**School of Computer Science Engineering and Information Systems**

**M.Tech (Software Engineering)-Integrated**
**(M.Tech-SE)**

Curriculum

AY 2023-2024

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## VISION STATEMENT OF VELLORE INSTITUTE OF TECHNOLOGY

Transforming life through excellence in education and research.

## MISSION STATEMENT OF VELLORE INSTITUTE OF TECHNOLOGY

**World class Education**: Excellence in education, grounded in ethics and critical thinking, for improvement of life.

**Cutting edge Research**: An innovation ecosystem to extend knowledge and solve critical problems.

**Impactful People**: Happy, accountable, caring and effective workforce and students.

**Rewarding Co-creations**:  Active collaboration with national & international industries & universities for productivity and economic development.

**Service to Society**: Service to the region and world through knowledge and compassion.

## VISION STATEMENT OF THE SCHOOL OF COMPUTER SCIENCE ENGINEERING AND INFORMATION SYSTEMS

To be a leading school that provides transformative education throughqualitative teaching and learning practices.

- To be a centre of excellence in education and research, producing global leaders for improvement of the society.

## MISSION STATEMENT OF THE SCHOOL OF COMPUTER SCIENCE ENGINEERING AND INFORMATION SYSTEMS

To provide sound fundamentals, and advances in Information Technology, Software Engineering, Digital Communications and Computer Applicationsby offering world class curricula.

- To create ethically strong leaders and trend setters for next generation IT.

- To nurture the desire among faculty and students from across the globe to perform outstanding and impactful research for the benefit of humanity and,to achieve meritorious and significant growth.

# School of Computer Science Engineering and Information Systems

## Master of Technology(Integrated) – Software Engineering

### 69<sup>th</sup> Academic Council Approved Credit Structure

| Programme Credit Structure | Credits |
|---|---|
| Foundation Core Courses | 56 |
| Discipline Linked Engineering Courses | 12 |
| Discipline Core Courses | 68 |
| Discipline Elective Courses | 30 |
| Open Elective Courses | 15 |
| Project and Internship | 35 |
| **Total Graded Credit Requirement** | **216** |
| **Non-Graded Credit Requirement** | **11** |

# Foundation Core Courses

## Basic Sciences and Mathematics

| S.No. | Course Code | Course Name | L | T | P | C |
|---|---|---|---|---|---|---|
| 1. | ICHY101L | Engineering Chemistry | 3 | 0 | 0 | 3 |
| 2. | ICHY101P | Engineering Chemistry Lab | 0 | 0 | 2 | 1 |
| 3. | IPHY101L | Engineering Physics | 3 | 0 | 0 | 3 |
| 4. | IPHY101P | Engineering Physics Lab | 0 | 0 | 2 | 1 |
| 5. | IMAT101L | Calculus | 3 | 0 | 0 | 3 |
| 6. | IMAT101P | Calculus Lab | 0 | 0 | 2 | 1 |
| 7. | IMAT102L | Differential Equations and Transforms | 3 | 1 | 0 | 4 |
| 8. | IMAT201L | Complex Variables and Linear Algebra | 3 | 1 | 0 | 4 |
| 9. | IMAT202L | Probability and Statistics | 3 | 0 | 0 | 3 |
| 10. | IMAT202P | Probability and Statistics Lab | 0 | 0 | 2 | 1 |
| **Total Credits** | | | **24** | | | |

## Engineering Sciences

| S.No. | Course Code | Course Name | L | T | P | C |
|---|---|---|---|---|---|---|
| 1. | IEEE102L | Basic Electrical and Electronics Engineering | 3 | 0 | 0 | 3 |
| 2. | IEEE102P | Basic Electrical and Electronics Engineering Lab | 0 | 0 | 2 | 1 |
| 3. | ICSE101E | Computer Programming: Python | 1 | 0 | 4 | 3 |
| 4. | ICSE102L | Structured and Object Oriented Programming | 2 | 0 | 0 | 2 |
| 5. | ICSE102P | Structured and Object Oriented Programming Lab | 0 | 0 | 4 | 2 |
| 6. | ICSE103E | Computer Programming: Java | 1 | 0 | 4 | 3 |
| 7. | ISWE101L | Software Engineering | 3 | 0 | 0 | 3 |
| **Total Credits** | | | **17** | | | |

## Humanities, Social Sciences and Management

| S.No. | Course Code | Course Name | L | T | P | C |
|---|---|---|---|---|---|---|
| 1. | IENG101N | Effective English Communication (NGC) | 0 | 0 | 4 | 2 |
| 2. | IENG101L | Technical English Communication | 2 | 0 | 0 | 2 |
| 3. | IENG101P | Technical English Communication Lab | 0 | 0 | 2 | 1 |
| 4. | IENG102P | Technical Report Writing | 0 | 0 | 2 | 1 |
| 5. | IFLE200L | Foreign Language | 2 | 0 | 0 | 2 |
| 6. | IHSM200L | HSM Elective | 3 | 0 | 0 | 3 |
| 7. | ISTS101P | Quantitative Skills Practice I | 0 | 0 | 3 | 1.5 |
| 8. | ISTS102P | Quantitative Skills Practice II | 0 | 0 | 3 | 1.5 |
| 9. | ISTS201P | Qualitative Skills Practice I | 0 | 0 | 3 | 1.5 |
| 10. | ISTS202P | Qualitative Skills Practice II | 0 | 0 | 3 | 1.5 |
| **Total Credits** | | | **15** | | | |

