

## Higher Semester Schemes

### B. Tech. Electronics & Communication Engineering

**Total Credit: 160**

| Third Semester   |                                   |          |   |   |    | Fourth Semester |                                       |          |   |    |    |
|------------------|-----------------------------------|----------|---|---|----|-----------------|---------------------------------------|----------|---|----|----|
| Code             | Course Name                       | L        | T | P | C  | Code            | Course Name                           | L        | T | P  | C  |
| MAS2001          | Statistics & Probability          | 3        | 0 | 0 | 3  | MEE2001         | Engineering Economics                 | 3        | 0 | 0  | 3  |
| MBB21XX          | Management of Technology          | 3        | 0 | 0 | 3  | ECE2201         | Electronic Devices-II                 | 4        | 0 | 0  | 4  |
| ECE2101          | Electronic Devices-I              | 3        | 1 | 0 | 4  | ECE2202         | Computer & Processor Architecture     | 3        | 1 | 0  | 4  |
| ECE2102          | Digital Electronics               | 3        | 1 | 0 | 4  | ECE22XX         | Flexi Core 2                          | 3        | 0 | 2  | 4  |
| ECE2103          | Signals and systems               | 3        | 1 | 0 | 4  | ECE22XX         | Program Elective 1                    | 3        | 0 | 0  | 3  |
| ECE21XX          | Flexi Core 1                      | 3        | 0 | 2 | 4  | XXX00XX         | Open Elective 1                       | 3        | 0 | 0  | 3  |
| ECE2130          | Electronic devices Lab-I          | 0        | 0 | 2 | 1  | ECE2230         | SPICE Lab                             | 0        | 0 | 2  | 1  |
| ECE2131          | Digital Electronics Lab           | 0        | 0 | 2 | 1  | ECE2231         | Computer & Processor Architecture Lab | 0        | 0 | 2  | 1  |
| ECE2170          | Project-based Learning 1          | 0        | 0 | 2 | 1  | ECE2270         | Project-based Learning 2              | 0        | 0 | 2  | 1  |
|                  | Total                             | 18       | 3 | 8 | 25 |                 | Total                                 | 19       | 1 | 8  | 24 |
|                  | Total Contact Hours (L+T+P)       | 29 Hours |   |   |    |                 | Total Contact Hours (L+T+P)           | 28 Hours |   |    |    |
| Fifth Semester   |                                   |          |   |   |    | Sixth Semester  |                                       |          |   |    |    |
| Code             | Course Name                       | L        | T | P | C  | Code            | Course Name                           | L        | T | P  | C  |
| ECE3101          | Digital VLSI Design               | 3        | 1 | 0 | 4  | ECE3201         | Optical Communication                 | 3        | 1 | 0  | 4  |
| ECE3102          | Analog and Digital Communication  | 3        | 1 | 0 | 4  | ECE32XX         | Program Elective 4                    | 3        | 0 | 0  | 3  |
| ECE31XX          | Flexi Core 3                      | 3        | 0 | 2 | 4  | ECE32XX         | Program Elective 5                    | 3        | 0 | 0  | 3  |
| ECE31XX          | Program Elective 2                | 3        | 0 | 0 | 3  | ECE32XX         | Program Elective 6                    | 3        | 0 | 0  | 3  |
| ECE31XX          | Program Elective 3                | 3        | 0 | 0 | 3  | XXX00XX         | Open Elective 3                       | 3        | 0 | 0  | 3  |
| XXX00XX          | Open Elective 2                   | 3        | 0 | 0 | 3  | ECE3210         | Professional Practice                 | 0        | 0 | 0  | 1  |
| ECE3130          | IC Design Lab                     | 0        | 0 | 2 | 1  | ECE3230         | Optical Communication Lab             | 0        | 0 | 2  | 1  |
| ECE3131          | Communication System Lab          | 0        | 0 | 2 | 1  | ECE3231         | Advanced System Design Lab            | 0        | 0 | 2  | 1  |
| ECE3170          | Project-based Learning 3          | 0        | 0 | 2 | 1  | ECE3270         | Project-based Learning 4              | 0        | 0 | 6  | 3  |
|                  | Total                             | 18       | 2 | 8 | 24 |                 | Total                                 | 15       | 1 | 10 | 22 |
|                  | Total Contact Hours (L+T+P)       | 28 Hours |   |   |    |                 | Total Contact Hours (L+T+P)           | 26 Hours |   |    |    |
| Seventh Semester |                                   |          |   |   |    | Eighth Semester |                                       |          |   |    |    |
| Code             | Course Name                       | L        | T | P | C  | Code            | Course Name                           | L        | T | P  | C  |
| ECE41XX          | Program Elective 7                | 3        | 0 | 0 | 3  | ECE4270         | Major Project                         | 0        | 0 | 0  | 12 |
| ECE41XX          | Program Elective 8                | 3        | 0 | 0 | 3  |                 |                                       |          |   |    |    |
| XXX00XX          | Open Elective 4                   | 3        | 0 | 0 | 3  |                 |                                       |          |   |    |    |
| XXX00XX          | Open Elective 5                   | 3        | 0 | 0 | 3  |                 |                                       |          |   |    |    |
| ECE4170          | Internship (Industry or Research) | 0        | 0 | 0 | 1  |                 |                                       |          |   |    |    |
|                  | Total                             | 12       | 0 | 0 | 13 |                 | Total                                 | 0        | 0 | 0  | 12 |
|                  | Total Contact Hours (L+T+P)       | 12 Hours |   |   |    |                 | Total Contact Hours (L+T+P)           |          |   |    |    |

