

Department of Electronics Engineering, Main Campus
Curriculum for Session 2K20 onwards in accordance with PEC/HEC guidelines

| First Semester | | | | | |
|------------------------|---|-----------------|----|----|-------------------------------------|
| BH-111 | Functional English | Humanities | 3 | 0 | |
| BH-112 | Calculus-I | Natural Science | 3 | 0 | |
| BH-113 | Applied Physics | Natural Science | 3 | 1 | |
| CS-114 | Computer Fundamentals & Programming | Computing | 2 | 1 | |
| BH-115 | Islamic Studies/Ethics | Humanities | 2 | 0 | |
| EN-116 | Workshop Practice | Foundation | 0 | 1 | |
| | | | 13 | 03 | |
| | Total | | 16 | | |
| Second Semester | | | | | |
| CS-121 | Object Oriented Programming | Computing | 2 | 1 | Computer Fundamentals & Programming |
| BH-122 | Differential Equations | Natural Science | 3 | 0 | Calculus-I |
| BH-123 | Calculus-II | Natural Science | 3 | 0 | Calculus-I |
| EN-124 | Circuit Analysis-I | Foundation | 3 | 1 | |
| EN-125 | Solid-State Electronics | Foundation | 3 | 0 | |
| | | | 14 | 02 | |
| | Total | | 16 | | |
| Third Semester | | | | | |
| BH-211 | Linear Algebra | Natural Science | 3 | 0 | |
| BH212 | Technical Report Writing & Communication Skills | Humanities | 3 | 0 | |
| EN-213 | Digital Logic Design | Foundation | 3 | 1 | |
| EN-214 | Circuit Analysis-II | Foundation | 3 | 1 | Circuit Analysis-I |
| EN-215 | Electronic Devices & Circuits | Foundation | 3 | 1 | Solid State Electronics |
| | | | 15 | 03 | |
| | Total | | 18 | | |
| Fourth Semester | | | | | |
| BH-221 | Complex Variables & Transforms | Natural Science | 3 | 0 | Differential Equations |
| EN-222 | Probability & Random Variables | Foundation | 3 | 0 | |
| EN-223 | Microprocessors & Microcontrollers | Breadth | 3 | 1 | Digital Logic Design |
| EN-224 | Electrical Machines | Breadth | 3 | 1 | Circuit Analysis-II |
| EN-225 | Electronic Circuit Design | Foundation | 3 | 1 | Electronic Devices & Circuits |
| | | | 15 | 03 | |
| | Total | | 18 | | |
| Fifth Semester | | | | | |
| BH-311 | Social Sciences Elective I | Humanities | 3 | 0 | |
| EN-312 | Integrated Electronics | Breadth | 3 | 1 | Electronic Circuit Design |
| EN-313 | Signals & Systems | Breadth | 3 | 1 | Complex Variables and Transform |

| | | | | | |
|-------------------------|---------------------------------|---------------------|-------|-----|--------------------------------|
| EN-314 | Electromagnetic Field Theory | Foundation | 3 | 0 | Calculus-II |
| EN-315 | Instrumentation & Measurements | Breadth | 3 | 1 | |
| | | | 15 | 03 | |
| | Total | | 18 | | |
| Sixth Semester | | | | | |
| BH-321 | Social Sciences Elective II | Humanities | 3 | 0 | |
| EN-322 | Analog & Digital Communication | IDEE | 3 | 1 | Signal & Systems |
| EN-323 | Control Systems | Breadth | 3 | 1 | Complex Variables & Transforms |
| EN-324 | Digital Signal Processing | Depth | 3 | 1 | Signals & Systems |
| BH-325 | Pakistan Studies | Humanities | 2 | 0 | |
| | | | 14 | 03 | |
| | Total | | 17 | | |
| Seventh Semester | | | | | |
| MS-411 | Management Sciences Elective I | Management Sciences | 3 | 0 | |
| EN-412 | VLSI Design | Depth | 3 | 1 | Integrated Electronics |
| EN-4XX | Elective-I | Depth | 3 | 1 | |
| XX-4XX | Elective-II | IDEE | 3 | 0/1 | See list of Elective Courses |
| EN-499A | Electronics Engineering Project | Project | 0 | 3 | |
| | | | 12 | 5/6 | |
| | Total | | 17/18 | | |
| Eighth Semester | | | | | |
| MS-421 | Management Sciences Elective II | Management Sciences | 3 | 0 | |
| XX-4XX | Elective-III | Depth | 3 | 0/1 | See list of Elective Courses |
| XX-4XX | Elective-IV | Depth | 3 | 0/1 | See list of Elective Courses |
| EN-499B | Electronics Engineering Project | Project | 0 | 3 | |
| | | | 09 | 3/5 | |
| | Total | | 12/14 | | |

