



# VIGNAN'S INSTITUTE OF MANAGEMENT AND TECHNOLOGY FOR WOMEN

An Autonomous Institution

(Sponsored by Lavu Educational Society)

[ Affiliated to JNTUH, Hyderabad & Approved by AICTE, New Delhi ]



## Department of Electronics and Communication Engineering

### BOARD OF STUDIES

| S. No | Name of the Member           | Designation               | Organization                                       | Role                   |
|-------|------------------------------|---------------------------|----------------------------------------------------|------------------------|
| 1     | Dr. T. Pullaiah              | Associate Professor & HOD | VMTW, Hyderabad.                                   | BoS Chairman           |
| 2     | Dr. T. Satya Savithri        | Professor                 | JNTUH, Hyderabad                                   | Member (JNTUH Nominee) |
| 3     | Mr. D. Srinivasa Rao         | Project Director          | RAILTEL Corporation of India Limited, Secunderabad | Member (Industry)      |
| 4     | Dr. D. Narendar Singh        | Associate Professor       | Anurag University, Hyderabad.                      | Member (Academician)   |
| 5     | Dr. Vadthiya Narendar        | Assistant Professor       | NIT, Warangal.                                     | Member (Academician)   |
| 6     | Ms. A. Sri Lasya             | Sr. System Engineer       | Cognizant, Hyderabad.                              | Member (Alumni)        |
| 7     | Mr. P. Harikrishna           | Associate Professor       | VMTW, Hyderabad.                                   | Member                 |
| 8     | Dr.SK. Masthan Basha         | Associate Professor       | VMTW, Hyderabad.                                   | Member                 |
| 9     | Dr. G. Jhansi Reddy          | Associate Professor       | VMTW, Hyderabad.                                   | Member                 |
| 10    | Dr. K. Padmaleela            | Assistant Professor       | VMTW, Hyderabad.                                   | Member                 |
| 11    | Mr. J. Sunil Kumar           | Associate Professor       | VMTW, Hyderabad.                                   | Member                 |
| 12    | Mrs. G. Indira Priyadarshini | Associate Professor       | VMTW, Hyderabad.                                   | Member                 |

Principal

Vignans Institute of Management & Technology For Women  
Kondapur (V), Ghatkesar (M), Medchal-Malkajgiri (DT)-501301,  
Telangana State



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## Department of Electronics and Communication Engineering

### 2<sup>nd</sup> BoS Meeting held on 19<sup>th</sup> August 2025

Members Present:

| S. No. | Name                         | Designation               | Organization                                       | Position in BoS        | Signature |
|--------|------------------------------|---------------------------|----------------------------------------------------|------------------------|-----------|
| 1      | Dr. T. Pullaiah              | Associate Professor & HOD | VMTW, Hyderabad.                                   | BOS Chairman           |           |
| 2      | Dr. T. Satya Savithri        | Professor                 | JNTUH, Hyderabad                                   | Member (JNTUH Nominee) |           |
| 3      | Mr. D. Srinivasa Rao         | Project Director          | RAILTEL Corporation of India Limited, Secunderabad | Member (Industry)      |           |
| 4      | Dr. D. Narendar Singh        | Associate Professor       | Anurag University, Hyderabad.                      | Member (Academician)   |           |
| 5      | Dr. Vadthiya Narendar        | Assistant Professor       | NIT, Warangal.                                     | Member (Academician)   |           |
| 6      | Ms. A. Sri Lasya             | Sr. System Engineer       | Cognizant, Hyderabad.                              | Member (Alumni)        |           |
| 7      | Mr. P. Harikrishna           | Associate Professor       | VMTW, Hyderabad.                                   | Member                 |           |
| 8      | Dr. SK. Masthan Basha        | Associate Professor       | VMTW, Hyderabad.                                   | Member                 |           |
| 9      | Dr. G. Jhansi Reddy          | Associate Professor       | VMTW, Hyderabad.                                   | Member                 |           |
| 10     | Dr. K. Padmaleela            | Assistant Professor       | VMTW, Hyderabad.                                   | Member                 |           |
| 11     | Mr. J. Sunil Kumar           | Associate Professor       | VMTW, Hyderabad.                                   | Member                 |           |
| 12     | Mrs. G. Indira Priyadarshini | Associate Professor       | VMTW, Hyderabad.                                   | Member                 |           |





