

**Annex B (37<sup>th</sup> ACM held on 14<sup>th</sup> Nov, 2012)**

**Unified Curriculum for BE in Electrical Engineering (BEE)**

| S. No.           | Course Code          | Subjects                          | Credit Hrs Teaching | Credit Hrs Labs | Semester        |
|------------------|----------------------|-----------------------------------|---------------------|-----------------|-----------------|
| 1                | MATH-101             | Calculus and Analytical Geometry  | 3                   | 0               | 1 <sup>st</sup> |
| 2                | ME-104               | Engineering Drawing               | 0                   | 1               |                 |
| 3                | HU-100               | English                           | 2                   | 0               |                 |
| 4                | CS-113<br>EC-105     | Introduction to Programming       | 1                   | 1               |                 |
| 5                | MATH-121             | Linear Algebra and ODEs           | 3                   | 0               |                 |
| 6                | HU-107               | Pakistan Studies                  | 2                   | 0               |                 |
| 7                | PHY-101              | Applied Physics                   | 3                   | 1               |                 |
| <b>Total CHs</b> |                      |                                   | <b>14</b>           | <b>3</b>        | <b>17</b>       |
| 8                | EE-111               | Linear Circuit Analysis           | 3                   | 1               | 2 <sup>nd</sup> |
| 9                | ME-100               | Engineering Mechanics             | 3                   | 0               |                 |
| 10               | HU-101               | Islamic Studies                   | 2                   | 0               |                 |
| 11               | ME -105              | Workshop Practice                 | 0                   | 1               |                 |
| 12               | MATH-106             | Multivariable & Vector Calculus   | 3                   | 0               |                 |
| 13               | CS - 212<br>EC - 201 | Object Oriented Programming (OOP) | 3                   | 1               |                 |
| <b>Total CHs</b> |                      |                                   | <b>14</b>           | <b>3</b>        | <b>17</b>       |
| 14               | EE-221               | Digital Logic Design              | 3                   | 1               | 3 <sup>rd</sup> |
| 15               | CS-250<br>EC-202     | Data Structures and Algorithms    | 3                   | 1               |                 |
| 16               | EE-211               | Electrical Network Analysis       | 3                   | 1               |                 |
| 17               | ME-102               | Thermodynamics                    | 2                   | 0               |                 |
| 18               | MATH-232             | Complex Variables and Transforms  | 3                   | 0               |                 |
| <b>Total CHs</b> |                      |                                   | <b>14</b>           | <b>3</b>        | <b>17</b>       |
| 19               | EE-232               | Signals and Systems               | 3                   | 1               | 4 <sup>th</sup> |
| 20               | EE-215               | Electronic Devices and Circuits   | 3                   | 1               |                 |
| 21               | HU-109               | Communication Skills              | 2                   | 0               |                 |
| 22               | EE-222               | Microprocessor Systems            | 3                   | 1               |                 |
| 23               | MATH-361             | Probability & Statistics          | 3                   | 0               |                 |
| <b>Total CHs</b> |                      |                                   | <b>14</b>           | <b>3</b>        | <b>17</b>       |

|                  |                                  |                                  |           |            |                 |
|------------------|----------------------------------|----------------------------------|-----------|------------|-----------------|
| 24               | MATH-351                         | Numerical Methods                | 3         | 0          | 5 <sup>th</sup> |
| 25               | EE-260                           | Electrical Machines              | 3         | 1          |                 |
| 26               | EE-313                           | Electronic Circuit Design        | 3         | 1          |                 |
| 27               | EE-351                           | Communication Systems            | 3         | 1          |                 |
| 28               | EE-241                           | Electromagnetic Field Theory     | 3         | 0          |                 |
| <b>Total CHs</b> |                                  |                                  | <b>15</b> | <b>3</b>   | <b>18</b>       |
| 29               | EE-379                           | Control Systems                  | 3         | 1          | 6 <sup>th</sup> |
| 30               | EE-330                           | Digital Signal Processing        | 3         | 1          |                 |
| 31               | ECO-130                          | Engineering Economics            | 2         | 0          |                 |
| 32               | EE - 383                         | Instrumentation and Measurements | 3         | 1          |                 |
| 33               | EE - XXX<br>CS - XXX<br>EC - XXX | <u>Elective-I</u>                | 3         | X          |                 |
| <b>Total CHs</b> |                                  |                                  | <b>14</b> | <b>3+X</b> | <b>17+X</b>     |
| 34               | OTM-455                          | Engineering Project Management   | 2         | 0          | 7 <sup>th</sup> |
| 35               | HU-212                           | Technical & Business Writing     | 2         | 0          |                 |
| 36               | EE-498                           | Senior Design Project-I          | 0         | 2          |                 |
| 37               | EE-XXX<br>CS-XXX<br>EC-XXX       | <u>Elective - II</u>             | 3         | X          |                 |
| 38               | EE-XXX<br>CS-XXX<br>EC-XXX       | <u>Elective - III</u>            | 3         | X          |                 |
| 39               | EE-XXX<br>CS-XXX<br>EC-XXX       | <u>Elective-IV</u>               | 3         | X          |                 |
| <b>Total CHs</b> |                                  |                                  | <b>13</b> | <b>2+X</b> | <b>15+X</b>     |
| 40               | HU-222                           | Professional Ethics              | 2         | 0          | 8 <sup>th</sup> |
| 41               | EE-499                           | Senior Design Project-II         | 0         | 4          |                 |
| 42               | XX-XXX                           | <u>University Elective</u>       | 3         | X          |                 |
| 43               | EE-XXX<br>CS-XXX<br>EC-XXX       | <u>Elective Lab</u>              | 0         | X          |                 |
| 44               | EE-XXX<br>CS-XXX<br>EC-XXX       | <u>Elective-V</u>                | 3         | X          |                 |
| 45               | MGT-271                          | Entrepreneurship                 | 2         | 0          |                 |