| List of Elective Courses | | | | |
|---------------------------------|------------------------------------|-------------|-------------|--------------------------------------|
| Course # | Course Title | Lec. | Lab. | Pre-Req. |
| EN-413 | FPGA-based System Design | 3 | 1 | Digital Logic Design |
| EN-414 | Embedded Systems Design | 3 | 1 | Microprocessors & Microcontrollers |
| EN-415 | Industrial Automation | 3 | 1 | Instrumentation & Measurements |
| EN-416 | Power Electronics | 3 | 1 | Electronic Circuit Design |
| EN/CS-417 | Digital Image Processing | 3 | 1 | Digital Signal Processing |
| EN-418 | Microelectronics Technology | 3 | 0 | |
| EN-419 | Microprocessor-based System Design | 3 | 1 | Microprocessors & Microcontrollers |
| EN-420 | Digital System Design | 3 | 1 | Integrated Electronics |
| EN-421 | Opto-Electronic Devices | 3 | 0 | Applied Physics |
| EN-422 | Analog & Mixed Signal Design | 3 | 1 | Integrated Electronics |
| EN-423 | IC Testing and Verification | 3 | 0 | |
| EN-424 | Industrial Electronics | 3 | 1 | Power Electronics |
| EN-425 | Microwave Electronics | 3 | 0 | Electromagnetic Field Theory |
| EN-426 | Computer Architecture | 3 | 0 | Microprocessors and Microcontrollers |
| EN/CS-427 | Computer Communication Networks | 3 | 1 | Analog and Digital Communications |
| EN/CS-428 | Telecommunication & Networks | 3 | | Analog and Digital Communications |
| EN-429 | Digital Control Systems | 3 | 1 | Control Systems |
| EN-430 | Artificial Intelligence | 3 | 1 | |
| EN-431 | Introduction to Nanotechnology | 3 | 0 | Solid-State Electronics |
| EN-432 | Biomedical Instrumentation | 3 | 1 | Instrumentation & Measurements |
| EN-433 | Laser and Fiber Optics | 3 | 0 | Applied Physics |
| EN-434 | Wireless Communications | 3 | 0 | Analog and Digital Communications |
| EN-435 | Wave Propagation and Antennas | 3 | 1 | Electromagnetic Field Theory |
| EN-436 | Operating Systems | 3 | 0 | Computer Fundamentals & Programming |
| EN/CS-437 | Introduction to Neural Networks | 3 | 0 | |
| EN/CS-438 | Fuzzy Logic | 3 | 0 | |
| BH-439 | Numerical Methods | 3 | 0 | |
| BH-440 | Statistical Methods | 3 | 0 | |
| EN/MT-441 | Introduction to Robotics | 3 | 0 | Linear Algebra |

Note: All the above mentioned Elective courses are either 3+0 credit hours or 3+1 credit hours. The Elective courses (either 3+0 or 3+1) offered by the department in a semester can be changed depending on the availability of teachers and related Lab facility and will be notified before the start of the semester.

| List of Social Sciences Elective Courses | |
|---|-----------------|
| Course Title | Pre-Req. |
| Professional and Social Ethics | Nil |
| Sociology and Development | Nil |
| Social Anthropology | Nil |
| Understanding Psychology and Human Behaviour | Nil |
| Applied Psychology | Nil |
| Organizational Behaviour | Nil |
| Introduction to Sociology | Nil |
| Critical Thinking | Nil |
| Introduction to Philosophy | Nil |

| List of Management Sciences Elective Courses | |
|---|-----------------|
| Course Title | Pre-Req. |
| Engineering Economics & Management | Nil |
| Engineering Project Management | Nil |
| Entrepreneurship | Nil |
| Principles of Management | Nil |
| Leadership & Personal Grooming | Nil |