# VIGNAN'S INSTITUTE OF MANAGEMENT AND TECHNOLOGY FOR WOMEN

(An Autonomous Institution)

[Sponsored by Lavu Educational Society, Affiliated to JNTUH & Approved by AICTE, New Delhi]  
Kondapur (V), Ghatkesar (M), Medchal - Malkajgiri (D) - 501 301. Phone: 96529 10002/3



## Department of Electronics and Communication Engineering

### 2<sup>nd</sup> BoS Meeting on 19<sup>th</sup> August 2025

#### AGENDA

| Item No.   | Agenda Item                                                                                                          |
|------------|----------------------------------------------------------------------------------------------------------------------|
| <b>1.0</b> | <b>Review and Confirmation of Items</b>                                                                              |
| 1.1        | Review and confirmation of the Minutes of Meeting of the 1 <sup>st</sup> BoS held on 19 <sup>th</sup> December 2024. |
| 1.2        | Review and Confirmation of I B.Tech ECE Course Structure (VR25) from the A:Y:2025-26                                 |
| 1.3        | Review and Confirmation of academic regulations VR25 from the A.Y. 2025-26                                           |
| <b>2.0</b> | <b>Approval Items</b>                                                                                                |
| 2.1        | Approval of Syllabus for I B. Tech I & II Semester.                                                                  |
| <b>3.0</b> | <b>Any other items with permission of Chair</b>                                                                      |

  
**Chairman-BoS**

Head of the Department  
Electronics and Communication Engineering  
Vignan's Institute of Management & Technology For Women  
Kondapur (V), Ghatkesar (M), Medchal-Malkajgiri (D) - 501 301

# MINUTES BOOK

## Vignan's Institute of Management & Technology for Women (An Autonomous Institutions& Accredited by NBA & NAAC)

### Department of Electronics and Communication Engineering

Minutes of the 2<sup>nd</sup> Board of Studies (BoS) meeting held on 19<sup>th</sup> August 2025, 02.00 PM  
at Department of ECE, VMTW

The Chairman-BoS Dr. T. Pullaiah introduced the following members in the Board.

| S. No. | Name                         | Designation               | Organization                                       | Position in BoS        |
|--------|------------------------------|---------------------------|----------------------------------------------------|------------------------|
| 1      | Dr. T. Pullaiah              | Associate Professor & HOD | VMTW, Hyderabad.                                   | BoS Chairman           |
| 2      | Dr. T. Satya Savithri        | Professor                 | JNTUH, Hyderabad                                   | Member (JNTUH Nominee) |
| 3      | Mr. D. Srinivasa Rao         | Project Director          | RAILTEL Corporation of India Limited, Secunderabad | Member (Industry)      |
| 4      | Dr. D. Narendar Singh        | Associate Professor       | Anurag University, Hyderabad.                      | Member (Academician)   |
| 5      | Dr. Vadthiya Narendar        | Assistant Professor       | NIT, Warangal.                                     | Member (Academician)   |
| 6      | Ms. A. Sri Lasya             | Sr. System Engineer       | Cognizant, Hyderabad.                              | Member (Alumni)        |
| 7      | Mr. P. Harikrishna           | Associate Professor       | VMTW, Hyderabad.                                   | Member                 |
| 8      | Dr.SK. Masthan Basha         | Associate Professor       | VMTW, Hyderabad.                                   | Member                 |
| 9      | Dr. G. Jhansi Reddy          | Associate Professor       | VMTW, Hyderabad.                                   | Member                 |
| 10     | Dr. K. Padmaleela            | Assistant Professor       | VMTW, Hyderabad.                                   | Member                 |
| 11     | Mr. J. Sunil Kumar           | Associate Professor       | VMTW, Hyderabad.                                   | Member                 |
| 12     | Mrs. G. Indira Priyadarshini | Associate Professor       | VMTW, Hyderabad.                                   | Member                 |

