U2)	Pingala's Chandahsastra, Pingala's Meru Prastara
3.		Optical Fiber Communications	Dept. Elective	M1 (U1)	Vaisheshika school of philosophy
4.		Smart Antennas	Dept. Elective	M1 (U2)	Aryabhata's trigonometric methods
5.		5G Mobile Communications	Dept. Elective	M1 (U2)	Yogakshema in Bhagavad Gita and Dynamic Spectrum Sharing (DSS),
				M2 (U3)	Dharma: Authentication and Encryption in 5G,
6.		Digital IC Design	Dept. Elective	M2 (U3)	vedic multiplier


Member Secretary


Chairperson

DEPARTMENT OF ECE

APPENDIX VI

I. Details of SDG Mapped Courses in R25-C25 Curriculum

Course Type	Total number of Courses	Number of Courses Mapped with SDGs	Percentage
Basic Sciences	2	2	100%
Professional Core	14	14	100%
Department Electives	24	24	100%
Open Electives	0	0	100%
Minors	0	0	100%
Honours	16	16	100%
Total	56	56	100%

II. List of R25-C25 Courses Mapped with SDGs along with Justification

S. No.	Course Code	Course Title	Type of course	SDGs covered	Justification
1		Probability Theory and Random Process	Basic Sciences	8	Probability Theory and Random Processes develop analytical and problem-solving skills essential for data-driven industries, enhancing employability and technical decision-making.
				9	The course supports innovation in communication, AI, signal processing, and engineering systems through statistical modeling and random process analysis.
				11	Concepts of probability and stochastic processes help in designing reliable smart city systems, traffic management, wireless networks, and disaster prediction models.
2		Semiconductor Physics and Devices	Basic Sciences	4	The course provides fundamental knowledge of semiconductor materials and electronic devices, strengthening scientific and technological education foundations.
				9	Semiconductor Physics and Devices support innovation in electronics, communication systems, and semiconductor industries through advanced device technologies.
				11	The course contributes to the development of energy-efficient electronic systems and smart technologies used in sustainable urban infrastructure.

				12	Understanding semiconductor device fabrication and efficient electronic design promotes optimal resource utilization and sustainable production practices.
3		Design Thinking and Engineering Orientation	Professional Core	4	The course promotes creative problem-solving, innovation, and practical learning approaches essential for modern engineering education.
				8	Design Thinking enhances entrepreneurial mindset, teamwork, and industry-oriented skills that improve employability and economic productivity.
				9	The course encourages innovative engineering solutions and technology-driven product development for industrial advancement.
				10	Human-centered design approaches help in developing inclusive solutions that address diverse societal and accessibility needs.
				12	The course emphasizes sustainable design practices and efficient resource utilization during product and system development.
4		Signals and Systems	Professional Core	9	The course provides the foundation for signal analysis and system modeling used in modern communication and automation technologies
				11	Signal processing concepts support smart communication, transportation, and monitoring systems for sustainable urban development.
5		Digital Electronics	Professional Core	7	Digital electronics enable the design of energy-efficient electronic and embedded systems.
				8	The course develops industry-relevant hardware design skills that enhance employability in electronics and semiconductor sectors.
				9	Digital circuit design forms the backbone of modern computing, automation, and communication infrastructure.
				11	Digital systems contribute to smart city technologies and intelligent public infrastructure.
6		Network Theory	Professional Core	9	Network Theory provides the analytical basis for electrical, electronic, and communication network design.
				11	Efficient network analysis supports reliable power and communication systems essential for sustainable communities.
7		Communication Systems	Professional Core	3	Communication systems support telemedicine, emergency communication, and healthcare monitoring applications.
				9	The course enables development of modern wireless and digital communication infrastructure.
				11	Communication technologies enhance smart connectivity and public communication systems in urban areas.
8		Electromagnetic Waves and Transmission Lines	Professional Core	7	The course supports efficient energy transmission and electromagnetic system design.
				9	Electromagnetic principles are fundamental for advanced communication and transmission technologies.
				11	Reliable transmission systems contribute to sustainable communication and utility infrastructure.
				12	Efficient transmission line design promotes reduced energy losses and optimal resource utilization.
9		Analog	Professional	4	The course builds strong foundations in electronic

		Electronics	Core		circuit design and practical engineering concepts.
				7	Analog circuits are essential for low-power and energy-efficient electronic applications.
				9	Analog electronics support innovation in sensors, communication, and instrumentation systems.
				11	Electronic control and sensing systems contribute to smart and sustainable urban technologies.
10		Micro Controllers	Professional Core	4	The course provides hands-on learning in embedded system design and programming.
				8	Microcontroller skills enhance employability in embedded systems and automation industries.
				9	Microcontrollers enable innovation in automation, robotics, and smart devices.
				11	Embedded technologies support smart city and intelligent monitoring applications.
				12	Efficient embedded system design promotes optimized energy and resource usage.
11		Control Systems	Professional Core	9	Control systems are essential for automation and industrial process optimization.
				11	Automated control improves efficiency in transportation, utilities, and smart infrastructure systems.
				12	Control techniques help reduce wastage and improve operational efficiency in industries.
				13	Intelligent control systems contribute to energy conservation and environmental monitoring solutions
12		Digital Signal Processing	Professional Core	9	DSP techniques are widely used in communication, multimedia, and intelligent systems development.
				11	Signal processing enables smart surveillance, transportation, and communication technologies.
				12	Efficient digital processing techniques optimize computational and energy resources.
13		Antenna Theory Analysis and Design	Professional Core	3	Antenna systems support healthcare communication and remote medical monitoring technologies.
				9	The course contributes to wireless communication and radar system innovation.
				11	Antenna technologies improve connectivity in smart city and public communication systems.
14		CMOS VLSI Design	Professional Core	8	VLSI design skills prepare students for semiconductor and chip design industries.
				9	CMOS technology drives innovation in integrated circuits and advanced electronic systems.
				11	Low-power VLSI systems support sustainable and intelligent electronic infrastructure.
				12	Efficient chip design promotes reduced power consumption and sustainable manufacturing practices.
15		Microwave Engineering	Professional Core	3	Microwave technologies are used in medical imaging, diagnostics, and healthcare communication systems.
				9	The course supports innovation in radar, satellite, and wireless communication technologies.
				11	Microwave communication systems improve reliable connectivity in urban and remote areas.
16		Data Communications and Computer Networks	Professional Core	3	Networking technologies support telemedicine and remote healthcare serv
				4	Computer networks enable digital learning and access to online educational resources

				8	Networking skills enhance employability in IT and communication industries.
				9	The course supports the development of modern digital communication infrastructure.
				11	Smart networking technologies contribute to intelligent urban services and connectivity.
17		Digital Image Processing	Department Electives	3	Image processing techniques are applied in medical imaging and healthcare diagnostics.
				4	The course develops analytical and computational skills in image analysis applications.
				9	Digital imaging supports innovation in surveillance, automation, and multimedia technologies.
				11	Imaging systems contribute to smart surveillance and urban monitoring applications.
18		Data Science using Python	Department Electives	3	Data analytics supports healthcare prediction and decision-making applications.
				4	The course enhances computational thinking and data-driven learning skills.
				8	Data science skills improve career opportunities in analytics and AI industries.
				9	Data-driven solutions foster technological innovation and industrial optimization.
				10	Data analysis can support inclusive policy-making and equitable resource distribution.
				11	Data science aids smart city planning and intelligent urban management.
				12	Data analytics helps optimize resources and reduce operational waste.
19		Artificial Intelligence	Department Electives	3	AI supports healthcare diagnostics, monitoring, and intelligent medical systems.
				4	The course promotes advanced learning in intelligent computing technologies.
				8	AI skills prepare students for emerging technology-driven careers.
				9	Artificial Intelligence accelerates automation and industrial innovation.
				11	AI-based systems enhance smart governance and urban management solutions.
				13	AI applications assist in climate prediction, environmental monitoring, and sustainability analysis.
20		Machine Learning and Deep Learning	Department Electives	3	ML and DL techniques support disease prediction and intelligent healthcare systems.
				4	The course develops advanced analytical and computational learning skills.
				8	Machine learning expertise improves employability in emerging AI industries.
				9	Intelligent learning systems drive innovation in automation and data analytics.
				11	ML applications support smart transportation and urban planning systems.
				13	AI-based predictive models contribute to climate and environmental analysis.
21		Time Series and Data Analysis	Department Electives	3	Time series analysis supports healthcare forecasting, disease trend analysis, and predictive decision-making systems.
				4	The course enhances analytical, statistical, and data interpretation skills essential for modern education and research.
				8	Data analysis and forecasting skills improve employability in analytics, finance, and