## Flexi Core

| Flexi Core 1                                                                    | Flexi Core 2                                                                    | Flexi Core 3                                                   |
|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------|----------------------------------------------------------------|
| 1. ECE2120: Circuits & network theory<br>2. ECE2121: Linear Integrated circuits | 1. ECE2220: System Design using HDL<br>2. ECE2221: Electromagnetic field theory | ECE3120: Antennas<br>ECE3121: Microcontroller and applications |

| Program Electives                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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| IV                                                                                                                                                                                                                          | V                                                                                                                                                                                                                                                                                                                                                                                                    | VI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | VII                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Program Elective 1</b> <ul style="list-style-type: none"> <li>ECE2240: Data Structures &amp; Algorithms</li> <li>ECE2241: Optical Components and Sensors</li> <li>ECE2242: Fundamentals of telecommunications</li> </ul> | <b>Program Elective 2</b> <ul style="list-style-type: none"> <li>ECE3140: Digital Signal Processing</li> <li>ECE3141: Semiconductor device Fabrication</li> <li>ECE3142: Nanophotonics</li> </ul> <b>Program Elective 3</b> <ul style="list-style-type: none"> <li>ECE3143: Design for Testability</li> <li>ECE3144: Radar &amp; Satellite Communication</li> <li>ECE3145: Control Theory</li> </ul> | <b>Program Elective 4</b> <ul style="list-style-type: none"> <li>ECE3240: VLSI physical design</li> <li>ECE3241: Wireless Communication</li> <li>ECE3242: Digital Image Processing</li> </ul> <b>Program Elective 5</b> <ul style="list-style-type: none"> <li>ECE3243: Microwave Engineering</li> <li>ECE3244: Embedded Systems</li> <li>ECE3245: Advanced Error Control Codes</li> </ul> <b>Program Elective 6</b> <ul style="list-style-type: none"> <li>ECE3246: Low Power VLSI design</li> <li>ECE3247: Computer Networks</li> <li>ECE3248: System-on-Chip Design</li> </ul> | <b>Program Elective 7</b> <ul style="list-style-type: none"> <li>ECE4140: Fundamentals of Quantum Optics</li> <li>ECE4141: Mobile Communication &amp; 5G Networks</li> <li>ECE4142: Adaptive Signal Processing</li> <li>ECE4143: Internet of Things</li> </ul> <b>Program Elective 8</b> <ul style="list-style-type: none"> <li>ECE4144: Millimeter wave Communication</li> <li>ECE4145: Optical Networks</li> <li>ECE4146: Wireless Sensors Networks</li> <li>ECE4147: Machine Learning</li> <li>ECE4148: 5G and beyond wireless Communication</li> </ul> |

## Open Electives

| Graded OE                                                                                                                                                                                                                                                                                          | Non-Graded OE                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li><b>OE1</b> ECE0001: Introduction to Communication Systems</li> <li><b>OE2</b> ECE0002: Introduction to game theory</li> <li><b>OE3</b> ECE0003: Stress free living (in collaboration with Abhigya Club &amp; faculty from Hare Krishna movement)</li> </ul> | <ul style="list-style-type: none"> <li><b>OE1</b> ECE0051: Excel fundamentals for data analysis</li> <li><b>OE2</b> ECE0052: Introduction to Word Processing</li> </ul> |