The following members were present:

1. Dr. T. Pullaiah
2. Dr. T. Satya Savithri
3. Mr.D.Srinivasa Rao
4. Dr. D. Narendar Singh
5. Dr. Vadthiya Narendar
6. Ms. A. Sri Lasya
7. Mr. P. Harikrishna
8. Dr. SK. Masthan Basha
9. Dr. G. Jhansi Reddy
10. Dr. K. Padmaleela
11. Mr. J. Sunil Kumar
12. Mrs. G. Indira Priyadarshini

The Chairman-BoS welcomed all the members to the meeting of the Board of Studies.

### **Proceedings of the meeting of the Board of Studies**

#### **1.0 Review and Confirmation of items**

##### **1.1 Review and Confirmation of the Minutes of Meeting of the 1<sup>st</sup> BoS held on 19<sup>th</sup> December 2024.**

The Board has reviewed the Minutes of meeting of the 1<sup>st</sup> BOS held on 19<sup>th</sup> December 2024.

##### **1.2 Review and confirmation of I B. TECH ECE Course structure (VR-25) for the A.Y-2025-26**

The Board has reviewed and confirmed the VR25 I.B. TECH ECE course structure for the A.Y. 2025-26(Annexure-I)

##### **1.3 Review and confirmation of academic regulations VR25 from the A.Y-2025-26**

The Board has reviewed and confirmed the Academic regulations VR25 for the A.Y. 2025-26(Annexure-I)

#### **2.0 Approval Items.**

##### **2.1 Approval of syllabus for I B. TECH I & II Semester**

The Chairman BOS presented the syllabus (attached here with Annexure –II) to the members.  
I.B. TECH –I SEM –CSE(EDC)& I.B. TECH –II SEM –AIML, DS& IT(EDC)

The Board has approved the syllabus as per JNTUH syllabus.

### 3.0 Any other points with the permission of the Chair

1. Dr. T. Satya Savithri, Professor, JNTUH, Hyderabad accepted I Year I-Semester Syllabus, suggested to replace the PYTHON PROGRAMMING subject with any core relevant subjects in I Year II-Semester because heavy credentials to the PYTHON PROGRAMMING. Applied Python Programming Lab is enough to learn the Python Programming subject.
2. Dr. D. Narendar Singh, Associate Professor, Anurag University, Hyderabad. agreed with Dr. T. Satya Savithri, Professor, JNTUH, also suggested any ECE related subject instead of PYTHON PROGRAMMING.
3. Mr. D. Srinivasa Rao, Project Director, RAILTEL Corporation of India Limited, Secunderabad suggested to include JFET, High power Amplifiers and Satellite Communication for Industry applications.
4. Mrs. G. Indira Priyadarshini, Associate Professor, VMTW agreed with Dr. T. Satya Savithri madam,

The Board suggested the Chairman\_BoS to maintain the Academic Quality, Update the syllabus to uphold the institution's standards.