					technology-driven industries.
				9	Time series modeling supports industrial optimization, predictive maintenance, and intelligent business analytics.
				10	Data-driven insights help policymakers and organizations make informed decisions for equitable resource distribution.
				11	Forecasting and trend analysis contribute to smart city planning, traffic prediction, and urban resource management.
				12	Predictive analytics helps optimize resource utilization, reduce wastage, and improve sustainable operational practices.
22		Advanced wireless Communication	Department Electives	9	The course supports the development of advanced wireless technologies and next-generation communication infrastructure.
				11	Wireless communication systems enable smart city connectivity, intelligent transportation, and public communication services.
				12	Efficient wireless network design promotes optimized spectrum and energy utilization.
23		Modern Digital Communications	Department Electives	8	Digital communication skills enhance employability in telecommunication and networking industries.
				9	The course contributes to innovation in digital communication technologies and infrastructure development.
				11	Modern communication systems improve smart connectivity and urban digital services.
				12	Efficient digital communication techniques support optimal utilization of bandwidth and energy resources.
24		Optical fiber Communications	Department Electives	7	Optical fiber systems provide energy-efficient high-speed communication networks.
				9	The course supports innovation in broadband and high-capacity communication technologies.
				11	Optical communication networks strengthen smart city connectivity and digital infrastructure.
				12	Fiber optic technologies reduce transmission losses and improve resource-efficient communication systems.
25		Cellular and Mobile Communications	Department Electives	3	Mobile communication technologies support telemedicine, emergency communication, and healthcare accessibility.
				9	The course contributes to the advancement of mobile network infrastructure and wireless technologies.
				11	Cellular communication systems enable smart mobility, public safety, and connected urban services.
26		Satellite Communications	Department Electives	9	Satellite communication systems strengthen global connectivity, remote communication, and advanced telecommunication infrastructure.
27		Embedded Operating Systems	Department Electives	4	The course develops practical knowledge of embedded software and real-time operating system concepts.
				9	Embedded operating systems support automation, robotics, and intelligent electronic applications.
				12	Efficient embedded software design promotes optimized hardware utilization and energy efficiency.

28		Internet of Things	Department Electives	4	The course provides interdisciplinary learning in smart connected technologies and embedded applications.
				9	IoT technologies drive innovation in automation, smart devices, and industrial monitoring systems.
				11	IoT applications support smart cities through intelligent transportation, energy management, and public services.
				12	IoT-based monitoring systems help optimize resource usage and reduce wastage.
				17	IoT platforms enable interconnected systems and collaborative technological solutions across sectors.
29		Linux for Embedded and Real-Time Applications	Department Electives	4	The course enhances practical software development skills for embedded and real-time systems.
				9	Linux-based embedded systems support industrial automation and open-source technological innovation.
				12	Efficient real-time application development improves system performance and resource utilization.
30		Sensors and Actuators for IOT	Department Electives	3	Sensors and actuators are widely used in healthcare monitoring and assistive technologies.
				9	The course supports innovation in smart sensing, automation, and IoT-based industrial applications.
				11	Smart sensors enable intelligent monitoring systems for transportation, utilities, and environmental management.
31		Smart Instrumentation	Department Electives	3	Smart instrumentation systems support healthcare monitoring and biomedical measurement applications.
				7	Intelligent instrumentation improves energy monitoring and efficient power utilization systems.
				9	The course promotes innovation in automation, industrial monitoring, and intelligent measurement technologies.
				11	Smart instrumentation enables efficient monitoring solutions for urban infrastructure and public utilities.
				12	Advanced instrumentation systems help optimize resource usage and reduce industrial wastage.
				13	Environmental monitoring instruments support climate observation and pollution control systems.
32		Radar System Design	Department Electives	3	Radar technologies support disaster warning systems and emergency response applications.
				9	The course contributes to innovation in radar, surveillance, and navigation technologies.
				11	Radar systems assist in smart transportation, air traffic management, and public safety systems.
				13	Radar applications are widely used in weather forecasting and environmental monitoring.
				14	Radar systems support marine navigation, coastal surveillance, and ocean monitoring applications.
				15	Remote sensing radar technologies help in forest monitoring, wildlife tracking, and land management.
				16	Radar systems strengthen national security, border surveillance, and disaster management infrastructure.

33		Smart Antennas	Department Electives	7	Smart antenna technologies improve energy-efficient wireless communication systems.
				9	The course supports innovation in advanced wireless and adaptive communication technologies.
				11	Smart antennas enhance reliable connectivity for smart city applications and public communication networks.
				12	Efficient antenna systems optimize spectrum utilization and reduce communication losses.
				13	Energy-efficient wireless communication technologies contribute to reduced environmental impact.
34		Microwave Integrated Circuits	Department Electives	7	Microwave integrated circuits support efficient high-frequency and low-power electronic systems.
				9	The course promotes innovation in microwave communication and integrated circuit technologies.
				11	Microwave ICs contribute to advanced communication infrastructure for smart urban systems.
				12	Efficient microwave circuit design encourages optimized material and energy utilization.
35		Microwave Measurements	Department Electives	7	Microwave measurement techniques improve efficiency in communication and electronic systems.
				9	The course develops expertise in testing and characterization of advanced microwave systems.
				12	Accurate microwave measurements support quality assurance and efficient resource utilization in industries.
36		Perl and TCL Programming	Department Electives	11	Programming and scripting skills support automation and smart software solutions for sustainable digital systems.
37		FPGA-based System Design	Department Electives	8	FPGA design skills improve employability in embedded systems and semiconductor industries.
				9	FPGA technologies enable innovation in reconfigurable computing and digital system development.
				11	FPGA-based systems support smart automation and intelligent infrastructure applications.
				12	Reconfigurable hardware systems promote efficient utilization of computing resources and power.
38		Verification Using System Verilog and UVM	Department Electives	8	Verification skills enhance career opportunities in semiconductor and VLSI industries.
				9	Advanced verification methodologies improve the reliability and quality of integrated circuit systems.
39		Advanced Digital System Design with HDL	Department Electives	8	HDL-based digital design skills strengthen employability in chip design and embedded industries.
				9	The course supports innovation in advanced digital hardware and embedded system design.
				11	Digital hardware systems contribute to smart automation and intelligent infrastructure solutions.
				12	Efficient hardware design techniques reduce power consumption and optimize system resources.

40		Testing of VLSI Circuits	Department Electives	9	VLSI testing techniques ensure reliability and performance of semiconductor devices and systems.
				11	Reliable integrated circuits support dependable smart technologies and urban digital infrastructure.
41		Advance Data Science	Honors	3	Advanced data analytics support healthcare prediction and intelligent decision-making systems.
				4	The course enhances advanced computational, analytical, and research-oriented learning skills.
				8	Data science expertise improves employability in analytics, AI, and technology industries.
				9	Advanced analytics and predictive modeling drive industrial innovation and optimization.
				10	Data-driven solutions support equitable policy planning and inclusive development strategies.
				11	Data science applications contribute to smart city planning and urban management.
				13	Predictive analytics support climate modeling, environmental monitoring, and sustainability analysis.
42		Computer Vision	Honors	3	Computer vision technologies support medical imaging and healthcare diagnostics.
				4	The course develops advanced learning in image analysis and intelligent visual systems.
				9	Computer vision drives innovation in automation, robotics, and surveillance technologies.
				11	Vision-based systems support smart transportation, security, and urban monitoring applications.
43		Advanced Machine Learning	Honors	3	Advanced ML techniques support predictive healthcare and intelligent diagnostic systems.
				4	The course promotes advanced learning in intelligent algorithms and data-driven technologies.
				8	Machine learning expertise enhances employability in AI-driven industries.
				9	Advanced ML models support industrial automation and technological innovation.
				11	Intelligent ML applications contribute to smart city services and infrastructure management.
				13	Intelligent ML applications contribute to smart city services and infrastructure management.
44		Reinforcement Learning	Honors	3	Reinforcement learning supports intelligent healthcare assistance and adaptive medical systems.
				4	The course develops advanced knowledge in autonomous and adaptive learning algorithms.
				8	Reinforcement learning skills improve opportunities in AI and automation sectors.
				9	RL techniques drive innovation in robotics, automation, and intelligent systems.
				11	Autonomous learning systems contribute to smart transportation and urban optimization.
				13	Reinforcement learning supports intelligent energy management and environmental optimization systems.
45		5G Mobile Communications	Honors	3	5G technologies support telemedicine, remote healthcare, and emergency communication services.

