# Bachelor of Science in Software Engineering
# BSSE
# Scheme of Studies
# Fall 2015
# (134 Cr. Hrs)

### i. Software Engineering- Computing Core Courses (44 Credit Hours)

| # | Code | Course Title | Cr.Hrs. | Contact Hrs |
|---|------|--------------|---------|-------------|
| 1 | CS102 | Introduction to Computing | 4 (3,1) | 3+3 = 6 |
| 2 | CS111 | Programming Fundamentals | 4 (3,1) | 3+3 = 6 |
| 3 | SE101 | Object Oriented Programming | 4 (3,1) | 3+3 = 6 |
| 4 | CS291 | Discrete Structures | 3 (3,0) | 3+0 = 3 |
| 5 | CS212 | Data Structure and Algorithms | 3 (2,1) | 3+1.5 = 4.5 |
| 6 | CS223 | Digital Logic and Design | 3 (2,1) | 3+1.5 = 4.5 |
| 7 | CS224 | Operating Systems | 4 (3,1) | 3+1.5 = 4.5 |
| 8 | CS242 | Introduction to Database Systems | 4 (3,3) | 3+3 = 6 |
| 9 | SE203 | Introduction to Software Engineering | 3 (3,0) | 3+0 = 3 |
| 10 | CS372 | Computer Communications and Networks | 3 (2,1) | 3+1.5 = 4.5 |
| 11 | SE431 | Human Computer Interaction | 3 (3,0) | 3+0 = 3 |
| 12 | CS400 | Senior Design Project | 6 (0,6) | 0+6 = 6 |

1 Credit hour of Lab =3 contact hours

### ii. Software Engineering –Core Courses (18 Credit Hours )

| # | Code | Course Title | Cr.Hrs. | Contact Hrs |
|---|------|--------------|---------|-------------|
| 13 | SE302 | Software Construction | 3(2,1) | 3+1.5 = 4.5 |
| 14 | SE311 | Software Requirements Engineering | 3(2,1) | 3+1.5 = 4.5 |
| 15 | SE331 | Software Design And Architecture | 3(2,1) | 3+1.5 = 4.5 |
| 16 | SE471 | Software Quality Engineering | 3(2,1) | 3+1.5 = 4.5 |
| 17 | SE461 | Software Project Management | 3(3,0) | 3+0 = 3 |
| 18 | SE222 | Formal Methods in Software Engineering | 3(3,0) | 3+0 = 3 |

### iii. Software Engineering Elective Courses (21 Credit hours )

Tentative list of elective courses is given as follows:

| # | Code | Course Title | Cr.Hrs. | Contact Hrs |
|---|------|--------------|---------|-------------|
| 1 | SE | Software Metrics | 3(3,0) | 3+0 = 3 |
| 2 | SE | Software Engineering Economics | 3(3,0) | 3+0 = 3 |
| 3 | MG | Information System Audit | 3(3,0) | 3+0 = 3 |
| 4 | CS | Business Process Automation | 3(3,0) | 3+0 = 3 |
| 5 | CS | Design Patterns | 3(3,0) | 3+0 = 3 |
| 6 | SE | Software Testing | 3(2,1) | 3+1.5 = 4.5 |
| 7 | SE | Personal Software Process (PSP) and Team Software Process (TSP) | 3(3,0) | 3+0 = 3 |

| 8 | SE | Enterprise System Development | 3(3,0) | 3+0 = 3 |
|---|---|---|---|---|
| 9 | CS | Real-Time Systems | 3(3,0) | 3+0 = 3 |
| 10 | CS | Data Warehousing and Data Mining | 3(3,0) | 3+0 = 3 |
| 11 | CS | Data Security and Encryption | 3(3,0) | 3+0 = 3 |
| 12 | CE | Microprocessor Interfacing | 3(3,0) | 3+0 = 3 |
| 13 | CS | Principles of Programming Languages | 3(3,0) | 3+0 = 3 |
| 14 | CS | Computer Graphics | 3(2,1) | 3+1.5 = 4.5 |
| 15 | CS | Artificial Neural Networks | 3(3,0) | 3+0 = 3 |
| 16 | CS | Advance Database Management Systems | 3(2,1) | 3+1.5 = 4.5 |
| 17 | SE241 | Advanced Computer Programming | 3(2,1) | 3+1.5 = 4.5 |
| 18 | CS | Bio-Informatics | 3(3,0) | 3+0 = 3 |
| 19 | SE321 | Object Oriented Analysis and Design | 3(3,0) | 3+0 = 3 |
| 20 | CS322 | Computer Organization and Assembly Language | 3(2,1) | 3+1.5 = 4.5 |
| 21 | CS314 | Theory of Automata & Formal Languages | 3(3,0) | 3+0 = 3 |
| 22 | CS213 | Design and Analysis of Algorithms | 3(3,0) | 3+0 = 3 |
| 23 | CS451 | Artificial Intelligence | 3(2,1) | 3+1.5 = 4.5 |
| 24 | CS321 | Computer Architecture | 3(2,1) | 3+1.5 = 4.5 |
| 25 | CS411 | Compiler Construction | 3(2,1) | 3+1.5 = 4.5 |
| 26 | | Software Development Technologies | 3(2,1) | 3+1.5 = 4.5 |