  
Chairman - BoS  
Dr. T. Pullaiah

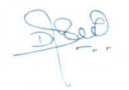
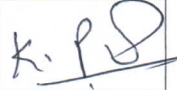
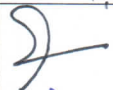
Head of the Department  
Electronics and Communication Engineering  
JNTUH Hyderabad  
Institution of Management & Technology for Women  
JNTUH Hyderabad  
2025-2026



**Vignan's Institute of Management & Technology for Women**  
(An Autonomous Institutions & Accredited by NBA & NAAC)

**Department of Electronics and Communication Engineering**

**Minutes of the 2<sup>nd</sup> Board of Studies (BoS) meeting held on 19<sup>th</sup> August 2025, 02.00 PM  
at Department of ECE, VMTW**

| S. No | Name                         | Designation               | Organization                                       | Position in BoS        | Signature                                                                             |
|-------|------------------------------|---------------------------|----------------------------------------------------|------------------------|---------------------------------------------------------------------------------------|
| 1     | Dr. T. Pullaiah              | Associate Professor & HOD | VMTW, Hyderabad.                                   | BOS Chairman           |    |
| 2     | Dr. T. Satya Savithri        | Professor                 | JNTUH, Hyderabad                                   | Member (JNTUH Nominee) |    |
| 3     | Mr. D. Srinivasa Rao         | Project Director          | RAILTEL Corporation of India Limited, Secunderabad | Member (Industry)      |    |
| 4     | Dr. D. Narendar Singh        | Associate Professor       | Anurag University, Hyderabad.                      | Member (Academician)   |   |
| 5     | Dr. Vadthiya Narendar        | Assistant Professor       | NIT, Warangal.                                     | Member (Academician)   |  |
| 6     | Ms. A. Sri Lasya             | Sr. System Engineer       | Cognizant, Hyderabad.                              | Member (Alumni)        |  |
| 7     | Mr. P. Harikrishna           | Associate Professor       | VMTW, Hyderabad.                                   | Member                 |  |
| 8     | Dr. SK. Masthan Basha        | Associate Professor       | VMTW, Hyderabad.                                   | Member                 |  |
| 9     | Dr. G. Jhansi Reddy          | Associate Professor       | VMTW, Hyderabad.                                   | Member                 |  |
| 10    | Dr. K. Padmaleela            | Assistant Professor       | VMTW, Hyderabad.                                   | Member                 |  |
| 11    | Mr. J. Sunil Kumar           | Associate Professor       | VMTW, Hyderabad.                                   | Member                 |  |
| 12    | Mrs. G. Indira Priyadarshini | Associate Professor       | VMTW, Hyderabad.                                   | Member                 |  |

Minutes of the Board of Studies (BoS) meeting held on Tuesday, 19<sup>th</sup> August 2025

## B. Tech. ELECTRONICS AND COMMUNICATION ENGINEERING

## COURSE STRUCTURE – VR25

## I B. Tech. – I Semester

| S.No | Course Code | Course                                          | L         | T        | P        | Credits   |
|------|-------------|-------------------------------------------------|-----------|----------|----------|-----------|
| 1    | 25MA101BS   | Matrices and Calculus                           | 3         | 1        | 0        | 4         |
| 2    | 25PH102BS   | Advanced Engineering Physics                    | 3         | 0        | 0        | 3         |
| 3    | 25ME103ES   | Engineering Drawing and Computer Aided Drafting | 2         | 0        | 2        | 3         |
| 4    | 25EE104ES   | Introduction to Electrical Engineering          | 2         | 0        | 0        | 2         |
| 5    | 25CS105ES   | Programming for Problem Solving                 | 3         | 0        | 0        | 3         |
| 6    | 25EN106HS   | English for Skill Enhancement                   | 3         | 0        | 0        | 3         |
| 7    | 25PH107BS   | Advanced Engineering Physics Lab                | 0         | 0        | 2        | 1         |
| 8    | 25CS108ES   | Programming for Problem Solving Lab             | 0         | 0        | 2        | 1         |
| 9    | 25EN109HS   | English Language and Communication Skills Lab   | 0         | 0        | 2        | 1         |
|      |             | <b>Total</b>                                    | <b>16</b> | <b>1</b> | <b>8</b> | <b>21</b> |