				7	5G networks enable energy-efficient communication technologies and smart energy systems.
				8	The course develops advanced telecom skills relevant to next-generation communication industries.
				9	5G communication drives innovation in high-speed wireless infrastructure and digital transformation.
				11	5G networks support smart city applications, autonomous systems, and intelligent transportation.
				16	Secure and reliable 5G communication systems strengthen public safety and emergency response infrastructure.
46		Software Defined Networking	Honors	4	The course develops advanced knowledge in programmable networking and modern communication technologies.
				8	SDN skills enhance employability in networking, cloud computing, and IT infrastructure industries.
				9	Software Defined Networking supports innovation in intelligent and flexible communication infrastructures.
				11	SDN technologies enable efficient smart city networking and digital public service systems.
47		Fundamentals of Massive MIMO	Honors	8	Massive MIMO technologies provide advanced communication skills relevant to next-generation telecom industries.
				9	The course supports innovation in high-capacity wireless communication and 5G infrastructure.
				11	Massive MIMO systems improve connectivity and network efficiency for smart city applications.
48		Multi carrier Communications for 5G		8	The course develops expertise in modern wireless communication technologies required in telecom industries.
				9	Multi-carrier communication techniques strengthen advanced 5G communication infrastructure development.
				11	5G communication systems support smart transportation, intelligent connectivity, and urban digital services.
49		Cognitive Radio Networks	Honors	9	Cognitive radio technologies improve spectrum efficiency and advanced wireless communication systems.
				11	Adaptive wireless networks support reliable communication for smart city applications.
				12	Efficient spectrum utilization promotes sustainable use of communication resources.
				17	Cognitive radio networks enable collaborative and interoperable communication systems across sectors.
50		Introduction to Industry 4.0 and Industrial Internet of Things	Honors	2	Industry 4.0 technologies support smart agriculture and precision farming systems for improved food production.
				3	IIoT systems enable smart healthcare monitoring and industrial safety applications.
				4	The course develops interdisciplinary knowledge in automation, smart systems, and digital transformation technologies.
				7	Industry 4.0 technologies support intelligent energy monitoring and efficient industrial power

					management.
				8	The course enhances employability in automation, IoT, and smart manufacturing industries.
				9	IIoT technologies drive industrial automation and innovation in smart manufacturing systems.
				11	Smart industrial systems contribute to sustainable urban infrastructure and intelligent public services.
				13	Smart monitoring and automation technologies support energy conservation and environmental sustainability.
				17	Industry 4.0 encourages interconnected industrial ecosystems and collaborative digital transformation.
51		Multicore Architecture	Honors	4	The course provides advanced learning in parallel processing and modern processor architectures.
				8	Multicore architecture skills enhance employability in computing and embedded system industries.
				9	Multicore systems support innovation in high-performance computing and intelligent electronic systems.
				11	Efficient computing architectures contribute to smart infrastructure and digital service systems.
				12	Multicore processing improves computational efficiency and optimized resource utilization.
52		Low Power VLSI Design	Honors	9	Low-power VLSI techniques support innovation in energy-efficient semiconductor and embedded systems.
53		Analog IC Design	Honors	8	Analog IC design skills improve employability in semiconductor and electronic design industries.
				9	The course supports innovation in integrated circuit and analog system development.
54		ASIC Design	Honors	8	ASIC design develops specialized chip design skills required in semiconductor industries.
				9	The course contributes to innovation in high-performance and application-specific integrated circuits.
55		Digital IC Design	Honors	8	Digital IC design enhances technical skills relevant to VLSI and semiconductor industries.
				9	The course supports the development of advanced digital integrated circuit technologies.
56		Nano Electronic Devices Modelling	Honors	7	Nanoelectronic device technologies support energy-efficient electronic systems and sustainable innovations.
				9	The course promotes research and innovation in nanoscale semiconductor device technologies.

I. Mapping of R25-C25 Courses with individual SDGs

SDG No.	SDG Name	No. of courses mapped	Percentage of courses mapped (%)
1	No Poverty	0	0
2	Zero Hunger	1	2
3	Good Health and Well-Being	19	34
4	Quality Education	21	38
5	Gender Equality	0	0
6	Clean Water and Sanitation	0	0
7	Affordable and Clean Energy	11	20
8	Decent Work and Economic Growth	27	48
9	Industry, Innovation and Infrastructure	56	100
10	Reduced Inequalities	4	7
11	Sustainable Cities and Communities	44	78
12	Responsible Consumption and Production	23	41
13	Climate Action	10	18
14	Life Below Water	1	2
15	Life On Land	1	2
16	Peace, Justice and Strong Institutions	2	4
17	Partnerships for the Goals	3	5


Member Secretary


Chairperson

DEPARTMENT OF ECE

APPENDIX VII

Action Taken Report (ATR) on the suggestions given in earlier BoS meetings

S.No.	Action Point	Response
1.	Dr. P. Srihari Rao suggested elaborating the syllabus contents of Module-1, Unit-1 to ensure stronger conceptual clarity in semiconductor fundamentals.	Module-1, Unit-1 of the SPD syllabus has been expanded. Additional core topics covering fundamentals.
2.	Expert recommended explicitly including Feedback Amplifier Topologies and Multistage Amplifiers in either SPD or the Analog Electronics/Circuits course.	Feedback Amplifier Topologies and Multistage Amplifiers have been formally incorporated into the core modules of the Analog Circuits course syllabus to maintain a logical teaching progression.
3.	Expert advised expanding and detailing the Module-2 contents to ensure adequate coverage of core communication concepts.	The Module-2 syllabus for Communication Systems has been re-structured and expanded with explicit sub-topics to ensure comprehensive coverage of the core engineering concepts.
4.	Expert advised that the syllabus should cover microcontrollers ranging from basic architecture and programming up to advanced platforms.	The curriculum was updated to ensure structural progression. The syllabus now initiates with foundational architecture/assembly concepts and smoothly transitions into advanced embedded platforms (ARM/Cortex).
5.	Expert suggested introducing elective courses related to 5G and advanced wireless communication technologies, subject to feasibility.	New department elective course titled "5G and Advanced Wireless Communication" has been designed in the same day with the help of external experts and introduced into the elective pool.
6.	Expert recommended including the textbook authored by Herold Kolimbris as an additional reference text.	The textbook " <i>Fiber Optic Communications</i> " by Herold Kolimbris has been added to the list of Reference Books in the course syllabus.
7.	Expert observed an excessive number of reference books and suggested removing reference book No. 4 to retain only standard texts.	The reference book listed under Serial No. 4 has been removed. The reference section has been streamlined to feature only core, high-quality standard textbooks.
8.	External Expert suggested that the Chemistry course may be removed and replaced with a department-specific professional core course to strengthen domain knowledge in ECE.	The expert committee reviewed on the same day, the suggestion but resolved to retain Chemistry in the curriculum. Engineering Chemistry is vital for ECE students as it provides the foundational science required for understanding semiconductor materials, VLSI fabrication processes, nanotechnology, and battery/energy-storage technologies. However, the syllabus will be reviewed to ensure emphasis on engineering and electronics-compatible applications.
9.	Dr. P. Srihari Rao recommended giving greater emphasis to patent filing under the Research/Work-in-Lieu credit system, alongside publications.	The recommendations sent to Dean AAA-office. Clear credit weightage have been introduced for filled/published patents also.


Member Secretary


Chairperson

DEPARTMENT OF ECE

APPENDIX I

B,Tech, ECE Programme : Curriculum Structure

II Year I Semester Structure

Course Code	Course Title	L	T	P	SL	C	Course category
	Probability Theory and Random Process	3	2	0	3	4	Basic Sciences
	Semiconductor Physics and Devices	2	0	2	2	3	Basic Sciences
	Data Structures	2	2	2	2	4	Basic Engineering
	Design Thinking and Engineering Orientation	0	0	2	0	1	Basic Engineering
	Signals and Systems	2	2	2	2	4	Professional Core-1
	Digital Electronics	2	2	2	2	4	Professional Core-2
	Network Theory	3	2	0	3	4	Professional Core-3
	Total					24	

II Year II Semester

Course Code	Course Title	L	T	P	SL	C	Course category
	Advanced Linear Algebra and PDE	2	2	0	2	3	Basic Sciences
	Industry – Interface (I^2) Course					1	Dept. Elective-1
	Open Elective-1					3	Open Elective-1
	Communication Systems	3	-	2	3	4	Professional Core-4
	Electromagnetic Waves and Transmission Lines	2	2	2	2	4	Professional Core-5
	Analog Electronics	2	2	2	2	4	Professional Core-6
	Microcontrollers	2	2	2	2	4	Professional Core-7
	Field Project	0	0	2	0	1	Project
	Total					24	