|                                   |  |                 |             |             |
|-----------------------------------|--|-----------------|-------------|-------------|
| <b>Total CHs</b>                  |  | <b>10</b>       | <b>4+X</b>  | <b>14+X</b> |
| <b>Overall CHs</b>                |  | <b>108</b>      | <b>24+X</b> |             |
| <b>Grand Total (Credit Hours)</b> |  | <b>(132+X)*</b> |             |             |

\* The labs and other courses should be offered in such a way that the total number of credit hours should remain in between 130-136 as per PEC requirements

### Elective Courses for BE in Electrical Engineering (BEE)

| <b>Electronics Engineering</b> |       |  |   |   |
|--------------------------------|-------|--|---|---|
| 1                              | EE317 | Integrated Circuits                        | 3 | 0 |
| 2                              | EE384 | Digital Instrumentation                    | 3 | 1 |
| 3                              | EE385 | Industrial Electronics                     | 3 | 1 |
| 4                              | EE411 | CMOS Analog Circuits Design                | 3 | 0 |
| 5                              | EE412 | VLSI Circuit Design                        | 3 | 0 |
| 6                              | EE414 | Digital Electronics                        | 3 | 1 |
| 7                              | EE415 | Opto-Electronics                           | 3 | 1 |
| 8                              | EE428 | Industrial Process Control                 | 3 | 1 |
| 9                              | EE316 | Operational Amplifier Applications         | 3 | 1 |
| 10                             | EEXXX | Selected Topics in Electronics Engineering | 3 | 0 |
| 11                             | EE318 | Solid State Electronics                    | 3 | 0 |
| <b>Computer Engineering</b>    |       |  |   |   |
| 1                              | EE321 | Computer Architecture and Organization     | 3 | 1 |
| 2                              | EE332 | Linear Systems and Signal Processing       | 3 | 0 |
| 3                              | EE333 | Digital Image Processing                   | 3 | 0 |
| 4                              | EC412 | Digital Image Processing                   | 3 | 0 |
| 5                              | EE421 | Digital System Design                      | 3 | 1 |
| 6                              | EE423 | Embedded System Design                     | 3 | 1 |
| 7                              | CS220 | Database Systems                           | 3 | 1 |
| 8                              | CS251 | Design & Analysis of Algorithms            | 3 | 0 |
| 9                              | CS330 | Operating Systems                          | 3 | 1 |
| 10                             | CS361 | Computer Graphics                          | 3 | 1 |
| 11                             | CS423 | Data Warehousing and Data Mining           | 3 | 1 |
| 12                             | CS474 | Computer Vision                            | 2 | 1 |
| 13                             | CS475 | Computer Vision                            | 3 | 0 |
| 14                             | CS435 | Parallel & Distributed Processing          | 3 | 1 |
| 15                             | CS470 | Machine Learning                           | 3 | 0 |
| 16                             | EC301 | Analysis & Design of Algorithm             | 3 | 0 |
| 17                             | EC320 | Computer Organization and Architecture     | 3 | 1 |
| 18                             | EC360 | Software Engineering                       | 3 | 0 |
| 19                             | EC400 | Computer Graphics                          | 3 | 0 |