## I B.Tech. - II Semester

| S.No | Course Code | Course                                              | L         | T        | P         | Credits   |
|------|-------------|-----------------------------------------------------|-----------|----------|-----------|-----------|
| 1    | 25MA201BS   | Ordinary Differential Equations and Vector Calculus | 3         | 0        | 0         | 3         |
| 2    | 25CH202BS   | Engineering Chemistry                               | 3         | 0        | 0         | 3         |
| 3    | 25ML203ES   | Python Programming                                  | 3         | 0        | 0         | 3         |
| 4    | 25EE204ES   | Network Analysis and Synthesis                      | 3         | 0        | 0         | 3         |
| 5    | 25CS205ES   | Data Structures                                     | 3         | 0        | 0         | 3         |
| 6    | 25CH206BS   | Engineering Chemistry Lab                           | 0         | 0        | 2         | 1         |
| 7    | 25CS207ES   | Data Structures Lab                                 | 0         | 0        | 2         | 1         |
| 8    | 25ML208ES   | Applied Python Programming Lab                      | 0         | 0        | 2         | 1         |
| 9    | 25ME209ES   | Engineering Workshop                                | 0         | 0        | 2         | 1         |
| 10   | 25EE210ES   | Basic Electrical Engineering Lab                    | 0         | 0        | 2         | 1         |
|      |             | <b>Total</b>                                        | <b>15</b> | <b>0</b> | <b>10</b> | <b>20</b> |

Note: L - Theory T - Tutorial P - Practical C - Credits



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9 Shany

10 K.P.S

11 Shi

12 Shi

## ELECTRONIC DEVICES AND CIRCUITS

**B.Tech. I Year I Sem - CSE.**

LTPC  
3003

**Course Overview:** This course introduces fundamental semiconductor devices and their behavior, including diodes, BJTs, and FETs. It covers their characteristics, applications, and the analysis of basic electronic circuits. The course also explores rectifiers, voltage regulation, amplifier design, and advanced semiconductor technologies like Fin FETs and CNTFETs. Emphasis is placed on developing a strong foundation for analog circuit design and understanding modern device technologies in electronics.

**Course Outcomes:** By the end of this course, students will be able to:

CO1: Analyze the electrical characteristics and models of semiconductor diodes and apply the min rectifier and clipping circuits.

CO2: Evaluate the operation and configurations of Bipolar Junction Transistors (BJTs) and analyze their input and output characteristics.

CO3: Design appropriate biasing networks for BJTs and determine the operating point for amplifier applications.

CO4: Analyze transistor amplifier circuits using h-parameter models and assess performance for various configurations.

CO5: Analyze the structure, working, and characteristics of JFETs, MOSFETs, and advanced devices like FinFETs and CNTFETs, and compare modern device technologies.

### Course Articulation Matrix

| COs/POs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| CO1     | 3   | 3   | 2   | 2   | 1   | 1   | -   | -   | -   | -    | -    |
| CO2     | 3   | 3   | 2   | 2   | 1   | -   | -   | -   | -   | -    | -    |
| CO3     | 3   | 3   | 3   | 2   | 1   | -   | -   | -   | -   | -    | -    |
| CO4     | 3   | 3   | 3   | 2   | 2   | -   | -   | -   | -   | -    | 1    |
| CO5     | 3   | 3   | 2   | 2   | 2   | 1   | -   | -   | -   | -    | 2    |

**Syllabus:**

### UNIT-I:

**Diode Characteristics and Applications:** PN junction diode - I-V characteristics, Diode resistance and capacitance, Diode models (Ideal, Simplified, Piecewise Linear), Rectifiers - Half-wave, Full-wave (Center-tap and bridge), Capacitor filter for rectifiers, Clippers and clampers, Zener diode -I-V characteristics and voltage regulation.

## UNIT-II:

**Bipolar Junction Transistor(BJT):**Structure and working principle of BJT, Current components and transistor action, Configurations: Common Base(CB), Common Emitter(CE), Common Collector(CC), Input and output characteristics, Determination of h-parameters from transistor characteristics.

