

**13. COURSES OF STUDY AND SCHEME OF ASSESSMENT
MSc CYBER SECURITY**
**(2020 REGULATIONS)
(TOTAL CREDITS TO BE EARNED: 212*)**

| Course Code | Course Title | Hours / Week | | | Credit | Maximum marks | | | Prerequisite Courses | CAT |
|---------------------|---------------------------------------|--------------|----------|-----------------------------|-----------|---------------|------------|------------|----------------------|-----|
| | | L | T | P | | CA | FE | Total | | |
| I SEMESTER | | | | | | | | | | |
| 20XC11 | CALCULUS AND ITS APPLICATIONS | 3 | 2 | 0 | 4 | 50 | 50 | 100 | - | BS |
| 20XC12 | ENGLISH FOR PROFESSIONAL SKILLS | 3 | 0 | 0 | 3 | 50 | 50 | 100 | - | HS |
| 20XC13 | APPLIED PHYSICS | 4 | 0 | 0 | 4 | 50 | 50 | 100 | - | BS |
| 20XC14 | DIGITAL SYSTEM DESIGN | 3 | 2 | 0 | 4 | 50 | 50 | 100 | - | PC |
| 20XC15 | PROBLEM SOLVING AND C PROGRAMMING | 4 | 0 | 0 | 4 | 50 | 50 | 100 | - | PC |
| 20XC16 | MATHEMATICAL FOUNDATIONS LAB | 0 | 0 | 4 | 2 | 100 | - | 100 | - | PC |
| 20XC17 | C PROGRAMMING LAB | 0 | 0 | 4 | 2 | 100 | - | 100 | - | PC |
| 20XC18 | APPLIED PHYSICS LAB | 0 | 0 | 2 | 1 | 100 | - | 100 | - | BS |
| 20XC19 | PERSONALITY AND CHARACTER DEVELOPMENT | 0 | 0 | ** Refer Sem 2 and footnote | | | | | | MC |
| Total 31 hrs | | 17 | 4 | 10 | 24 | 550 | 250 | 800 | | |
| II SEMESTER | | | | | | | | | | |
| 20XC21 | DISCRETE STRUCTURES | 3 | 2 | 0 | 4 | 50 | 50 | 100 | | BS |
| 20XC22 | ALGEBRA AND NUMBER THEORY | 3 | 2 | 0 | 4 | 50 | 50 | 100 | - | BS |
| 20XC23 | DATA STRUCTURES | 3 | 0 | 0 | 3 | 50 | 50 | 100 | 20XC15 | PC |
| 20XC24 | OBJECT ORIENTED PROGRAMMING | 3 | 0 | 0 | 3 | 50 | 50 | 100 | 20XC15 | PC |
| 20XC25 | COMPUTER ARCHITECTURE | 3 | 0 | 0 | 3 | 50 | 50 | 100 | 20XC14 | PC |
| 20XC26 | DATA STRUCTURES LAB | 0 | 0 | 4 | 2 | 100 | - | 100 | - | PC |
| 20XC27 | OBJECT COMPUTING LAB | 0 | 0 | 4 | 2 | 100 | - | 100 | - | PC |
| 20XC28 | PYTHON PROGRAMMING LAB | 0 | 0 | 4 | 2 | 100 | - | 100 | - | PC |
| 20XC29 | PERSONALITY AND CHARACTER DEVELOPMENT | 0 | 0 | ** Grade - - - | | | | | | MC |
| Total 31 hrs | | 15 | 4 | 12 | 23 | 550 | 250 | 800 | | |

* Indicated is the minimum number of credits to be earned by a student.

L-Lecture ; T-Tutorial ; P-Practical ; CA – Continuous Assessment; FE - Final Examination; CAT – Category; BS – Basic Sciences; HS – Humanities & Social Sciences; ES – Engineering Sciences; PC – Professional Core; PE – Professional Elective; OE – Open Elective; EEC – Employability Enhancement Course; MC – Mandatory Course.