## B. General Courses (40%)
### Group A: University Required Courses (24 Credit Hours)

| # | Code | Course Title | Cr.Hrs. | Contact Hrs |
|---|---|---|---|---|
| 1 | GC101 | Understanding Quran I | 3(3,0) | 3+0 = 3 |
| 2 | GC102 | English I (English Composition & Comprehension) | 3(3,0) | 3+0 = 3 |
| 3 | GC103 | Understanding Quran II | 3(3,0) | 3+0 = 3 |
| 4 | GC104 | English II (Communication Skills) | 3(3,0) | 3+0 = 3 |
| 5 | GC105 | Basic Of Academic Writing | 3(3,0) | 3+0 = 3 |
| 6 | GC106 | Islamic World View & Civilization – I | 3(3,0) | 3+0 = 3 |
| 7 | GC107 | Islamic World View & Civilization – II | 3(3,0) | 3+0 = 3 |
| 8 | GC109 | Pakistani Culture & Society | 3(3,0) | 3+0 = 3 |

### Group B: Outside Department / Faculty Courses (27 Credit Hours )

| # | Code | Course Title | Cr.Hrs. | Contact Hrs |
|---|---|---|---|---|
| 1 | Math 110 | Calculus And Analytical Geometry | 3(3,0) | 3+0 = 3 |
| 2 | Math 121 | Liner Algebra | 3(3,0) | 3+0 = 3 |
| 3 | ST301 | Probability & Statistic | 3(3,0) | 3+0 = 3 |
| 4 | Math 352 | Multivariate Calculus | 3(3,0) | 3+0 = 3 |
| 5 | Math 401 | Numerical Computing | 3(3,0) | 3+0 = 3 |
| 6 | GC108 | Professional and Ethical Issues | 3(3,0) | 3+0 = 3 |
| 7 | GC191 | Basic Electronic | 3(3,0) | 3+0 = 3 |
| 8 | GC151 | Introduction To Finance | 3(3,0) | 3+0 = 3 |
| 9 | GC152 | Introduction To Management | 3(3,0) | 3+0 = 3 |

## Tentative Semester Wise Course Offering (BSSE)

Tentative scheme of studies of **BS Software Engineering (134 Cr. Hrs)** for **FALL 2015** and onwards in semester wise format is given as under:

## Tentative Course Offering Plan
### BS(Software Engineering)
### Fall 2015

| Course Code | Pre-Req | Course Title | Cr Hrs. | Contact Hrs. |
|---|---|---|---|---|
| **1st Semester** | | | | |
| CS 102 | - | Introduction to Computing | 4 (3,1) | 6 |
| MATH 110 | - | Calculus & Analytical Geometry | 3 (3,0) | 3 |
| GC 102 | - | English I (English Composition & Comprehension) | 3 (3,0) | 3 |
| GC 191 | - | Basic Electronics | 3 (3,0) | 3 |
| CS 291 | - | Discrete Structures | 3 (3,0) | 3 |
| **Total Credit Hrs.** | | | **16** | **18** |

| Course Code | Pre-Req | Course Title | Cr Hrs. | Contact Hrs. |
|---|---|---|---|---|
| **2nd Semester** | | | | |
| CS 111 | - | Programming Fundamentals | 4 (3,1) | 6 |
| CS 221 | GC191 | Digital Logic and Design/Computer Organization | 3 (3,0) | 3 |
| GC 104 | - | English II (Communication Skills) | 3 (3,0) | 3 |
| ST 301 | - | Probability & Statistics | 3 (3,0) | 3 |
| GC 101 | - | Understanding Quran I | 3 (3,0) | 3 |
| **Total Credit Hrs.** | | | **16** | **18** |