III Year I Semester

Course Code	Course Title	L	T	P	SL	C	Course category
	Soft Skills Laboratory	0	0	2	0	1	Humanities
	Quantitative Aptitude and Logical Reasoning	0	2	0	0	1	Humanities
	Dept. Elective-2					3	Dept. Elective-2
	Control Systems	2	2	0	2	3	Professional Core-8
	Digital Signal Processing	2	2	2	2	4	Professional Core-9
	Antenna Theory: Analysis and Design	3	0	2	3	4	Professional Core-10
	CMOS VLSI Design	3	0	2	3	4	Professional Core-11
	Sub-Total	11	12	08	11	20	
	Honours/Minors (Add-on)					4	Honours/Minors
	Total					24	

III Year II Semester

Course Code	Course Title	L	T	P	SL	C	Course category
	Professional Communication Skills	0	0	2	0	1	Humanities
	Dept. Elective-3					4	Dept. Elective-3
	Dept. Elective-4					4	Dept. Elective-4
	Open Elective-2					3	Open Elective-2
	Microwave Engineering	3	0	2	3	4	Professional Core-12
	Data Communications and Computer Networks	2	0	2	2	3	Professional Core-13
	Project	0	0	2	2	1	Project
	Sub-Total	11	06	12	13	20	
	Honours/Minors (Add-on)					4	Honours/Minors
	Total					24	

IV Year I Semester

Course Code	Course Title	L	T	P	SL	C	Course category
	Ethics for Engineers	1	2	0	1	2	Humanities
	Dept. Elective-5					4	Dept. Elective-5
	Dept. Elective-6					4	Dept. Elective-6
	Work-in-Lieu of Course – Research paper publications/patents/presentations/ global certifications					4*	Dept. Elective-7
	Open Elective-3					3	Open Elective-3
	Sub-Total					17	
	Honours/Minors (Add-on)					4	Honours/Minors
	Total					21	

IV Year II Semester

Course Code	Course Title	L	T	P	SL	C	Course category
	Project/Internship	0	2	22	0	12	Project/ Internship
	Sub-Total	0	2	22	0	12	
	Honours/Minors (Add-on)					4	Honours/Minors
	Total					16	

L=Lecture; T= Tutorial; P= Practical; SL= Self Learning; C=Credits

DEPARTMENT ELECTIVES

Course Code	Course Title	L	T	P	SL	C
AI & ML Stream						
	Digital Image Processing	2	0	2	2	3
	Data Science using Python	2	0	2	2	3
	Artificial Intelligence	2	2	2	2	4
	Machine Learning And Deep Learning	2	2	2	2	4
	Time Series Data Analysis	3	0	2	3	4
CSP Stream						
	Advanced Wireless Communication	2	2	2	2	4
	Modern Digital Communications	2	2	2	2	4
	Optical Fiber Communications	2	2	2	2	4
	Cellular and Mobile Communications	2	2	0	2	3
	Satellite Communications	3	2	0	3	4
IOT Stream						
	Embedded Operating Systems	3	0	2	3	4
	Internet of Things	2	2	2	2	4
	Linux for Embedded and Real-time Applications	2	0	2	2	3
	Sensors and Actuators for IOT	2	2	2	2	4
	Smart Instrumentation	3	0	2	3	4
RF & MW Stream						
	Radar System Design	3	0	2	3	4
	Smart Antennas	3	0	2	3	4
	Microwave Integrated Circuits	3	2	0	3	4
	Microwave Measurements	2	2	0	2	3
VLSI Stream						
	PERL and TCL Programming	3	0	2	3	4
	FPGA Based System Design	2	0	2	2	3
	Verification using System Verilog and UVM	3	0	2	3	4
	Advanced Digital System Design with HDL	2	2	2	2	4
	Testing of VLSI Circuits	3	0	2	3	4

HONORS

Course Code	Course Title	L	T	P	SL	C
AI & ML Stream						
	Advanced Data Science	3	0	2	3	4
	Computer Vision	2	0	2	2	3
	Advanced Machine Learning	2	2	2	2	4
	Reinforcement Learning	2	2	2	2	4
CSP Stream						
	5G Mobile Communications	3	0	2	3	4
	Software Defined Networking	3	0	2	3	4
	Fundamentals of Massive MIMO	3	0	2	3	4
	Multi Carrier Communications for 5G	3	0	2	3	4
IoT Stream						
	Cognitive Radio Networks	3	0	2	3	4
	Introduction to Industry 4.0 And Industrial Internet Of Things	2	2	2	2	4
	Multicore Architectures	3	2	0	3	4
VLSI Stream						
	Low Power VLSI Design	2	2	2	2	4
	Analog IC Design	3	0	2	3	4
	ASIC Design	3	2	0	3	4
	Digital IC Design	2	2	2	2	4
	Nano Electronic Devices Modelling	3	2	0	3	4


Member Secretary


Chairperson

DEPARTMENT OF ECE

APPENDIX II

List of Courses that Enables Employability or Entrepreneurship or Skill Development II Year I Semester Structure

S. No.	Course Code	Course Title	Year of Introduction	Employability / Entrepreneurship / Skill development
1		Probability Theory and Random Process	2025	Skill Development: Develops analytical and problem-solving skills required for signal analysis, communication systems, and statistical modeling.
2		Semiconductor Physics and Devices		Skill Development: Provides fundamental knowledge of semiconductor devices and develops technical skills required in electronics applications.
3		Data Structures	2025	Employability: Enhances programming, logical thinking, and computational problem-solving skills essential for software and embedded applications
4		Design Thinking and Engineering Orientation	2025	Entrepreneurship: Encourages innovation, creativity, and product-oriented thinking required for entrepreneurial development.
5		Signals and Systems	2025	Skill development: Builds analytical skills in signal processing and system analysis for core ECE applications.
6		Digital Electronics	2025	Employability: Provides practical knowledge of digital circuit design and enhances employability in electronics and VLSI industries.
7		Network Theory	2025	Skill development: Develops circuit analysis and electrical network problem-solving skills for advanced engineering applications.

II Year II Semester Structure

S. No.	Course Code	Course Title	Year of Introduction	Employability / Entrepreneurship / Skill development
1		Advanced Linear Algebra and PDE	2025	Skill Development: Strengthens mathematical and analytical skills required for solving engineering and communication problems
2		Industry – Interface (I ²) Course		Employability: Exposes students to industry practices and current technologies, improving industry readiness.
3		Open Elective-1	2025	Entrepreneurship/ Employability/ Skill Development: Provides interdisciplinary knowledge that supports innovation, technical competency, and career development.
4		Communication Systems	2025	Skill Development: Develops understanding of communication techniques and transmission systems used in modern communication networks.

5		Electromagnetic Waves and Transmission Lines	2025	Skill Development: Builds foundational knowledge in electromagnetic wave propagation and transmission systems.
6		Analog Electronics	2025	Employability: Provides practical exposure to analog circuit design and enhances employability in hardware industries
7		Microcontrollers	2025	Skill Development: Develops programming and interfacing skills required for embedded and automation systems.

III Year I Semester Structure

S. No.	Course Code	Course Title	Year of Introduction	Employability / Entrepreneurship / Skill development
1		Soft Skills Laboratory	2025	Skill Development: Enhances communication, teamwork, leadership, and presentation skills required in professional environments.
2		Quantitative Aptitude and Logical Reasoning		Employability: Improves aptitude and reasoning abilities essential for placements and competitive examinations.
3		Dept. Elective-2	2025	Entrepreneurship/ Employability/ Skill Development: Provides specialization in emerging technologies to improve innovation and employability.
4		Control Systems	2025	Skill development: Develops analytical and design skills related to automation and industrial control systems.
5		Digital Signal Processing	2025	Skill development: Enhances skills in digital signal analysis and filtering techniques used in communication and AI applications.
6		Antenna Theory : Analysis & Design	2025	Skill development: Develops antenna design and wireless communication skills for RF and satellite applications
7		CMOS VLSI Design	2025	Employability: Provides knowledge of integrated circuit design and improves employability in semiconductor industries.

III Year II Semester Structure

S. No.	Course Code	Course Title	Year of Introduction	Employability / Entrepreneurship / Skill development
1		Professional Communication Skills	2025	Skill Development: Improves professional communication, technical writing, and presentation abilities.
2		Dept. Elective-3		Entrepreneurship/ Employability/ Skill Development: Enhances domain-specific technical knowledge and supports innovation-oriented learning.
3		Dept. Elective-4	2025	Entrepreneurship/ Employability/ Skill Development: Provides advanced technical exposure that supports research, entrepreneurship, and employment opportunities.
4		Open Elective-2	2025	Entrepreneurship/ Employability/ Skill Development: Offers interdisciplinary exposure to enhance technical competency

				and innovation skills.
5		Microwave Engineering	2025	Skill development: Develops technical skills related to microwave devices and high-frequency communication systems.
6		Data Communications and Computer Networks	2025	Employability: Provides practical knowledge of networking concepts and communication protocols required in IT industries.