MSc CYBER SECURITY**(2020 REGULATIONS)**

| Course Code | Course Title | Hours / Week | | | Credit | Maximum marks | | | Prerequisite Courses | CAT |
|---------------------|---------------------------------------|--------------|----------|-----------|-----------|---------------|------------|------------|----------------------------|-----|
| | | L | T | P | | CA | FE | Total | | |
| III SEMESTER | | | | | | | | | | |
| 20XC31 | PROBABILITY AND STATISTICS | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC11 | BS |
| 20XC32 | MICROCONTROLLERS AND EMBEDDED SYSTEMS | 4 | 0 | 0 | 4 | 50 | 50 | 100 | 20XC25 | PC |
| 20XC33 | LINEAR ALGEBRA | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC22 | BS |
| 20XC34 | DATABASE DESIGN | 3 | 0 | 0 | 3 | 50 | 50 | 100 | 20XC21, 20XC23 | PC |
| 20XC35 | DESIGN AND ANALYSIS OF ALGORITHMS | 3 | 0 | 0 | 3 | 50 | 50 | 100 | 20XC21, 20XC23 | PC |
| 20XC36 | EMBEDDED SYSTEMS LAB | 0 | 0 | 4 | 2 | 100 | - | 100 | - | PC |
| 20XC37 | DESIGN AND ANALYSIS OF ALGORITHMS LAB | 0 | 0 | 4 | 2 | 100 | - | 100 | - | PC |
| 20XC38 | DATABASE DESIGN LAB | 0 | 0 | 4 | 2 | 100 | - | 100 | - | PC |
| Total 32hrs | | 16 | 4 | 12 | 24 | 550 | 250 | 800 | | |
| IV SEMESTER | | | | | | | | | | |
| 20XC41 | OPTIMIZATION TECHNIQUES | 3 | 0 | 0 | 3 | 50 | 50 | 100 | 20XC33 | PC |
| 20XC42 | COMPUTER NETWORKS | 3 | 0 | 0 | 3 | 50 | 50 | 100 | 20XC25 | PC |
| 20XC43 | OPERATING SYSTEMS | 4 | 0 | 0 | 4 | 50 | 50 | 100 | 20XC15 20XC23 20XC25 | PC |
| 20XC44 | CRYPTOGRAPHY | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC22 | PC |
| 20XC45 | HARDWARE SECURITY | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC25 | PC |
| 20XC46 | COMPUTER NETWORKS LAB | 0 | 0 | 4 | 2 | 100 | - | 100 | - | PC |
| 20XC47 | OPERATING SYSTEMS LAB | 0 | 0 | 4 | 2 | 100 | - | 100 | - | PC |
| 20XC48 | JAVA PROGRAMMING LAB | 0 | 0 | 4 | 2 | 100 | - | 100 | | PC |
| Total 32hrs | | 16 | 4 | 12 | 24 | 550 | 250 | 800 | | |

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 EEC – Employability Enhancement Course

MSc CYBER SECURITY**(2020 REGULATIONS)**

| Course Code | Course Title | Hours / Week | | | Credit | Maximum marks | | | Prerequisite Courses | CAT |
|---------------------|--|--------------|----------|-----------|-----------|---------------|------------|------------|--------------------------------------|-----|
| | | L | T | P | | CA | FE | Total | | |
| V SEMESTER | | | | | | | | | | |
| 20XC51 | NETWORK SECURITY | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC42 20XC44 | PC |
| 20XC52 | WEB ENGINEERING | 3 | 0 | 0 | 3 | 50 | 50 | 100 | 20XC42 20XC44 | PC |
| 20XC53 | MACHINE LEARNING | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC11 20XC31 20XC33 20XC41 | PC |
| 20XC54 | COMPILERS AND PROGRAM ANALYSIS | 4 | 0 | 0 | 4 | 50 | 50 | 100 | 20XC21 | PC |
| 20XCE_ | PROFESSIONAL ELECTIVE I | 3 | 2 | 0 | 4 | 50 | 50 | 100 | - | PE |
| 20XC56 | WINDOWS SYSTEM PROGRAMMING LAB | 0 | 0 | 2 | 1 | 100 | - | 100 | 20XC42 20XC43 | PC |
| 20XC57 | WEB ENGINEERING LAB | 0 | 0 | 4 | 2 | 100 | - | 100 | - | PC |
| 20XC58 | ETHICAL HACKING LAB | 0 | 0 | 4 | 2 | 100 | - | 100 | 20XC42 20XC43 | PC |
| Total 32 hrs | | 16 | 6 | 10 | 24 | 550 | 250 | 800 | | |
| VI SEMESTER | | | | | | | | | | |
| 20XC61 | CLOUD SECURITY | 3 | 0 | 0 | 3 | 50 | 50 | 100 | 20XC42 20XC43 | PC |
| 20XC62 | UBIQUITOUS COMPUTING | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC42 20XC44 | PC |
| 20XC63 | CYBER SECURITY ANALYTICS | 3 | 0 | 0 | 3 | 50 | 50 | 100 | 20XC51 20XC53 | PC |
| 20XC64 | SECURE CODING | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC15 20XC24 20XC25 | PC |
| 20XCE_ | PROFESSIONAL ELECTIVE II | 3 | 2 | 0 | 4 | 50 | 50 | 100 | - | PE |
| 20XC66 | CLOUD SECURITY LAB | 0 | 0 | 2 | 1 | 100 | - | 100 | - | PC |
| 20XC67 | CYBER SECURITY ANALYTICS AND VISUALIZATION LAB | 0 | 0 | 4 | 2 | 100 | - | 100 | - | PC |
| 20XC68 | DISTRIBUTED COMPUTING LAB | 0 | 0 | 4 | 2 | 100 | - | 100 | - | PC |
| Total 31 hrs | | 15 | 6 | 10 | 23 | 550 | 250 | 800 | | |
| VII SEMESTER | | | | | | | | | | |
| 20XCP1 | PROJECT WORK I | 0 | 0 | - | 12 | 50 | 50 | 100 | - | EEC |