### UNIT-III:

**BJT Biasing:** Need for biasing and stabilization, Load line and operating point, Biasing techniques: Fixed bias, Collector-to-base bias, Voltage divider bias, Stability factors and thermal runaway

#### UNIT-IV:

**Transistor Amplifiers:** Transistor as a small-signal amplifier, h-parameter equivalent circuit, CE, CB, CC amplifier analysis using h-parameters, Approximate CE model - with and without emitter bypass capacitor.

#### UNIT-V:

**Special Purpose Diodes:** Principle of Operation of- SCR, Tunnel Diode, Varactor Diode, Photo

3 Ph 4 Amul 5 Ph 6 Karya 7 Ph 8 Ph 9 Ph 10 K.P.S 11 Ph 12 Ph 13 Ph 14 Ph 15 Ph 16 Ph 17 Ph 18 Ph 19 Ph 20 Ph 21 Ph 22 Ph 23 Ph 24 Ph 25 Ph 26 Ph 27 Ph 28 Ph 29 Ph 30 Ph 31 Ph 32 Ph 33 Ph 34 Ph 35 Ph 36 Ph 37 Ph 38 Ph 39 Ph 40 Ph 41 Ph 42 Ph 43 Ph 44 Ph 45 Ph 46 Ph 47 Ph 48 Ph 49 Ph 50 Ph 51 Ph 52 Ph 53 Ph 54 Ph 55 Ph 56 Ph 57 Ph 58 Ph 59 Ph 60 Ph 61 Ph 62 Ph 63 Ph 64 Ph 65 Ph 66 Ph 67 Ph 68 Ph 69 Ph 70 Ph 71 Ph 72 Ph 73 Ph 74 Ph 75 Ph 76 Ph 77 Ph 78 Ph 79 Ph 80 Ph 81 Ph 82 Ph 83 Ph 84 Ph 85 Ph 86 Ph 87 Ph 88 Ph 89 Ph 90 Ph 91 Ph 92 Ph 93 Ph 94 Ph 95 Ph 96 Ph 97 Ph 98 Ph 99 Ph 100 Ph 101 Ph 102 Ph 103 Ph 104 Ph 105 Ph 106 Ph 107 Ph 108 Ph 109 Ph 110 Ph 111 Ph 112 Ph 113 Ph 114 Ph 115 Ph 116 Ph 117 Ph 118 Ph 119 Ph 120 Ph 121 Ph 122 Ph 123 Ph 124 Ph 125 Ph 126 Ph 127 Ph 128 Ph 129 Ph 130 Ph 131 Ph 132 Ph 133 Ph 134 Ph 135 Ph 136 Ph 137 Ph 138 Ph 139 Ph 140 Ph 141 Ph 142 Ph 143 Ph 144 Ph 145 Ph 146 Ph 147 Ph 148 Ph 149 Ph 150 Ph 151 Ph 152 Ph 153 Ph 154 Ph 155 Ph 156 Ph 157 Ph 158 Ph 159 Ph 160 Ph 161 Ph 162 Ph 163 Ph 164 Ph 165 Ph 166 Ph 167 Ph 168 Ph 169 Ph 170 Ph 171 Ph 172 Ph 173 Ph 174 Ph 175 Ph 176 Ph 177 Ph 178 Ph 179 Ph 180 Ph 181 Ph 182 Ph 183 Ph 184 Ph 185 Ph 186 Ph 187 Ph 188 Ph 189 Ph 190 Ph 191 Ph 192 Ph 193 Ph 194 Ph 195 Ph 196 Ph 197 Ph 198 Ph 199 Ph 200 Ph 201 Ph 202 Ph 203 Ph 204 Ph 205 Ph 206 Ph 207 Ph 208 Ph 209 Ph 210 Ph 211 Ph 212 Ph 213 Ph 214 Ph 215 Ph 216 Ph 217 Ph 218 Ph 219 Ph 220 Ph 221 Ph 222 Ph 223 Ph 224 Ph 225 Ph 226 Ph 227 Ph 228 Ph 229 Ph 230 Ph 231 Ph 232 Ph 233 Ph 234 Ph 235 Ph 236 Ph 237 Ph 238 Ph 239 Ph 240 Ph 241 Ph 242 Ph 243 Ph 244 Ph 245 Ph 246 Ph 247 Ph 248 Ph 249 Ph 250 Ph 251 Ph 252 Ph 253 Ph 254 Ph 255 Ph 256 Ph 257 Ph 258 Ph 259 Ph 260 Ph 261 Ph 262 Ph 263 Ph 264 Ph 265 Ph 266 Ph 267 Ph 268 Ph 269 Ph 270 Ph 271 Ph 272 Ph 273 Ph 274 Ph 275 Ph 276 Ph 277 Ph 278 Ph 279 Ph 280 Ph 281 Ph 282 Ph 283 Ph 284 Ph 285 Ph 286 Ph 287 Ph 288 Ph 289 Ph 290 Ph 291 Ph 292 Ph 293 Ph 294 Ph 295 Ph 296 Ph 297 Ph 298 Ph 299 Ph 300 Ph 301 Ph 302 Ph 303 Ph 304 Ph 305 Ph 306 Ph 307 Ph 308 Ph 309 Ph 310 Ph 311 Ph 312 Ph 313 Ph 314 Ph 315 Ph 316 Ph 317 Ph 318 Ph 319 Ph 320 Ph 321 Ph 322 Ph 323 Ph 324 Ph 325 Ph 326 Ph 327 Ph 328 Ph 329 Ph 330 Ph 331 Ph 332 Ph 333 Ph 334 Ph 335 Ph 336 Ph 337 Ph 338 Ph 339 Ph 340 Ph 341 Ph 342 Ph 343 Ph 344 Ph 345 Ph 346 Ph 347 Ph 348 Ph 349 Ph 350 Ph 351 Ph 352 Ph 353 Ph 354 Ph 355 Ph 356 Ph 357 Ph 358 Ph 359 Ph 360 Ph 361 Ph 362 Ph 363 Ph 364 Ph 365 Ph 366 Ph 367 Ph 368 Ph 369 Ph 370 Ph 371 Ph 372 Ph 373 Ph 374 Ph 375 Ph 376 Ph 377 Ph 378 Ph 379 Ph 380 Ph 381 Ph 382 Ph 383 Ph 384