IV Year I Semester Structure

S. No.	Course Code	Ethics	Year of Introduction	Employability / Entrepreneurship / Skill development
1		Dept. Elective-5	2025	Entrepreneurship/ Employability/ Skill Development: Enhances expertise in advanced technologies relevant to industry and research applications.
2		Dept. Elective-6		Entrepreneurship/ Employability/ Skill Development: Supports specialization and technical competency development in emerging engineering domains.
3		Work-in-Lieu of Course – Research paper publications/patents/ presentations/ global certifications	2025	Skill Development: Develops research, innovation, technical documentation, and professional certification skills.
4		Open Elective-3	2025	Entrepreneurship/ Employability/ Skill Development: Provides interdisciplinary learning opportunities that support innovation and career growth.

IV Year II Semester Structure

S. No.	Course Code	Course Title	Year of Introduction	Employability / Entrepreneurship / Skill development
1		Project/Internship	2025	Employability: Provides real-time industrial exposure and hands-on experience to improve professional and technical competency.


Member Secretary


Chairperson

DEPARTMENT OF ECE

APPENDIX III

Comparison of Course Contents between R25-C25 and R22-C22/C24 Curriculums PROFESSIONAL CORE

S. No.	Course Code	Course Title	% of Changes	Justification for the changes
1.		Probability Theory and Random Process	20%	Approch towards more random process due to its applications in Communications
2.		Semiconductor Physics and Devices	40%	FET Concepts are included
3.		Signals and Systems	10%	Review of Basic Trigonometry etc. to breshup the fundamentals.
4.		Design Thinking and Engineering Orientation	0%	
5.		Digital Electronics	5%	Fundamental Concepts added as Rivision.
6.		Network Theory	0%	Fundamental Course, modification not needed
7.		Electro Magnetics and Transmission Lines	20%	Planar Transmition lines, as these concepts are become fundamentals in Microstrip Antennas.
8.		Analog Electronics	20%	IC723 Voltage Regulators added.
9.		Microcontrollers	80%	Fundamentals controllers and then advanced ARM Controllers are included.
10.		Communication Systems	50%	Merged Analog and Digital Communication Courses.
11.		Control Systems	20%	State Space Analysis is included
12.		Digital Signal Processing	0%	
13.		Antennas (Design & Analysis)	5%	MIMO Parameters removed
14.		CMOS VLSI Design	20%	Digital VLSI Concepts are included
15.		Microwave Engineering	0%	
16.		Data Communications and Computer Networks	0%	

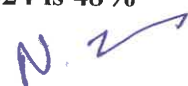
Pefcentage of change in Professional Core & Basic Science (Mandatory Courses from second Year) is R25-C25 from R22-C24 is 19%




DEPARTMENT ELECTIVES

S. No.	Course Code	Course Title	% of Changes	Justification for the changes
1.		Digital Image Processing	20%	Colour Image is included
2.		Data Science using Python	100%	New Course
3.		Artificial Intelligence	5%	Planning is included.
4.		Machine Learning And Deep Learning	60%	Data Science removed and Deep learning is included
5.		Time Series Data Analysis	40%	DL and State of Art approaches are included
6.		Advanced Wireless Communication	100%	New Course
7.		Modern Digital Communications	100%	New Course
8.		Optical Fiber Communications	20%	Optical Components are included
9.		Cellular and Mobile Communications	0%	
10.		Satellite Communications	0%	
11.		Embedded Operating Systems	100%	New Course
12.		Internet of Things	0%	
13.		Linux for Embedded and Real-time Applications	100%	New Course
14.		Sensors and Actuators for IOT	20%	Case Studies are included
15.		Smart Instrumentation	100%	New Course
16.		Radar System Design	0%	
17.		Smart Antennas	20%	Smart antennas for Wireless Communications is included
18.		Microwave Integrated Circuits	100%	New Course
19.		Microwave Measurements	80%	Anechoic Chamber Measurements are included in this course
20.		PERL and TCL Programming	10%	TK tools kits are added.
21.		FPGA Based System Design	0%	
22.		Verification using System Verilog and UVM	40%	Interfacing and Testbenches are included
23.		Advanced Digital System Design with HDL	100%	New Course
24.		Testing of VLSI Circuits	40%	Design Architectures and Fault Diagnosis are included.

Percentage of change in Department Electives R25-C25 from R22-C24 is 48%

HONORS

S. No.	Course Code	Course Title	% of Changes	Justification for the changes
1.		Advanced Data Science	100%	New Course is Included to increase job/research potentiality.
2.		Computer Vision	100%	New Course is Included to increase job/research potentiality.
3.		Advanced Machine Learning	100%	New Course is Included to increase job/research potentiality.
4.		Reinforcement Learning	100%	New Course is Included to increase job/research potentiality.
5.		5G Mobile Communications	100%	New Course is Included to increase job/research potentiality.
6.		Software Defined Networking	100%	New Course is Included to increase job/research potentiality.
7.		Fundamentals of Massive MIMO	10%	Capacity Building Tools are included
8.		Multi Carrier Communications for 5G	100%	New Course is Included to increase job/research potentiality.
9.		Cognitive Radio Networks	0%	
10.		Introduction to Industry 4.0 And Industrial Internet of Things	0%	
11.		Multicore Architectures	100%	New Course is Included to increase job/research potentiality.
12.		Low Power VLSI Design	0%	
13.		Analog IC Design	10%	Noise components are included
14.		ASIC Design	15%	Tradeoff issues are included
15.		Digital IC Design	0%	
16.		Nano Electronic Devices Modelling	100%	New Course is Included to increase job/research potentiality.

Percentage of change in Honors R25-C25 from R22-C24 is 58%




DEPARTMENT OF ECE

APPENDIX IV

List of New Courses in the R25-C25 Curriculum

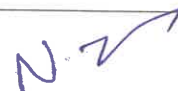
PROFESSIONAL CORE

S. No.	Course Code	Course Title	% of Change	Justification for the Changes
1.		Probability Theory and Random Process	20%	Approach towards more random process due to its applications in Communications
2.		Semiconductor Physics and Devices	40%	FET Concepts are included
3.		Electro Magnetics and Transmission Lines	20%	Planar Transmission lines, as these concepts are become fundamentals in Microstrip Antennas.
4.		Analog Electronics	20%	IC723 Voltage Regulators added.
5.		Microcontrollers	80%	Fundamentals controllers and then advanced ARM Controllers are included.
6.		Communication Systems	50%	Merged Analog and Digital Communication Courses.
7.		Control Systems	20%	State Space Analysis is included
8.		CMOS VLSI Design	20%	Digital VLSI Concepts are included




DEPARTMENT ELECTIVES

S. No.	Course Code	Course Title	% of Change	Justification for the Changes
1.		Digital Image Processing	20%	Colour Image is included
2.		Data Science using Python	100%	New Course
3.		Machine Learning And Deep Learning	60%	Data Science removed and Deep learning is included
4.		Time Series Data Analysis	40%	DL and State of Art approaches are included
5.		Advanced Wireless Communication	100%	New Course
6.		Modern Digital Communications	100%	New Course
7.		Optical Fiber Communications	20%	Optical Components are included
8.		Embedded Operating Systems	100%	New Course
9.		Linux for Embedded and Real-time Applications	100%	New Course
10.		Sensors and Actuators for IOT	20%	Case Studies are included
11.		Smart Instrumentation	100%	New Course
12.		Smart Antennas	20%	Smart antennas for Wireless Communications is included
13.		Microwave Integrated Circuits	100%	New Course
14.		Microwave Measurements	80%	Anechoic Chamber Measuremnets are included in this course
15.		Verification using System Verilog and UVM	40%	Interfacing and Testbenches are included
16.		Advanced Digital System Design with HDL	100%	New Course
17.		Testing of VLSI Circuits	40%	Design Architectures and Fault Diagnosis are included.