BSc ELECTRONICS ENGINEERING SCHEME OF STUDIES
FRAMEWORK SUMMARY

| | | | | |
|---|--|--------------------------------|--------------------|------------------|
| 1 | Total Credit Hours | Theory 107 | Practical 25/28 | Total 132/135 |
| 2 | Ratio of Non-Engineering to Engineering Subjects | 30.4/69.6 | | |
| 3 | Ratio of Theory to Practical Contact Hour | 56.02/43.98 | | |
| 4 | One Theory Credit Hour | 01 Contact Hour (60 Minutes) | | |
| 5 | One Practical Credit Hour | 03 Contact Hours (180 Minutes) | | |

| Sr. No. | Knowledge Area | Domain | As per ENC |
|----------------|--|-----------------|-------------------|
| 1 | Humanities | Non-Engineering | 16 |
| 2 | Management | Non-Engineering | 6 |
| 3 | Natural Sciences | Non-Engineering | 19 |
| 4 | Computing | Engineering | 6 |
| 5 | Engineering Foundation | Engineering | 30 |
| 6 | Major Based Core – Breadth | Engineering | 24 |
| 7 | Major Based Core – Depth | Engineering | 18/20 |
| 8 | Inter-disciplinary Engineering Breadth | Engineering | 7/8 |
| 9 | Senior Design Project | Engineering | 6 |
| | Total | | 132/135 |
| | Non-Engineering | | 30.4% |
| | Engineering | | 69.6% |

HEC Criteria:

Total numbers of Credit hours: 124-136

Duration: 4 years

Semester duration: 16-18 weeks

Semesters: 8

Course Load per Semester: 15-18 Cr hr

Number of courses per semester: 4-6 (not more than 3 lab/practical courses)

| Sr. No. | Detail | Credit Hour | | | Contact Hour | | |
|---------|-----------|-----------------|-------------|---------|-----------------|-------------|---------|
| | | Non-Engineering | Engineering | Total | Non-Engineering | Engineering | Total |
| 1 | Theory | 40 | 67 | 107 | 40 | 67 | 107 |
| 2 | Practical | 1 | 24/27 | 25/28 | 3 | 72/81 | 75/84 |
| | Total | 41 | 91/94 | 132/135 | 43 | 139/148 | 182/191 |

ACADEMIC CALENDAR

| Sr. No. | Detail | Weeks per Semester | Weeks per Year |
|---------|---------------------------|---------------------------|----------------|
| 1 | Teaching | 16 | 32 |
| 2 | Preparation & Examination | 04 | 08 |
| 3 | Semester Break | Fall | 12 |
| | | Spring + Summer Vacations | |
| | Total | | 52 |

FRAMEWORK FOR BSc ELECTRONICS ENGINEERING

SUMMARY: NON-ENGINEERING DOMAIN

| Sr. No. | Knowledge Area | Credit Hours | Percentage |
|---------|------------------|--------------|------------|
| 1 | Humanities | 16 | 39% |
| 2 | Management | 6 | 14.6% |
| 3 | Natural Sciences | 19 | 46.4% |
| | Total | 41 | 100% |

DETAIL: NON-ENGINEERING Domain Courses

| Knowledge Area | Sub Area | Name of Course | Theory Contact Hours | Practical Contact Hours | Credit Hours (CH) | Number of Subjects | Total Credit Hours |
|-----------------------------|-----------------|---|----------------------|-------------------------|-------------------|--------------------|--------------------|
| Humanities | English | Functional English | 3 | 0 | 3 | 2 | 6 |
| | | Technical Report Writing & Communication Skills | 3 | 0 | 3 | | |
| | Culture | Islamic Studies/Ethics | 2 | 0 | 2 | 2 | 4 |
| | | Pakistan Studies | 2 | 0 | 2 | | |
| | Social Sciences | Social Sciences Elective I | 3 | 0 | 3 | 2 | 6 |
| Social Sciences Elective II | | 3 | 0 | 3 | | | |
| Management Sciences | -- | Management Sciences Elective I | 3 | 0 | 3 | 2 | 6 |
| | | Management Sciences Elective II | 3 | 0 | 3 | | |
| Natural Sciences | Math | Calculus-I | 3 | 0 | 3 | 5 | 15 |
| | | Calculus-II | 3 | 0 | 3 | | |
| | | Linear Algebra | 3 | 0 | 3 | | |
| | | Differential Equations | 3 | 0 | 3 | | |
| | Physics | Complex Variables & Transforms | 3 | 0 | 3 | 1 | 4 |
| Applied Physics | 3 | 3 | 4 | | | | |
| Total | | | 40 | 3 | 41 | 14 | 41 |