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 EEC – Employability Enhancement Course

MSc CYBER SECURITY

(2020 REGULATIONS)

| Course Code | Course Title | Hours / Week | | | Credit | Maximum marks | | | Prerequisite | CAT |
|----------------------|--|--------------|----------|-----------|-----------|---------------|------------|------------|----------------------------|-----|
| | | L | T | P | | CA | FE | Total | | |
| VIII SEMESTER | | | | | | | | | | |
| 20XC81 | SOFTWARE SECURITY AND EXPLOITATION | 3 | 0 | 0 | 3 | 50 | 50 | 100 | 20XC43 20XC64 | PC |
| 20XC82 | MOBILE SECURITY | 3 | 0 | 0 | 3 | 50 | 50 | 100 | 20XC43 | PC |
| 20XC83 | DATA PRIVACY | 3 | 0 | 0 | 3 | 50 | 50 | 100 | 20XC34 20XC53 | PC |
| 20XCE_ | PROFESSIONAL ELECTIVE III | 3 | 2 | 0 | 4 | 50 | 50 | 100 | - | PE |
| 20XCO_ | OPEN ELECTIVE I | 3 | 2 | 0 | 4 | 50 | 50 | 100 | - | OE |
| 20XC86 | SOFTWARE SECURITY AND EXPLOITATION LAB | 0 | 0 | 4 | 2 | 100 | - | 100 | 20XC47 20XC56 | PC |
| 20XC87 | MOBILE SECURITY LAB | 0 | 0 | 4 | 2 | 100 | - | 100 | - | PC |
| 20XC88 | MALWARE ANALYSIS LAB | 0 | 0 | 4 | 2 | 100 | - | 100 | 20XC42 20XC43 | PC |
| Total 31hrs | | 15 | 4 | 12 | 23 | 550 | 250 | 800 | | |
| IX SEMESTER | | | | | | | | | | |
| 20XC91 | THREAT HUNTING | 3 | 0 | 0 | 3 | 50 | 50 | 100 | 20XC43 20XC51 20XC63 | PC |
| 20XC92 | CRYPTOECONOMICS | 3 | 0 | 0 | 3 | 50 | 50 | 100 | 20XC34 20XC44 | PC |
| 20XC93 | COMPUTER FORENSICS | 3 | 0 | 0 | 3 | 50 | 50 | 100 | 20XC42 20XC43 20XC44 | PC |
| 20XCE_ | PROFESSIONAL ELECTIVE IV | 3 | 2 | 0 | 4 | 50 | 50 | 100 | - | PE |
| 20XCO_ | OPEN ELECTIVE II | 3 | 2 | 0 | 4 | 50 | 50 | 100 | - | OE |
| 20XC96 | THREAT HUNTING LAB | 0 | 0 | 4 | 2 | 100 | - | 100 | - | PC |
| 20XC97 | COMPUTER FORENSICS LAB | 0 | 0 | 4 | 2 | 100 | - | 100 | - | PC |
| 20XC98 | SECURITY CAPSTONE LAB | 0 | 0 | 4 | 2 | 100 | - | 100 | - | EEC |
| Total 31 hrs | | 15 | 4 | 12 | 23 | 550 | 250 | 800 | | |
| X SEMESTER | | | | | | | | | | |
| 20XCP2 | PROJECT WORK 2 | 0 | 0 | - | 12 | 50 | 50 | 100 | - | EEC |