**Field Effect Transistors and Advanced Devices:** JFET: Structure, operation, and characteristics, MOSFET: Enhancement and Depletion modes –Structure, operation, and characteristics, Advanced Devices: FinFETs - 3D structure, Scaling advantages, CNTFETs - Structure, ballistic transport, fabrication, Comparison: CMOS vs. FinFET vs. CNTFET.

**TEXTBOOKS:**

1. Millman, Jacob, and Christos C. Halkias. *Electronic Devices and Circuits*. Tata McGraw-Hill, 1991.
2. Boylestad, Robert L., and Louis Nashelsky. *Electronic Devices and Circuit Theory*. Pearson, 11th ed., 2013.
3. Sedra, Adel S., and Kenneth C. Smith. *Microelectronic Circuits*. Oxford University Press, 7th ed., 2014.

**REFERENCEBOOKS:**

1. Bell, David A. *Electronic Devices and Circuits*. Oxford University Press, 5th ed., 2008.
2. Neamen, Donald A. *Electronic Circuit Analysis and Design*. McGraw-Hill, 2nd ed., 2001.
3. Salivahanan, S and N. Suresh Kumar. *Electronic Devices and Circuits*. McGraw-Hill Education, 4th ed., 2017.
4. Razavi, Behzad. *Fundamentals of Microelectronics*. Wiley, 2nd ed., 2013.
5. Taur, Yuan, and Tak H. Ning. *Fundamentals of Modern VLSI Devices*. Cambridge University Press, 2nd ed., 2009.