**B. Tech. (Hons) Electronics & Communication Engineering****Total Credit: 178 (160 + 18\*)**

| Third Semester   |                                   |          |   |    |    |          | Fourth Semester                       |    |   |    |    |  |  |
|------------------|-----------------------------------|----------|---|----|----|----------|---------------------------------------|----|---|----|----|--|--|
| Code             | Course Name                       | L        | T | P  | C  | Code     | Course Name                           | L  | T | P  | C  |  |  |
| MAS2001          | Statistics & Probability          | 3        | 0 | 0  | 3  | MEE2001  | Engineering Economics                 | 3  | 0 | 0  | 3  |  |  |
| MBB21XX          | Management of Technology          | 3        | 0 | 0  | 3  | ECE2201  | Electronic Devices-II                 | 4  | 0 | 0  | 4  |  |  |
| ECE2101          | Electronic Devices-I              | 3        | 1 | 0  | 4  | ECE2202  | Computer & Processor Architecture     | 3  | 1 | 0  | 4  |  |  |
| ECE2102          | Digital Electronics               | 3        | 1 | 0  | 4  | ECE22XX  | Flexi Core 2                          | 3  | 0 | 2  | 4  |  |  |
| ECE2103          | Signals and systems               | 3        | 1 | 0  | 4  | ECE22XX  | Program Elective 1                    | 3  | 0 | 0  | 3  |  |  |
| ECE21XX          | Flexi Core 1                      | 3        | 0 | 2  | 4  | XXX00XX  | Open Elective 1                       | 3  | 0 | 0  | 3  |  |  |
| ECE2130          | Electronic devices Lab-I          | 0        | 0 | 2  | 1  | ECE2230  | SPICE Lab                             | 0  | 0 | 2  | 1  |  |  |
| ECE2131          | Digital Electronics Lab           | 0        | 0 | 2  | 1  | ECE2231  | Computer & Processor Architecture Lab | 0  | 0 | 2  | 1  |  |  |
| ECE2170          | Project-based Learning 1          | 0        | 0 | 2  | 1  | ECE2270  | Project-based Learning 2              | 0  | 0 | 2  | 1  |  |  |
|                  |                                   | 18       | 3 | 8  | 25 |          |                                       | 19 | 1 | 8  | 24 |  |  |
|                  | Total Contact Hours (L+T+P)       | 29       |   |    |    |          | Total Contact Hours (L+T+P)           | 28 |   |    |    |  |  |
| Fifth Semester   |                                   |          |   |    |    |          | Sixth Semester                        |    |   |    |    |  |  |
| Code             | Course Name                       | L        | T | P  | C  | Code     | Course Name                           | L  | T | P  | C  |  |  |
| ECE3101          | Digital VLSI Design               | 3        | 1 | 0  | 4  | ECE3201  | Optical Communication                 | 3  | 1 | 0  | 4  |  |  |
| ECE3102          | Analog and Digital Communication  | 3        | 1 | 0  | 4  | ECE32XX  | Program Elective 4                    | 3  | 0 | 0  | 3  |  |  |
| ECE31XX          | Flexi Core 3                      | 3        | 0 | 2  | 4  | ECE32XX  | Program Elective 5                    | 3  | 0 | 0  | 3  |  |  |
| ECE31XX          | Program Elective 2                | 3        | 0 | 0  | 3  | ECE32XX  | Program Elective 6                    | 3  | 0 | 0  | 3  |  |  |
| ECE31XX          | Program Elective 3                | 3        | 0 | 0  | 3  | XXX00XX  | Open Elective 3                       | 3  | 0 | 0  | 3  |  |  |
| XXX00XX          | Open Elective 2                   | 3        | 0 | 0  | 3  | ECE3210  | Professional Practice                 | 0  | 0 | 0  | 1  |  |  |
| ECE3130          | IC Design Lab                     | 0        | 0 | 2  | 1  | ECE3230  | Optical Communication Lab             | 0  | 0 | 2  | 1  |  |  |
| ECE3131          | Communication System Lab          | 0        | 0 | 2  | 1  | ECE3231  | Advanced System Design Lab            | 0  | 0 | 2  | 1  |  |  |
| ECE3170          | Project-based Learning 3          | 0        | 0 | 2  | 1  | ECE3270  | Project-based Learning 4              | 0  | 0 | 6  | 3  |  |  |
| ECE3180*         | Research Methodology              | 0        | 0 | 2  | 1  | ECE3280* | Hons. Elective 1                      | 3  | 0 | 0  | 3  |  |  |
|                  |                                   | 18       | 2 | 10 | 25 |          |                                       | 18 | 1 | 10 | 25 |  |  |
|                  | Total Contact Hours (L+T+P)       | 30       |   |    |    |          | Total Contact Hours (L+T+P)           | 29 |   |    |    |  |  |
| Seventh Semester |                                   |          |   |    |    |          | Eighth Semester                       |    |   |    |    |  |  |
| Code             | Course Name                       | L        | T | P  | C  | Code     | Course Name                           | L  | T | P  | C  |  |  |
| ECE41XX          | Program Elective 7                | 3        | 0 | 0  | 3  | ECE427X  | Major Project                         | 0  | 0 | 0  | 12 |  |  |
| ECE41XX          | Program Elective 8                | 3        | 0 | 0  | 3  | ECE4280* | Honors Project                        | 0  | 0 | 0  | 8  |  |  |
| XXX00XX          | Open Elective 4                   | 3        | 0 | 0  | 3  |          |                                       |    |   |    |    |  |  |
| XXX00XX          | Open Elective 5                   | 3        | 0 | 0  | 3  |          |                                       |    |   |    |    |  |  |
| ECE417X          | Internship (Industry or Research) | 0        | 0 | 0  | 1  |          |                                       |    |   |    |    |  |  |
| ECE4180*         | Hons. Elective 2                  | 3        | 0 | 0  | 3  |          |                                       |    |   |    |    |  |  |
| ECE4181*         | Hons. Elective 3                  | 3        | 0 | 0  | 3  |          |                                       |    |   |    |    |  |  |
|                  |                                   | 18       | 0 | 0  | 19 |          |                                       |    |   |    | 20 |  |  |
|                  | Total Contact Hours (L+T+P)       | 18 Hours |   |    |    |          | Total Contact Hours (L+T+P)           |    |   |    |    |  |  |