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 EEC – Employability Enhancement Course

| Course Code | Course Title | Hours / Week | | | Credit | Maximum marks | | | Prerequisite | CAT |
|--|--|--------------|---|---|--------|---------------|----|-------|--------------------------------------|-----|
| | | L | T | P | | CA | FE | Total | | |
| PROFESSIONAL ELECTIVE THEORY COURSES (Four to be opted) | | | | | | | | | | |
| 20XCE1 | INFORMATION AND CODING THEORY | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC14 20XC31 20XC33 | PE |
| 20XCE2 | QUANTUM COMPUTING | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC21 20XC33 20XC44 | PE |
| 20XCE3 | POST QUANTUM CRYPTOGRAPHY | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC21 20XC33 20XC44 | PE |
| 20XCE4 | ACTIVE DEFENSE USING DECEPTION | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC51 | PE |
| 20XCE5 | SECURITY MODELING AND ANALYSIS | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC22 20XC44 | PE |
| 20XCE6 | COMPUTER GRAPHICS AND VISUALIZATION | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC33 20XC35 | PE |
| 20XCE7 | ARTIFICIAL INTELLIGENCE | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC21 20XC23 20XC31 20XC35 | PE |
| 20XCE8 | SOCIAL NETWORK ANALYSIS | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC35 | PE |
| 20XCE9 | APPLIED GRAPH THEORY | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC21 | PE |
| 20XCEA | MULTIMEDIA SECURITY | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC44 20XCEJ | PE |
| 20XCEB | IDENTITY AND ACCESS MANAGEMENT | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC43 20XC51 | PE |
| 20XCEC | ESSENTIALS OF CYBER PHYSICAL SYSTEM SECURITY | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC32 20XC42 20XC62 | PE |
| 20XCED | DATA COMPRESSION | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC14 20XC23 20XCEJ | PE |
| 20XCEE | BIG DATA AND MODERN DATABASES | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC34 20XC35 | PE |
| 20XCEF | NETWORK FORENSICS | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC51 | PE |
| 20XCEG | BIOMETRIC SECURITY | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC53 | PE |
| 20XCEH | GAME THEORY | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC31 | PE |
| 20XCEI | ETHICS AND CYBER LAW | 3 | 2 | 0 | 4 | 50 | 50 | 100 | - | PE |
| 20XCEJ | DIGITAL IMAGE PROCESSING | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC11 20XC21 20XC31 20XC33 | PE |
| 20XCEK | NATURAL LANGUAGE PROCESSING | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC53 20XCE7 | PE |
| 20XCEL | INFORMATION RETRIEVAL AND FILTERING | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC31 20XC33 20XC35 | PE |
| 20XCEM | REINFORCEMENT LEARNING | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC53 20XCE7 | PE |
| 20XCEN | DEEP LEARNING | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC53 | PE |
| 20XCEO | RANDOMIZED ALGORITHMS | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC23 20XC31 20XC35 | PE |

| Course Code | Course Title | Hours/Week | | | Credit | Maximum marks | | | Prerequisite | CAT |
|---|---|------------|---|---|--------|---------------|----|-------|--------------------------------------|-----|
| | | L | T | P | | CA | FE | Total | | |
| OPEN ELECTIVE THEORY COURSES (Two to be opted) | | | | | | | | | | |
| 20XCO1 | GERMAN | 3 | 2 | 0 | 4 | 50 | 50 | 100 | - | OE |
| 20XCO2 | VIRTUAL AND AUGMENTED REALITY | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XCE6 | OE |
| 20XCO3 | COMPUTATIONAL FOUNDATION FOR ROBOTICS | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC11 20XC33 | OE |
| 20XCO4 | STOCHASTIC MODELS | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC31 | OE |
| 20XCO5 | PRINCIPLES OF MANAGEMENT | 3 | 2 | 0 | 4 | 50 | 50 | 100 | - | OE |
| 20XCO6 | ENVIRONMENTAL SCIENCE AND GREEN COMPUTING | 3 | 2 | 0 | 4 | 50 | 50 | 100 | - | OE |
| 20XCO7 | COMPUTATIONAL FINANCE | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC11 20XC31 20XC33 20XC04 | OE |
| 20XCO8 | ENTREPRENEURSHIP | 3 | 2 | 0 | 4 | 50 | 50 | 100 | - | OE |
| 20XCO9 | STATISTICAL LEARNING | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC31 20XC53 | OE |
| 20XCOA | MATHEMATICAL MODELLING | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC31 20XCO4 | OE |
| 20XCOB | ADVERSARIAL MACHINE LEARNING | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC53 | OE |
| 20XCOC | NETWORK SCIENCE | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC31 20XCE9 | OE |
| 20XCOD | SOFTWARE PATTERNS | 3 | 2 | 0 | 4 | 50 | 50 | 100 | 20XC24 | OE |