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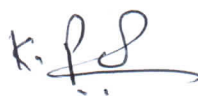
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## ELECTRONIC DEVICES AND CIRCUITS

B.Tech. I Year II Sem – CSE(DS)/IT/AI/ML.

L T P C  
3 0 0 3

**Course Overview:** This course introduces fundamental semiconductor devices and their behavior, including diodes, BJTs, and FETs. It covers their characteristics, applications, and the analysis of basic electronic circuits. The course also explores rectifiers, voltage regulation, amplifier design, and advanced semiconductor technologies like FinFETs and CNTFETs. Emphasis is placed on developing a strong foundation for analog circuit design and understanding modern device technologies in electronics.

**Course Outcomes:** By the end of this course, students will be able to:

CO1: Analyze the electrical characteristics and models of semiconductor diodes and apply the min rectifier and clipping circuits.

CO2: Evaluate the operation and configurations of Bipolar Junction Transistors (BJTs) and analyze their input and output characteristics.

CO3: Design appropriate biasing networks for BJTs and determine the operating point for amplifier applications.

CO4: Analyze transistor amplifier circuits using h-parameter models and assess performance for various configurations.

CO5: Analyze the structure, working, and characteristics of JFETs, MOSFETs, and advanced devices like FinFETs and CNTFETs, and compare modern device technologies.

**Course Articulation Matrix**

| COs/POs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| CO1     | 3   | 3   | 2   | 2   | 1   | 1   | -   | -   | -   | -    | -    |
| CO2     | 3   | 3   | 2   | 2   | 1   | -   | -   | -   | -   | -    | -    |
| CO3     | 3   | 3   | 3   | 2   | 1   | -   | -   | -   | -   | -    | -    |
| CO4     | 3   | 3   | 3   | 2   | 2   | -   | -   | -   | -   | -    | 1    |
| CO5     | 3   | 3   | 2   | 2   | 2   | 1   | -   | -   | -   | -    | 2    |

**Syllabus:****UNIT-I:**

**Diode Characteristics and Applications:** PN junction diode - I-V characteristics, Diode resistance and capacitance, Diode models (Ideal, Simplified, Piecewise Linear), Rectifiers - Half-wave, Full-wave (Center-tap and bridge), Capacitor filter for rectifiers, Clippers and clampers, Zener diode - I-V characteristics and voltage regulation.

**UNIT-II:**

**Bipolar Junction Transistor (BJT):** Structure and working principle of BJT, Current components and transistor action, Configurations: Common Base (CB), Common Emitter (CE), Common Collector (CC), Input and output characteristics, Determination of h-parameters from transistor characteristics.

**UNIT-III:**

**BJT Biasing:** Need for biasing and stabilization, Load line and operating point, Biasing techniques: Fixed bias, Collector-to-base bias, Voltage divider bias, Stability factors and thermal runaway

**UNIT-IV:**

**Transistor Amplifiers:** Transistor as a small-signal amplifier, h-parameter equivalent circuit, CE, CB, CC amplifier analysis using h-parameters, Approximate CE model - with and without emitter bypass capacitor.

**UNIT-V:**

**Special Purpose Diodes:** Principle of Operation of- SCR, Tunnel Diode, Varactor Diode, Photo Diode,

3. 4. 5. 6. 7. 8. 9. 10. 11. 12.

Solar Cell, LED and Schottky Diode.

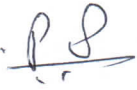
**Field Effect Transistors and Advanced Devices:** JFET: Structure, operation, and characteristics, MOSFET: Enhancement and Depletion modes –Structure, operation, and characteristics, Advanced Devices: FinFETs - 3D structure, Scaling advantages, CNTFETs - Structure, ballistic transport, fabrication, Comparison: CMOS vs. FinFET vs. CNTFET.

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