| Course Code | Pre-Req | Course Title | Cr Hrs. | Contact Hrs. |
|---|---|---|---|---|
| **3rd Semester** | | | | |
| SE 101 | CS 111 | Object Oriented Paradigm | 4 (3,3) | 6 |
| MATH 352 | MATH110 | Multivariate Calculus | 3 (3,0) | 3 |
| GC 105 | - | English-III (Basics of Academic Writing) | 3 (3,0) | 3 |
| GC 103 | - | Understanding Quran II | 3 (3,0) | 3 |
| SE 202 | SE 101 | Introduction to Software Engineering (SE-I) | 3 (3,0) | 3 |
| **Total Credit Hrs.** | | | **16** | **21** |

| 4th Semester | | | | |
|---|---|---|---|---|
| **Course Code** | **Pre-Req** | **Course Title** | **Cr Hrs.** | **Contact Hrs.** |
| CS 242 | CS 212 | Introduction to Database Systems | 4 (3,1) | 6 |
| CS 372 | - | Computer Communications & Networks | 3 (2,1) | 4.5 |
| CS 212 | CS 103 | Data Structure & Algorithms | 3 (2,1) | 4.5 |
| GC 106 | - | Islamic World View & Civilization-I | 3 (3,0) | 3 |
| GC 151 | - | Introduction to Finance | 3 (3,0) | 3 |
| SE 301 | SE 202 | Software Construction | 3 (3,0) | 3 |
| **Total Credit Hrs.** | | | **19** | |

| 5th Semester | | | | |
|---|---|---|---|---|
| **Course Code** | **Pre-Req** | **Course Title** | **Cr Hrs.** | **Contact Hrs.** |
| SE322 | - | Formal Methods in Software Engineering | 3 (3,0) | 3 |
| CS 224 | - | Operating System | 4 (3,1) | 4.5 |
| MATH 121 | - | Linear Algebra | 3 (3,0) | 3 |
| GC 107 | - | Islamic World View & Civilization-II | 3 (3,0) | 3 |
| SE 321 | SE 301 | Elective – I - Object Oriented Analysis and Design | 3 (3,0) | 3 |
| - | - | Elective – II – Advanced Computer Programming | 3 (2,1) | 4.5 |
| **Total Credit Hrs.** | | | **19** | **21** |

| 6th Semester | | | | |
|---|---|---|---|---|
| **Course Code** | **Pre-Req** | **Course Title** | **Cr Hrs.** | **Contact Hrs.** |
| SE 331 | | Software Design and Architecture | 3 (2,1) | 4.5 |
| SE 471 | SE 311 | Software Quality Assurance | 3 (2,1) | 4.5 |
| SE 311 | SE 301 | Software Requirements Engineering | 3 (2,1) | 4.5 |
| GC 152 | - | Introduction to Management | 3 (3,0) | 3 |
| - | - | Elective – III | 3 (3,0) | 3 |
| - | - | Elective – IV | 3 (3,0) | 3 |
| **Total Credit Hrs.** | | | **18** | **22.5** |

| 7th Semester | | | | |
|---|---|---|---|---|
| **Course Code** | **Pre-Req** | **Course Title** | **Cr Hrs.** | **Contact Hrs.** |
| SE 461 | SE 202 | Software Project Management | 3 (3,0) | 3 |
| SE 431 | - | Human Computer Interaction | 3 (3,0) | 3 |
| MATH 401 | MATH110 | Numerical Computing | 3 (3,0) | 3 |
| - | - | Elective – V | 3 (3,0) | 3 |
| - | - | Elective – VI | 3 (3,0) | 3 |
| - | - | Elective – VII | 3 (3,0) | 3 |
| **Total Credit Hrs.** | | | **18** | **18** |

| 8th Semester | | | | |
|---|---|---|---|---|
| **Course Code** | **Pre-Req** | **Course Title** | **Cr Hrs.** | **Contact Hrs.** |
| SE 400 | | Software Project | 6 (0-6) | 6 |
| GC 109 | - | Pakistan Culture & Society | 3 (3-0) | 3 |
| GE 108 | - | Professional Practices | 3 (3-0) | 3 |
| **Total Credit Hrs.** | | | **12** | **12** |