Labeling & Group of Courses

| PROFESSIONAL CORE (PC) | | | | |
|-------------------------------|-------------|---------------------------------------|---------|--------------------|
| Sl.No. | Course Code | Course Title | L:T:P:C | Preferred Semester |
| 1. | 20XC14 | DIGITAL SYSTEM DESIGN | 3:2:0:4 | I |
| 2. | 20XC15 | PROBLEM SOLVING AND C PROGRAMMING | 4:0:0:4 | I |
| 3. | 20XC17 | C PROGRAMMING LAB | 0:0:4:2 | I |
| 4. | 20XC18 | APPLIED PHYSICS LAB | 0:0:2:1 | I |
| 5. | 20XC23 | DATA STRUCTURES | 3:0:0:3 | II |
| 6. | 20XC24 | OBJECT ORIENTED PROGRAMMING | 3:0:0:3 | II |
| 7. | 20XC25 | COMPUTER ARCHITECTURE | 3:0:0:3 | II |
| 8. | 20XC26 | DATA STRUCTURES LAB | 0:0:4:2 | II |
| 9. | 20XC27 | OBJECT COMPUTING LAB | 0:0:4:2 | II |
| 10. | 20XC28 | PYTHON PROGRAMMING LAB | 0:0:4:2 | II |
| 11. | 20XC32 | MICROCONTROLLERS AND EMBEDDED SYSTEMS | 4:0:0:4 | III |
| 12. | 20XC34 | DATABASE DESIGN | 3:0:0:3 | III |
| 13. | 20XC35 | DESIGN AND ANALYSIS OF ALGORITHMS | 3:0:0:3 | III |
| 14. | 20XC36 | EMBEDDED SYSTEMS LAB | 0:0:4:2 | III |
| 15. | 20XC37 | DESIGN AND ANALYSIS OF ALGORITHMS LAB | 0:0:4:2 | III |
| 16. | 20XC38 | DATABASE DESIGN LAB | 0:0:4:2 | III |
| 17. | 20XC41 | OPTIMIZATION TECHNIQUES | 3:0:0:3 | IV |