HONORS

S. No.	Course Code	Course Title	% of Changes	Justification for the changes
1.		Advanced Data Science	100%	New Course is Included to increase job/research potentiality.
2.		Computer Vision	100%	New Course is Included to increase job/research potentiality.
3.		Advanced Machine Learning	100%	New Course is Included to increase job/research potentiality.
4.		Reinforcement Learning	100%	New Course is Included to increase job/research potentiality.
5.		5G Mobile Communications	100%	New Course is Included to increase job/research potentiality.
6.		Software Defined Networking	100%	New Course is Included to increase job/research potentiality.
7.		Multi Carrier Communications for 5G	100%	New Course is Included to increase job/research potentiality.
8.		Multicore Architectures	100%	New Course is Included to increase job/research potentiality.
9.		Nano Electronic Devices Modelling	100%	New Course is Included to increase job/research potentiality.



DEPARTMENT OF ECE

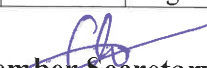
APPENDIX V

I. Details of IKS Components Incorporated in R25-C25 Curriculum

Course Type	Total number of Courses	Number of Courses Incorporating IKS	Percentage
Basic Sciences	3	1	33%
Professional Core	13	1	7%
Department Electives	24	4	17%
Open Electives	0	0	0%
Minors	0	0	0%
Honours	16	0	0%
Total	55	6	11%

II. List of Courses in the R25-C25 Curriculum Incorporating IKS

S. No.	Course Code	Course Title	Type of course	Module (Unit)	IKS Components Incorporated
1.		Advanced Linear Algebra and PDE	Basic Sciences	M1 (Practices)	Vichāra to deduce solutions to partial differential equations.
2.		Antenna Theory: Analysis and Design	Professional Core	M1 (U2)	Pingala's Chandahsastra, Pingala's Meru Prastara
3.		Optical Fiber Communications	Dept. Elective	M1 (U1)	Vaisheshika school of philosophy
4.		Smart Antennas	Dept. Elective	M1 (U2)	Aryabhata's trigonometric methods
5.		5G Mobile Communications	Dept. Elective	M1 (U2)	Yogakshema in Bhagavad Gita and Dynamic Spectrum Sharing (DSS),
				M2 (U3)	Dharma: Authentication and Encryption in 5G,
6.		Digital IC Design	Dept. Elective	M2 (U3)	vedic multiplier


Member Secretary


Chairperson

DEPARTMENT OF ECE

APPENDIX VI

I. Details of SDG Mapped Courses in R25-C25 Curriculum

Course Type	Total number of Courses	Number of Courses Mapped with SDGs	Percentage
Basic Sciences	2	2	100%
Professional Core	14	14	100%
Department Electives	24	24	100%
Open Electives	0	0	100%
Minors	0	0	100%
Honours	16	16	100%
Total	56	56	100%

II. List of R25-C25 Courses Mapped with SDGs along with Justification

S. No.	Course Code	Course Title	Type of course	SDGs covered	Justification
1		Probability Theory and Random Process	Basic Sciences	8	Probability Theory and Random Processes develop analytical and problem-solving skills essential for data-driven industries, enhancing employability and technical decision-making.
				9	The course supports innovation in communication, AI, signal processing, and engineering systems through statistical modeling and random process analysis.
				11	Concepts of probability and stochastic processes help in designing reliable smart city systems, traffic management, wireless networks, and disaster prediction models.
2		Semiconductor Physics and Devices	Basic Sciences	4	The course provides fundamental knowledge of semiconductor materials and electronic devices, strengthening scientific and technological education foundations.
				9	Semiconductor Physics and Devices support innovation in electronics, communication systems, and semiconductor industries through advanced device technologies.
				11	The course contributes to the development of energy-efficient electronic systems and smart technologies used in sustainable urban infrastructure.

				12	Understanding semiconductor device fabrication and efficient electronic design promotes optimal resource utilization and sustainable production practices.
3		Design Thinking and Engineering Orientation	Professional Core	4	The course promotes creative problem-solving, innovation, and practical learning approaches essential for modern engineering education.
				8	Design Thinking enhances entrepreneurial mindset, teamwork, and industry-oriented skills that improve employability and economic productivity.
				9	The course encourages innovative engineering solutions and technology-driven product development for industrial advancement.
				10	Human-centered design approaches help in developing inclusive solutions that address diverse societal and accessibility needs.
				12	The course emphasizes sustainable design practices and efficient resource utilization during product and system development.
4		Signals and Systems	Professional Core	9	The course provides the foundation for signal analysis and system modeling used in modern communication and automation technologies
				11	Signal processing concepts support smart communication, transportation, and monitoring systems for sustainable urban development.
5		Digital Electronics	Professional Core	7	Digital electronics enable the design of energy-efficient electronic and embedded systems.
				8	The course develops industry-relevant hardware design skills that enhance employability in electronics and semiconductor sectors.
				9	Digital circuit design forms the backbone of modern computing, automation, and communication infrastructure.
				11	Digital systems contribute to smart city technologies and intelligent public infrastructure.
6		Network Theory	Professional Core	9	Network Theory provides the analytical basis for electrical, electronic, and communication network design.
				11	Efficient network analysis supports reliable power and communication systems essential for sustainable communities.
7		Communication Systems	Professional Core	3	Communication systems support telemedicine, emergency communication, and healthcare monitoring applications.
				9	The course enables development of modern wireless and digital communication infrastructure.
				11	Communication technologies enhance smart connectivity and public communication systems in urban areas.
8		Electromagnetic Waves and Transmission Lines	Professional Core	7	The course supports efficient energy transmission and electromagnetic system design.
				9	Electromagnetic principles are fundamental for advanced communication and transmission technologies.
				11	Reliable transmission systems contribute to sustainable communication and utility infrastructure.
				12	Efficient transmission line design promotes reduced energy losses and optimal resource utilization.
9		Analog	Professional	4	The course builds strong foundations in electronic

		Electronics	Core		circuit design and practical engineering concepts.
				7	Analog circuits are essential for low-power and energy-efficient electronic applications.
				9	Analog electronics support innovation in sensors, communication, and instrumentation systems.
				11	Electronic control and sensing systems contribute to smart and sustainable urban technologies.
10		Micro Controllers	Professional Core	4	The course provides hands-on learning in embedded system design and programming.
				8	Microcontroller skills enhance employability in embedded systems and automation industries.
				9	Microcontrollers enable innovation in automation, robotics, and smart devices.
				11	Embedded technologies support smart city and intelligent monitoring applications.
				12	Efficient embedded system design promotes optimized energy and resource usage.
11		Control Systems	Professional Core	9	Control systems are essential for automation and industrial process optimization.
				11	Automated control improves efficiency in transportation, utilities, and smart infrastructure systems.
				12	Control techniques help reduce wastage and improve operational efficiency in industries.
				13	Intelligent control systems contribute to energy conservation and environmental monitoring solutions
12		Digital Signal Processing	Professional Core	9	DSP techniques are widely used in communication, multimedia, and intelligent systems development.
				11	Signal processing enables smart surveillance, transportation, and communication technologies.
				12	Efficient digital processing techniques optimize computational and energy resources.
13		Antenna Theory Analysis and Design	Professional Core	3	Antenna systems support healthcare communication and remote medical monitoring technologies.
				9	The course contributes to wireless communication and radar system innovation.
				11	Antenna technologies improve connectivity in smart city and public communication systems.
14		CMOS VLSI Design	Professional Core	8	VLSI design skills prepare students for semiconductor and chip design industries.
				9	CMOS technology drives innovation in integrated circuits and advanced electronic systems.
				11	Low-power VLSI systems support sustainable and intelligent electronic infrastructure.
				12	Efficient chip design promotes reduced power consumption and sustainable manufacturing practices.
15		Microwave Engineering	Professional Core	3	Microwave technologies are used in medical imaging, diagnostics, and healthcare communication systems.
				9	The course supports innovation in radar, satellite, and wireless communication technologies.
				11	Microwave communication systems improve reliable connectivity in urban and remote areas.
16		Data Communications and Computer Networks	Professional Core	3	Networking technologies support telemedicine and remote healthcare serv
				4	Computer networks enable digital learning and access to online educational resources