|                                      |       |  |   |   |
|--------------------------------------|-------|--|---|---|
| 20                                   | EC240 | Database Engineering                               | 3 | 1 |
| 21                                   | EC452 | Machine Learning                                   | 3 | 0 |
| 22                                   | EC413 | Computer Vision                                    | 3 | 0 |
| 23                                   | EC414 | Digital System Design                              | 3 | 0 |
| 24                                   | EC415 | Embedded System Design                             | 3 | 0 |
| 25                                   | EC416 | Parallel & Distributed Processing                  | 3 | 0 |
| 26                                   | EC440 | Data Mining  | 3 | 0 |
| 27                                   | EC441 | Relational Database Management System Using Oracle | 2 | 1 |
| 28                                   | EC442 | Management Information Systems                     | 3 | 0 |
| 29                                   | EC450 | AI & Decision Support Systems                      | 3 | 0 |
| 30                                   | SE200 | Software Engineering                               | 3 | 0 |
| 31                                   | EEXXX | Selected Topics in Computer Engineering            | 3 | 0 |
| <b>Control Engineering</b>           |       |  |   |   |
| 1                                    | EE372 | Digital Control Systems                            | 3 | 1 |
| 2                                    | EE373 | Fuzzy Logic  | 3 | 1 |
| 3                                    | EE374 | Optimal Control                                    | 3 | 0 |
| 4                                    | EE375 | Introduction to Adaptive Control                   | 3 | 1 |
| 5                                    | EE376 | Stochastic Control                                 | 3 | 1 |
| 6                                    | EE377 | Multivariable Control                              | 3 | 1 |
| 7                                    | EE378 | Introduction to Non-linear Control                 | 3 | 0 |
| 8                                    | EE381 | Robotics-I   | 3 | 1 |
| 9                                    | EE472 | Industrial Control and Automation                  | 3 | 0 |
| 10                                   | EE473 | Fuzzy Control                                      | 3 | 0 |
| 11                                   | EE474 | Advanced Control Systems                           | 3 | 0 |
| 12                                   | EE475 | Power System Operation and Control                 | 3 | 0 |
| 13                                   | EE476 | System Identification                              | 3 | 0 |
| 14                                   | EE481 | Robotics-II  | 3 | 0 |
| 15                                   | EE493 | Applied Control and Navigation Systems             | 3 | 0 |
| 16                                   | EEXXX | Selected Topics in Control Engineering             | 3 | 0 |
| <b>Telecommunication Engineering</b> |       |  |   |   |
| 1                                    | EE352 | Communication Systems II                           | 3 | 1 |
| 2                                    | EE355 | Digital Communication Systems                      | 3 | 1 |
| 3                                    | EE356 | Wireless Communication                             | 3 | 0 |
| 4                                    | EE357 | Computer and Communication Networks                | 3 | 1 |
| 5                                    | EE386 | Communication Planning                             | 3 | 0 |
| 6                                    | EE451 | Mobile Communication Systems                       | 3 | 0 |
| 7                                    | EE452 | Satellite Communication Systems                    | 3 | 0 |
| 8                                    | EE455 | Optical Fiber Communication                        | 3 | 0 |
| 9                                    | EE458 | Broadband Technologies                             | 3 | 0 |
| 10                                   | EE491 | Radar Systems                                      | 3 | 1 |
| 11                                   | EEXXX | Selected Topics in Telecommunication               | 3 | 0 |

| <b>RF &amp; Microwave Engineering</b> |       |  |   |   |
|---------------------------------------|-------|--|---|---|
| 1                                     | EE341 | Transmission Lines, Antennas & Wave Propagation  | 3 | 1 |
| 2                                     | EE342 | Microwave Engineering                            | 3 | 1 |
| 3                                     | EE343 | Transmission Lines & Waveguides                  | 3 | 1 |
| 4                                     | EE344 | Wave Propagation and Antennas                    | 3 | 1 |
| 5                                     | EE441 | Microwave ICs Design                             | 3 | 0 |
| 6                                     | EE442 | Microwave Devices                                | 3 | 1 |
| 8                                     | EE443 | Electromagnetic Compatibility                    | 3 | 0 |
| 9                                     | EE444 | Antenna Design                                   | 3 | 0 |
| 10                                    | EEXXX | Selected Topics in RF & Microwave                | 3 | 0 |
| <b>Power Engineering</b>              |       |  |   |   |
| 1                                     | EE361 | Analysis and Design of Electric Machines         | 3 | 0 |
| 2                                     | EE362 | Power Generation                                 | 3 | 0 |
| 3                                     | EE363 | Power Transmission                               | 3 | 0 |
| 4                                     | EE364 | Power Distribution and Utilization               | 3 | 0 |
| 5                                     | EE365 | Renewable Energy Systems                         | 3 | 0 |
| 6                                     | EE366 | Power Engineering                                | 3 | 0 |
| 7                                     | EE367 | Electrical Power Transmission & Distribution     | 3 | 1 |
| 8                                     | EE369 | Power Electronics                                | 3 | 0 |
| 9                                     | EE368 | Power Electronics                                | 3 | 1 |
| 10                                    | EE461 | Power System Analysis and Design                 | 3 | 0 |
| 11                                    | EE462 | Electrical Machine Design and Equipment Training | 3 | 0 |
| 12                                    | EE463 | Fundamentals of High Voltage Engineering         | 3 | 0 |
| 13                                    | EE464 | Power Systems Protection                         | 3 | 0 |
| 14                                    | EE465 | Power Economics and Management                   | 3 | 0 |
| 15                                    | EE466 | Advanced Electrical Machines                     | 3 | 1 |
| 16                                    | EE482 | Electric Drives                                  | 3 | 1 |
| 17                                    | EE497 | Power Engineering Lab                            | 0 | 1 |
| 18                                    | CE185 | Basic Civil Engineering                          | 3 | 1 |
| 19                                    | EEXXX | Selected Topics in Power Engineering             | 3 | 0 |

| <b>University Electives</b>                                |  |
|--|--|
| Any course from any discipline can be opted by the student |  |

**\* Electives shall be offered based on students' interest and subject to availability of resources**