| | | | | |
|-----|--------|--|---------|------|
| 18. | 20XC42 | COMPUTER NETWORKS | 3:0:0:3 | IV |
| 19. | 20XC43 | OPERATING SYSTEMS | 4:0:0:4 | IV |
| 20. | 20XC44 | CRYPTOGRAPHY | 3:2:0:4 | IV |
| 21. | 20XC45 | HARDWARE SECURITY | 3:2:0:4 | IV |
| 22. | 20XC46 | COMPUTER NETWORKS LAB | 0:0:4:2 | IV |
| 23. | 20XC47 | OPERATING SYSTEMS LAB | 0:0:4:2 | IV |
| 24. | 20XC48 | JAVA PROGRAMMING LAB | 0:0:4:2 | IV |
| 25. | 20XC51 | NETWORK SECURITY | 3:0:0:3 | V |
| 26. | 20XC52 | WEB ENGINEERING | 3:0:0:3 | V |
| 27. | 20XC53 | MACHINE LEARNING | 3:2:0:4 | V |
| 28. | 20XC54 | COMPILERS AND PROGRAM ANALYSIS | 4:0:0:4 | V |
| 29. | 20XC56 | WINDOWS SYSTEM PROGRAMMING LAB | 0:0:2:1 | V |
| 30. | 20XC57 | WEB ENGINEERING LAB | 0:0:4:2 | V |
| 31. | 20XC58 | ETHICAL HACKING LAB | 0:0:4:2 | V |
| 32. | 20XC61 | CLOUD SECURITY | 3:0:0:3 | VI |
| 33. | 20XC62 | UBIQUITOUS COMPUTING | 3:2:0:4 | VI |
| 34. | 20XC63 | CYBER SECURITY ANALYTICS | 3:0:0:3 | VI |
| 35. | 20XC64 | SECURE CODING | 3:2:0:4 | VI |
| 36. | 20XC66 | CLOUD SECURITY LAB | 0:0:2:1 | VI |
| 37. | 20XC67 | CYBER SECURITY ANALYTICS AND VISUALIZATION LAB | 0:0:4:2 | VI |
| 38. | 20XC68 | DISTRIBUTED COMPUTING LAB | 0:0:4:2 | VI |
| 39. | 20XC81 | SOFTWARE SECURITY AND EXPLOITATION | 3:0:0:3 | VIII |
| 40. | 20XC82 | MOBILE SECURITY | 3:0:0:3 | VIII |
| 41. | 20XC83 | DATA PRIVACY | 3:0:0:3 | VIII |
| 42. | 20XC86 | SOFTWARE SECURITY AND EXPLOITATION LAB | 0:0:4:2 | VIII |
| 43. | 20XC87 | MOBILE SECURITY LAB | 0:0:4:2 | VIII |
| 44. | 20XC88 | MALWARE ANALYSIS LAB | 0:0:4:2 | VIII |
| 45. | 20XC91 | THREAT HUNTING | 3:0:0:3 | IX |
| 46. | 20XC92 | CRYPTOECONOMICS | 3:0:0:3 | IX |
| 47. | 20XC93 | COMPUTER FORENSICS | 3:0:0:3 | IX |
| 48. | 20XC96 | THREAT HUNTING LAB | 0:0:4:2 | IX |
| 49. | 20XC97 | COMPUTER FORENSICS LAB | 0:0:4:2 | IX |

PROFESSIONAL ELECTIVES (PE)

| Sl.No. | Course Code | Course Title | L:T:P:C | Preferred Semester |
|--------|-------------|--|---------|--------------------|
| 1. | 20XCE1 | INFORMATION AND CODING THEORY | 3:2:0:4 | FROM V |
| 2. | 20XCE2 | QUANTUM COMPUTING | 3:2:0:4 | FROM V |
| 3. | 20XCE3 | POST QUANTUM CRYPTOGRAPHY | 3:2:0:4 | FROM V |
| 4. | 20XCE4 | ACTIVE DEFENSE USING DECEPTION | 3:2:0:4 | FROM VI |
| 5. | 20XCE5 | SECURITY MODELING AND ANALYSIS | 3:2:0:4 | FROM VI |
| 6. | 20XCE6 | COMPUTER GRAPHICS AND VISUALIZATION | 3:2:0:4 | FROM VI |
| 7. | 20XCE7 | ARTIFICIAL INTELLIGENCE | 3:2:0:4 | V or VI |
| 8. | 20XCE8 | SOCIAL NETWORK ANALYSIS | 3:2:0:4 | FROM VI |
| 9. | 20XCE9 | APPLIED GRAPH THEORY | 3:2:0:4 | V OR VI |
| 10. | 20XCEA | MULTIMEDIA SECURITY | 3:2:0:4 | FROM VIII |
| 11. | 20XCEB | IDENTITY AND ACCESS MANAGEMENT | 3:2:0:4 | FROM VI |
| 12. | 20XCEC | ESSENTIALS OF CYBER PHYSICAL SYSTEM SECURITY | 3:2:0:4 | FROM VI |
| 13. | 20XCED | DATA COMPRESSION | 3:2:0:4 | FROM VIII |
| 14. | 20XCEE | BIG DATA AND MODERN DATABASES | 3:2:0:4 | FROM VI |
| 15. | 20XCEF | NETWORK FORENSICS | 3:2:0:4 | FROM VI |