SUMMARY: ENGINEERING DOMAIN

| Sr. No. | Knowledge Area | Credit Hours | Percentage |
|---------|-----------------------------------|--------------|------------|
| 1 | Computing | 6 | 6.4% |
| 2 | Electronic Engineering Foundation | 30 | 31.9% |
| 3 | Electronic Engineering Breadth | 24 | 25.5% |
| 4 | Electronic Engineering Depth | 18/20 | 21.3% |
| 5 | IDEE | 7/8 | 8.5% |
| 6 | Technical Project | 6 | 6.4% |
| | Total | 91/94 | 100.00% |

DETAIL: ENGINEERING DOMAIN

| Knowledge Area | Name of Course | Theory Contact Hours | Practical Contact Hours | Credit Hours (CH) | Number of Subjects | Total Credit Hours |
|------------------------------------|---|----------------------|-------------------------|-------------------|--------------------|--------------------|
| Computing | Computer Fundamentals & Programming | 2 | 3 | 3 | 2 | 6 |
| | Object Oriented Programming | 2 | 3 | 3 | | |
| Electronics Engineering Foundation | Workshop Practice | 0 | 3 | 1 | 9 | 30 |
| | Circuit Analysis-I | 3 | 3 | 4 | | |
| | Solid-State Electronics | 3 | 0 | 3 | | |
| | Digital Logic Design | 3 | 3 | 4 | | |
| | Circuit Analysis-II | 3 | 3 | 4 | | |
| | Electronic Devices & Circuits | 3 | 3 | 4 | | |
| | Electronic Circuit Design | 3 | 3 | 4 | | |
| | Electromagnetic Field Theory | 3 | 0 | 3 | | |
| | Probability & Random Variables | 3 | 0 | 3 | | |
| Electronics Engineering Breadth | Microprocessors & Microcontrollers | 3 | 3 | 4 | 6 | 24 |
| | Electrical Machines | 3 | 3 | 4 | | |
| | Integrated Electronics | 3 | 3 | 4 | | |
| | Signals & Systems | 3 | 3 | 4 | | |
| | Instrumentation & Measurements | 3 | 3 | 4 | | |
| | Control Systems | 3 | 3 | 4 | | |
| Electronics Engineering Depth | Digital Signal Processing | 3 | 3 | 4 | 5 | 18/20 |
| | VLSI Design | 3 | 3 | 4 | | |
| | Elective-I | 3 | 3 | 4 | | |
| | Elective-III | 3 | 0/3 | ¾ | | |
| | Elective-IV | 3 | 0/3 | ¾ | | |
| IDEE | Analog & Digital Communication (IDEE I) | 3 | 3 | 4 | 2 | 7/8 |
| | Elective-II (IDEE II) | 3 | 0/3 | ¾ | | |
| Project | Electronic Engineering Project | 0 | 9 | 3 | 2 | 6 |

| | | | | | | |
|-------|-----------------------------------|----|-------|-------|----|-------|
| | Electronic Engineering Project | 0 | 9 | 3 | | |
| Total | | 67 | 72/81 | 91/94 | 26 | 91/94 |

SCHEME OF STUDIES (SEMESTER WISE) SUMMARY

| Sr. No. | Semester | No. of Subjects | Credit Hours | | Total Credit Hours | Contact Hours | | Total Contact Hours |
|------------|----------|--------------------|--------------|-----------|--------------------------|---------------|-----------|------------------------|
| | | | Theory | Practical | | Theory | Practical | |
| 1 | First | 6 | 13 | 3 | 16 | 13 | 09 | 22 |
| 2 | Second | 5 | 14 | 02 | 16 | 14 | 06 | 20 |
| 3 | Third | 5 | 15 | 3 | 18 | 15 | 09 | 24 |
| 4 | Fourth | 5 | 15 | 3 | 18 | 15 | 09 | 24 |
| 5 | Fifth | 5 | 15 | 3 | 18 | 15 | 09 | 24 |
| 6 | Sixth | 5 | 14 | 3 | 17 | 14 | 09 | 23 |
| 7 | Seventh | 5 | 12 | 5/6 | 17/18 | 12 | 15/18 | 27/30 |
| 8 | Eighth | 4 | 09 | 3/5 | 12/14 | 09 | 9/15 | 18/24 |
| Total | | 40 | 107 | 25/28 | 132/135 | 107 | 75/88 | 182/191 |