				8	Networking skills enhance employability in IT and communication industries.
				9	The course supports the development of modern digital communication infrastructure.
				11	Smart networking technologies contribute to intelligent urban services and connectivity.
17		Digital Image Processing	Department Electives	3	Image processing techniques are applied in medical imaging and healthcare diagnostics.
				4	The course develops analytical and computational skills in image analysis applications.
				9	Digital imaging supports innovation in surveillance, automation, and multimedia technologies.
				11	Imaging systems contribute to smart surveillance and urban monitoring applications.
18		Data Science using Python	Department Electives	3	Data analytics supports healthcare prediction and decision-making applications.
				4	The course enhances computational thinking and data-driven learning skills.
				8	Data science skills improve career opportunities in analytics and AI industries.
				9	Data-driven solutions foster technological innovation and industrial optimization.
				10	Data analysis can support inclusive policy-making and equitable resource distribution.
				11	Data science aids smart city planning and intelligent urban management.
				12	Data analytics helps optimize resources and reduce operational waste.
19		Artificial Intelligence	Department Electives	3	AI supports healthcare diagnostics, monitoring, and intelligent medical systems.
				4	The course promotes advanced learning in intelligent computing technologies.
				8	AI skills prepare students for emerging technology-driven careers.
				9	Artificial Intelligence accelerates automation and industrial innovation.
				11	AI-based systems enhance smart governance and urban management solutions.
				13	AI applications assist in climate prediction, environmental monitoring, and sustainability analysis.
20		Machine Learning and Deep Learning	Department Electives	3	ML and DL techniques support disease prediction and intelligent healthcare systems.
				4	The course develops advanced analytical and computational learning skills.
				8	Machine learning expertise improves employability in emerging AI industries.
				9	Intelligent learning systems drive innovation in automation and data analytics.
				11	ML applications support smart transportation and urban planning systems.
				13	AI-based predictive models contribute to climate and environmental analysis.
21		Time Series and Data Analysis	Department Electives	3	Time series analysis supports healthcare forecasting, disease trend analysis, and predictive decision-making systems.
				4	The course enhances analytical, statistical, and data interpretation skills essential for modern education and research.
				8	Data analysis and forecasting skills improve employability in analytics, finance, and

					technology-driven industries.
				9	Time series modeling supports industrial optimization, predictive maintenance, and intelligent business analytics.
				10	Data-driven insights help policymakers and organizations make informed decisions for equitable resource distribution.
				11	Forecasting and trend analysis contribute to smart city planning, traffic prediction, and urban resource management.
				12	Predictive analytics helps optimize resource utilization, reduce wastage, and improve sustainable operational practices.
22		Advanced wireless Communication	Department Electives	9	The course supports the development of advanced wireless technologies and next-generation communication infrastructure.
				11	Wireless communication systems enable smart city connectivity, intelligent transportation, and public communication services.
				12	Efficient wireless network design promotes optimized spectrum and energy utilization.
23		Modern Digital Communications	Department Electives	8	Digital communication skills enhance employability in telecommunication and networking industries.
				9	The course contributes to innovation in digital communication technologies and infrastructure development.
				11	Modern communication systems improve smart connectivity and urban digital services.
				12	Efficient digital communication techniques support optimal utilization of bandwidth and energy resources.
24		Optical fiber Communications	Department Electives	7	Optical fiber systems provide energy-efficient high-speed communication networks.
				9	The course supports innovation in broadband and high-capacity communication technologies.
				11	Optical communication networks strengthen smart city connectivity and digital infrastructure.
				12	Fiber optic technologies reduce transmission losses and improve resource-efficient communication systems.
25		Cellular and Mobile Communications	Department Electives	3	Mobile communication technologies support telemedicine, emergency communication, and healthcare accessibility.
				9	The course contributes to the advancement of mobile network infrastructure and wireless technologies.
				11	Cellular communication systems enable smart mobility, public safety, and connected urban services.
26		Satellite Communications	Department Electives	9	Satellite communication systems strengthen global connectivity, remote communication, and advanced telecommunication infrastructure.
27		Embedded Operating Systems	Department Electives	4	The course develops practical knowledge of embedded software and real-time operating system concepts.
				9	Embedded operating systems support automation, robotics, and intelligent electronic applications.
				12	Efficient embedded software design promotes optimized hardware utilization and energy efficiency.

28		Internet of Things	Department Electives	4	The course provides interdisciplinary learning in smart connected technologies and embedded applications.
				9	IoT technologies drive innovation in automation, smart devices, and industrial monitoring systems.
				11	IoT applications support smart cities through intelligent transportation, energy management, and public services.
				12	IoT-based monitoring systems help optimize resource usage and reduce wastage.
				17	IoT platforms enable interconnected systems and collaborative technological solutions across sectors.
29		Linux for Embedded and Real-Time Applications	Department Electives	4	The course enhances practical software development skills for embedded and real-time systems.
				9	Linux-based embedded systems support industrial automation and open-source technological innovation.
				12	Efficient real-time application development improves system performance and resource utilization.
30		Sensors and Actuators for IOT	Department Electives	3	Sensors and actuators are widely used in healthcare monitoring and assistive technologies.
				9	The course supports innovation in smart sensing, automation, and IoT-based industrial applications.
				11	Smart sensors enable intelligent monitoring systems for transportation, utilities, and environmental management.
31		Smart Instrumentation	Department Electives	3	Smart instrumentation systems support healthcare monitoring and biomedical measurement applications.
				7	Intelligent instrumentation improves energy monitoring and efficient power utilization systems.
				9	The course promotes innovation in automation, industrial monitoring, and intelligent measurement technologies.
				11	Smart instrumentation enables efficient monitoring solutions for urban infrastructure and public utilities.
				12	Advanced instrumentation systems help optimize resource usage and reduce industrial wastage.
				13	Environmental monitoring instruments support climate observation and pollution control systems.
32		Radar System Design	Department Electives	3	Radar technologies support disaster warning systems and emergency response applications.
				9	The course contributes to innovation in radar, surveillance, and navigation technologies.
				11	Radar systems assist in smart transportation, air traffic management, and public safety systems.
				13	Radar applications are widely used in weather forecasting and environmental monitoring.
				14	Radar systems support marine navigation, coastal surveillance, and ocean monitoring applications.
				15	Remote sensing radar technologies help in forest monitoring, wildlife tracking, and land management.
				16	Radar systems strengthen national security, border surveillance, and disaster management infrastructure.

33		Smart Antennas	Department Electives	7	Smart antenna technologies improve energy-efficient wireless communication systems.
				9	The course supports innovation in advanced wireless and adaptive communication technologies.
				11	Smart antennas enhance reliable connectivity for smart city applications and public communication networks.
				12	Efficient antenna systems optimize spectrum utilization and reduce communication losses.
				13	Energy-efficient wireless communication technologies contribute to reduced environmental impact.
34		Microwave Integrated Circuits	Department Electives	7	Microwave integrated circuits support efficient high-frequency and low-power electronic systems.
				9	The course promotes innovation in microwave communication and integrated circuit technologies.
				11	Microwave ICs contribute to advanced communication infrastructure for smart urban systems.
				12	Efficient microwave circuit design encourages optimized material and energy utilization.
35		Microwave Measurements	Department Electives	7	Microwave measurement techniques improve efficiency in communication and electronic systems.
				9	The course develops expertise in testing and characterization of advanced microwave systems.
				12	Accurate microwave measurements support quality assurance and efficient resource utilization in industries.
36		Perl and TCL Programming	Department Electives	11	Programming and scripting skills support automation and smart software solutions for sustainable digital systems.
37		FPGA-based System Design	Department Electives	8	FPGA design skills improve employability in embedded systems and semiconductor industries.
				9	FPGA technologies enable innovation in reconfigurable computing and digital system development.
				11	FPGA-based systems support smart automation and intelligent infrastructure applications.
				12	Reconfigurable hardware systems promote efficient utilization of computing resources and power.
38		Verification Using System Verilog and UVM	Department Electives	8	Verification skills enhance career opportunities in semiconductor and VLSI industries.
				9	Advanced verification methodologies improve the reliability and quality of integrated circuit systems.
39		Advanced Digital System Design with HDL	Department Electives	8	HDL-based digital design skills strengthen employability in chip design and embedded industries.
				9	The course supports innovation in advanced digital hardware and embedded system design.
				11	Digital hardware systems contribute to smart automation and intelligent infrastructure solutions.
				12	Efficient hardware design techniques reduce power consumption and optimize system resources.