## Flexi Core

| Flexi Core 1                                                                    | Flexi Core 2                                                                    | Flexi Core 3                                                         |
|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------|----------------------------------------------------------------------|
| 3. ECE2120: Circuits & network theory<br>4. ECE2121: Linear Integrated circuits | 3. ECE2220: System Design using HDL<br>4. ECE2221: Electromagnetic field theory | 1. ECE3120: Antennas<br>2. ECE3121: Microcontroller and applications |

| Program Electives                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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| IV                                                                                                                                                                                                                          | V                                                                                                                                                                                                                                                                                                                                                                                                    | VI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | VII                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Program Elective 1</b> <ul style="list-style-type: none"> <li>ECE2240: Data Structures &amp; Algorithms</li> <li>ECE2241: Optical Components and Sensors</li> <li>ECE2242: Fundamentals of telecommunications</li> </ul> | <b>Program Elective 2</b> <ul style="list-style-type: none"> <li>ECE3140: Digital Signal Processing</li> <li>ECE3141: Semiconductor device Fabrication</li> <li>ECE3142: Nanophotonics</li> </ul> <b>Program Elective 3</b> <ul style="list-style-type: none"> <li>ECE3143: Design for Testability</li> <li>ECE3144: Radar &amp; Satellite Communication</li> <li>ECE3145: Control Theory</li> </ul> | <b>Program Elective 4</b> <ul style="list-style-type: none"> <li>ECE3240: VLSI physical design</li> <li>ECE3241: Wireless Communication</li> <li>ECE3242: Digital Image Processing</li> </ul> <b>Program Elective 5</b> <ul style="list-style-type: none"> <li>ECE3243: Microwave Engineering</li> <li>ECE3244: Embedded Systems</li> <li>ECE3245: Advanced Error Control Codes</li> </ul> <b>Program Elective 6</b> <ul style="list-style-type: none"> <li>ECE3246: Low Power VLSI design</li> <li>ECE3247: Computer Networks</li> <li>ECE3248: System-on-Chip Design</li> </ul> | <b>Program Elective 7</b> <ul style="list-style-type: none"> <li>ECE4140: Fundamentals of Quantum Optics</li> <li>ECE4141: Mobile Communication &amp; 5G Networks</li> <li>ECE4142: Adaptive Signal Processing</li> <li>ECE4143: Internet of Things</li> </ul> <b>Program Elective 8</b> <ul style="list-style-type: none"> <li>ECE4144: Millimeter wave Communication</li> <li>ECE4145: Optical Networks</li> <li>ECE4146: Wireless Sensors Networks</li> <li>ECE4147: Machine Learning</li> <li>ECE4148: 5G and beyond wireless Communication</li> </ul> |

## Open Electives

| Graded OE                                                                                                                                                                                                                                                                                          | Non-Graded OE                                                                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li><b>OE1</b> ECE0001: Introduction to Communication Systems</li> <li><b>OE2</b> ECE0002: Introduction to game theory</li> <li><b>OE3</b> ECE0003: Stress free living (in collaboration with Abhigya Club &amp; faculty from Hare Krishna movement)</li> </ul> | <ul style="list-style-type: none"> <li><b>OE1</b> ECE0051: Excel fundamentals for data analysis</li> <li><b>OE2</b> ECE0052: Introduction to Word Processing</li> </ul> |

| Hons. Electives                                                                                                                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VI / VII                                                                                                                                                                      |
| <ul style="list-style-type: none"> <li>ECE3280: Analog VLSI Design</li> <li>ECE4180: System Verilog for verification</li> <li>ECE4181: Scripting language for VLSI</li> </ul> |