| | | | | |
|-----|--------|--------------------------------------|---------|-----------|
| 16. | 20XCEG | BIOMETRIC SECURITY | 3:2:0:4 | FROM VI |
| 17. | 20XCEH | GAME THEORY | 3:2:0:4 | FROM VI |
| 18. | 20XCEI | ETHICS AND CYBER LAW | 3:2:0:4 | V or VI |
| 20. | 20XCEJ | DIGITAL IMAGE PROCESSING | 3:2:0:4 | V or VI |
| 21. | 20XCEK | NATURAL LANGUAGE PROCESSING | 3:2:0:4 | FROM VIII |
| 22. | 20XCEL | INFORMATION RETRIEVAL AND WEB SEARCH | 3:2:0:4 | FROM VI |
| 23. | 20XCEM | REINFORCEMENT LEARNING | 3:2:0:4 | FROM VIII |
| 25. | 20XCEO | DEEP LEARNING | 3:2:0:4 | FROM VI |
| 26. | 20XCEQ | RANDOMIZED ALGORITHMS | 3:2:0:4 | FROM VI |

| OPEN ELECTIVES (OE) | | | | |
|----------------------------|--------------------|---|----------------|---------------------------|
| S.No. | Course Code | Course Title | L:T:P:C | Preferred Semester |
| 1 | 20XCO1 | GERMAN | 3:2:0:4 | VIII or IX |
| 2 | 20XCO2 | VIRTUAL AND AUGMENTED REALITY | 3:2:0:4 | VIII or IX |
| 3 | 20XCO3 | COMPUTATIONAL FOUNDATION FOR ROBOTICS | 3:2:0:4 | VIII or IX |
| 4 | 20XCO4 | STOCHASTIC MODELS | 3:2:0:4 | VIII |
| 5 | 20XCO5 | PRINCIPLES OF MANAGEMENT | 3:2:0:4 | VIII or IX |
| 6 | 20XCO6 | ENVIRONMENTAL SCIENCE AND GREEN COMPUTING | 3:2:0:4 | VIII or IX |
| 7 | 20XCO7 | COMPUTATIONAL FINANCE | 3:2:0:4 | VIII or IX |
| 8 | 20XCO8 | ENTREPRENEURSHIP | 3:2:0:4 | VIII or IX |
| 9 | 20XCO9 | STATISTICAL LEARNING | 3:2:0:4 | VIII or IX |
| 10 | 20XCOA | MATHEMATICAL MODELLING | 3:2:0:4 | IX |
| 11 | 20XCOB | ADVERSARIAL MACHINE LEARNING | 3:2:0:4 | VIII or IX |
| 12 | 20XCOC | NETWORK SCIENCE | 3:2:0:4 | VIII or IX |
| 13 | 20XCOD | SOFTWARE PATTERNS | 3:2:0:4 | VIII or IX |

| BASIC SCIENCES (BS) | | | | |
|----------------------------|--------------------|-------------------------------|----------------|---------------------------|
| Sl.No. | Course Code | Course Title | L:T:P:C | Preferred Semester |
| 1. | 20XC11 | CALCULUS AND ITS APPLICATIONS | 3:2:0:4 | I |
| 2. | 20XC13 | APPLIED PHYSICS | 4:0:0:4 | I |
| 3. | 20XC16 | MATHEMATICAL FOUNDATIONS LAB | 0:0:4:2 | I |
| 4. | 20XC21 | DISCRETE STRUCTURES | 3:2:0:4 | II |
| 5. | 20XC22 | ALGEBRA AND NUMBER THEORY | 3:2:0:4 | II |
| 6. | 20XC31 | PROBABILITY AND STATISTICS | 3:2:0:4 | III |
| 7. | 20XC33 | LINEAR ALGEBRA | 3:2:0:4 | III |

| HUMANITIES AND SOCIAL SCIENCES (HS) | | | | |
|--|--------------------|---------------------------------|----------------|---------------------------|
| Sl.No. | Course Code | Course Title | L:T:P:C | Preferred Semester |
| 1. | 20XC12 | ENGLISH FOR PROFESSIONAL SKILLS | 3:0:0:3 | I |

| EMPLOYMENT ENHANCEMENT COURSES (EEC) | | | | |
|---|--------------------|-----------------------|----------------|---------------------------|
| Sl.No. | Course Code | Course Title | L:P:T:C | Preferred Semester |
| 1. | 20XCP1 | PROJECT WORK - I | 0:0:0:12 | VII |
| 2. | 20XCP2 | PROJECT WORK - II | 0:0:0:12 | X |
| 3 | 20XC98 | SECURITY CAPSTONE LAB | 0:0:4:2 | X |