40		Testing of VLSI Circuits	Department Electives	9	VLSI testing techniques ensure reliability and performance of semiconductor devices and systems.
				11	Reliable integrated circuits support dependable smart technologies and urban digital infrastructure.
41		Advance Data Science	Honors	3	Advanced data analytics support healthcare prediction and intelligent decision-making systems.
				4	The course enhances advanced computational, analytical, and research-oriented learning skills.
				8	Data science expertise improves employability in analytics, AI, and technology industries.
				9	Advanced analytics and predictive modeling drive industrial innovation and optimization.
				10	Data-driven solutions support equitable policy planning and inclusive development strategies.
				11	Data science applications contribute to smart city planning and urban management.
				13	Predictive analytics support climate modeling, environmental monitoring, and sustainability analysis.
42		Computer Vision	Honors	3	Computer vision technologies support medical imaging and healthcare diagnostics.
				4	The course develops advanced learning in image analysis and intelligent visual systems.
				9	Computer vision drives innovation in automation, robotics, and surveillance technologies.
				11	Vision-based systems support smart transportation, security, and urban monitoring applications.
43		Advanced Machine Learning	Honors	3	Advanced ML techniques support predictive healthcare and intelligent diagnostic systems.
				4	The course promotes advanced learning in intelligent algorithms and data-driven technologies.
				8	Machine learning expertise enhances employability in AI-driven industries.
				9	Advanced ML models support industrial automation and technological innovation.
				11	Intelligent ML applications contribute to smart city services and infrastructure management.
				13	Intelligent ML applications contribute to smart city services and infrastructure management.
44		Reinforcement Learning	Honors	3	Reinforcement learning supports intelligent healthcare assistance and adaptive medical systems.
				4	The course develops advanced knowledge in autonomous and adaptive learning algorithms.
				8	Reinforcement learning skills improve opportunities in AI and automation sectors.
				9	RL techniques drive innovation in robotics, automation, and intelligent systems.
				11	Autonomous learning systems contribute to smart transportation and urban optimization.
				13	Reinforcement learning supports intelligent energy management and environmental optimization systems.
45		5G Mobile Communications	Honors	3	5G technologies support telemedicine, remote healthcare, and emergency communication services.

				7	5G networks enable energy-efficient communication technologies and smart energy systems.
				8	The course develops advanced telecom skills relevant to next-generation communication industries.
				9	5G communication drives innovation in high-speed wireless infrastructure and digital transformation.
				11	5G networks support smart city applications, autonomous systems, and intelligent transportation.
				16	Secure and reliable 5G communication systems strengthen public safety and emergency response infrastructure.
46		Software Defined Networking	Honors	4	The course develops advanced knowledge in programmable networking and modern communication technologies.
				8	SDN skills enhance employability in networking, cloud computing, and IT infrastructure industries.
				9	Software Defined Networking supports innovation in intelligent and flexible communication infrastructures.
				11	SDN technologies enable efficient smart city networking and digital public service systems.
47		Fundamentals of Massive MIMO	Honors	8	Massive MIMO technologies provide advanced communication skills relevant to next-generation telecom industries.
				9	The course supports innovation in high-capacity wireless communication and 5G infrastructure.
				11	Massive MIMO systems improve connectivity and network efficiency for smart city applications.
48		Multi carrier Communications for 5G		8	The course develops expertise in modern wireless communication technologies required in telecom industries.
				9	Multi-carrier communication techniques strengthen advanced 5G communication infrastructure development.
				11	5G communication systems support smart transportation, intelligent connectivity, and urban digital services.
49		Cognitive Radio Networks	Honors	9	Cognitive radio technologies improve spectrum efficiency and advanced wireless communication systems.
				11	Adaptive wireless networks support reliable communication for smart city applications.
				12	Efficient spectrum utilization promotes sustainable use of communication resources.
				17	Cognitive radio networks enable collaborative and interoperable communication systems across sectors.
50		Introduction to Industry 4.0 and Industrial Internet of Things	Honors	2	Industry 4.0 technologies support smart agriculture and precision farming systems for improved food production.
				3	IIoT systems enable smart healthcare monitoring and industrial safety applications.
				4	The course develops interdisciplinary knowledge in automation, smart systems, and digital transformation technologies.
				7	Industry 4.0 technologies support intelligent energy monitoring and efficient industrial power

					management.
				8	The course enhances employability in automation, IoT, and smart manufacturing industries.
				9	IIoT technologies drive industrial automation and innovation in smart manufacturing systems.
				11	Smart industrial systems contribute to sustainable urban infrastructure and intelligent public services.
				13	Smart monitoring and automation technologies support energy conservation and environmental sustainability.
				17	Industry 4.0 encourages interconnected industrial ecosystems and collaborative digital transformation.
51		Multicore Architecture	Honors	4	The course provides advanced learning in parallel processing and modern processor architectures.
				8	Multicore architecture skills enhance employability in computing and embedded system industries.
				9	Multicore systems support innovation in high-performance computing and intelligent electronic systems.
				11	Efficient computing architectures contribute to smart infrastructure and digital service systems.
				12	Multicore processing improves computational efficiency and optimized resource utilization.
52		Low Power VLSI Design	Honors	9	Low-power VLSI techniques support innovation in energy-efficient semiconductor and embedded systems.
53		Analog IC Design	Honors	8	Analog IC design skills improve employability in semiconductor and electronic design industries.
				9	The course supports innovation in integrated circuit and analog system development.
54		ASIC Design	Honors	8	ASIC design develops specialized chip design skills required in semiconductor industries.
				9	The course contributes to innovation in high-performance and application-specific integrated circuits.
55		Digital IC Design	Honors	8	Digital IC design enhances technical skills relevant to VLSI and semiconductor industries.
				9	The course supports the development of advanced digital integrated circuit technologies.
56		Nano Electronic Devices Modelling	Honors	7	Nanoelectronic device technologies support energy-efficient electronic systems and sustainable innovations.
				9	The course promotes research and innovation in nanoscale semiconductor device technologies.

I. Mapping of R25-C25 Courses with individual SDGs

SDG No.	SDG Name	No. of courses mapped	Percentage of courses mapped (%)
1	No Poverty	0	0
2	Zero Hunger	1	2
3	Good Health and Well-Being	19	34
4	Quality Education	21	38
5	Gender Equality	0	0
6	Clean Water and Sanitation	0	0
7	Affordable and Clean Energy	11	20
8	Decent Work and Economic Growth	27	48
9	Industry, Innovation and Infrastructure	56	100
10	Reduced Inequalities	4	7
11	Sustainable Cities and Communities	44	78
12	Responsible Consumption and Production	23	41
13	Climate Action	10	18
14	Life Below Water	1	2
15	Life On Land	1	2
16	Peace, Justice and Strong Institutions	2	4
17	Partnerships for the Goals	3	5


Member Secretary


Chairperson

DEPARTMENT OF ECE

APPENDIX VII

Action Taken Report (ATR) on the suggestions given in earlier BoS meetings

S.No.	Action Point	Response
1.	Dr. P. Srihari Rao suggested elaborating the syllabus contents of Module-1, Unit-1 to ensure stronger conceptual clarity in semiconductor fundamentals.	Module-1, Unit-1 of the SPD syllabus has been expanded. Additional core topics covering fundamentals.
2.	Expert recommended explicitly including Feedback Amplifier Topologies and Multistage Amplifiers in either SPD or the Analog Electronics/Circuits course.	Feedback Amplifier Topologies and Multistage Amplifiers have been formally incorporated into the core modules of the Analog Circuits course syllabus to maintain a logical teaching progression.
3.	Expert advised expanding and detailing the Module-2 contents to ensure adequate coverage of core communication concepts.	The Module-2 syllabus for Communication Systems has been re-structured and expanded with explicit sub-topics to ensure comprehensive coverage of the core engineering concepts.
4.	Expert advised that the syllabus should cover microcontrollers ranging from basic architecture and programming up to advanced platforms.	The curriculum was updated to ensure structural progression. The syllabus now initiates with foundational architecture/assembly concepts and smoothly transitions into advanced embedded platforms (ARM/Cortex).
5.	Expert suggested introducing elective courses related to 5G and advanced wireless communication technologies, subject to feasibility.	New department elective course titled "5G and Advanced Wireless Communication" has been designed in the same day with the help of external experts and introduced into the elective pool.
6.	Expert recommended including the textbook authored by Herold Kolimbris as an additional reference text.	The textbook " <i>Fiber Optic Communications</i> " by Herold Kolimbris has been added to the list of Reference Books in the course syllabus.
7.	Expert observed an excessive number of reference books and suggested removing reference book No. 4 to retain only standard texts.	The reference book listed under Serial No. 4 has been removed. The reference section has been streamlined to feature only core, high-quality standard textbooks.
8.	External Expert suggested that the Chemistry course may be removed and replaced with a department-specific professional core course to strengthen domain knowledge in ECE.	The expert committee reviewed on the same day, the suggestion but resolved to retain Chemistry in the curriculum. Engineering Chemistry is vital for ECE students as it provides the foundational science required for understanding semiconductor materials, VLSI fabrication processes, nanotechnology, and battery/energy-storage technologies. However, the syllabus will be reviewed to ensure emphasis on engineering and electronics-compatible applications.
9.	Dr. P. Srihari Rao recommended giving greater emphasis to patent filing under the Research/Work-in-Lieu credit system, alongside publications.	The recommendations sent to Dean AAA-office. Clear credit weightage have been introduced for filled/published patents also.


Member Secretary


Chairperson