## Discipline Linked Engineering Courses

| S.No. | Course Code | Course Name | L | T | P | C |
|---|---|---|---|---|---|---|
| 1. | IMAT205L | Discrete Mathematics and Graph Theory | 3 | 1 | 0 | 4 |
| 2. | ISWE201L | Digital Logic and Microprocessor | 3 | 0 | 0 | 3 |
| 3. | ISWE201P | Digital Logic and Microprocessor Lab | 0 | 0 | 2 | 1 |
| 4. | ISWE401L | Embedded Systems and IoT | 3 | 0 | 0 | 3 |
| 5. | ISWE401P | Embedded Systems and IoT Lab | 0 | 0 | 2 | 1 |
| **Total Credits** | | | **12** | | | |

## Discipline Core Courses

| S.No. | Course Code | Course Name | L | T | P | C |
|-------|-------------|-------------|---|---|---|---|
| 1. | ISWE102L | Data Structures and Algorithms | 3 | 0 | 0 | 3 |
| 2. | ISWE102P | Data Structures and Algorithms Lab | 0 | 0 | 2 | 1 |
| 3. | ISWE103L | Database Systems | 3 | 0 | 0 | 3 |
| 4. | ISWE103P | Database Systems Lab | 0 | 0 | 2 | 1 |
| 5. | ISWE202L | Requirements Engineering and Management | 3 | 0 | 0 | 3 |
| 6. | ISWE203L | Theory of Computation | 3 | 1 | 0 | 4 |
| 7. | ISWE204L | Operating Systems | 3 | 0 | 0 | 3 |
| 8. | ISWE204P | Operating Systems Lab | 0 | 0 | 2 | 1 |
| 9. | ISWE205L | Computer Networks | 3 | 0 | 0 | 3 |
| 10. | ISWE205P | Computer Networks Lab | 0 | 0 | 2 | 1 |
| 11. | ISWE206L | Web Technologies | 3 | 0 | 0 | 3 |
| 12. | ISWE206P | Web Technologies Lab | 0 | 0 | 2 | 1 |
| 13. | ISWE207L | Object Oriented Analysis and Design | 3 | 0 | 0 | 3 |
| 14. | ISWE207P | Object Oriented Analysis and Design Lab | 0 | 0 | 2 | 1 |
| 15. | ISWE301L | Computer Architecture and Organization | 3 | 0 | 0 | 3 |
| 16. | ISWE302L | Artificial Intelligence | 3 | 0 | 0 | 3 |
| 17. | ISWE302P | Artificial Intelligence Lab | 0 | 0 | 2 | 1 |
| 18. | ISWE304L | Software Architecture | 3 | 0 | 0 | 3 |
| 19. | ISWE305L | Software Testing | 3 | 0 | 0 | 3 |
| 20. | ISWE305P | Software Testing Lab | 0 | 0 | 2 | 1 |
| 21. | ISWE306L | Software Project Management | 3 | 0 | 0 | 3 |
| 22. | ISWE402L | Software Metrics | 3 | 0 | 0 | 3 |
| 23. | ISWE403L | Software Configuration Management | 3 | 0 | 0 | 3 |
| 24. | ISWE404L | Design Patterns | 3 | 0 | 0 | 3 |

| S.No. | Course Code | Course Name | L | T | P | C |
|-------|-------------|-------------|---|---|---|---|
| 25. | ISWE405L | Network and Information Security | 3 | 0 | 0 | 3 |
| 26. | ISWE406L | Agile Development Process and Devops | 3 | 0 | 0 | 3 |
| 27. | ISWE406P | Agile Development Process and Devops Lab | 0 | 0 | 2 | 1 |
| 28. | ISWE407L | User Interface and User Experience Design | 3 | 0 | 0 | 3 |
| 29. | ISWE407P | User Interface and User Experience Design Lab | 0 | 0 | 2 | 1 |
| **Total Credits** | | | **68** | | | |

## Discipline Elective Courses

| S.No. | Course Code | Course Name | L | T | P | C |
|-------|-------------|-------------|---|---|---|---|
| 1. | ISWE208L | Optimization Techniques | 3 | 0 | 0 | 3 |
| 2. | ISWE209L | Data Mining | 3 | 0 | 0 | 3 |
| 3. | ISWE210L | R for Data Science | 3 | 0 | 0 | 3 |
| 4. | ISWE307L | Digital Image Processing | 3 | 0 | 0 | 3 |
| 5. | ISWE308L | Soft Computing | 3 | 0 | 0 | 3 |
| 6. | ISWE309L | Cloud Computing | 3 | 0 | 0 | 3 |
| 7. | ISWE310L | Natural Language Processing | 3 | 0 | 0 | 3 |
| 8. | ISWE311L | Software Industrialization and Economics | 3 | 0 | 0 | 3 |
| 9. | ISWE312L | Computer Vision | 3 | 0 | 0 | 3 |
| 10. | ISWE313L | Advanced Java Programming | 3 | 0 | 0 | 3 |
| 11. | ISWE314L | Social Network Analysis | 3 | 0 | 0 | 3 |
| 12. | ISWE408L | Cross Platform Application Development | 2 | 0 | 0 | 2 |
| 13. | ISWE408P | Cross Platform Application Development Lab | 0 | 0 | 2 | 1 |
| 14. | ISWE409L | High Performance Computing | 3 | 0 | 0 | 3 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 15. | ISWE410L | Machine Learning | 2 | 0 | 0 | 2 |
| 16. | ISWE410P | Machine Learning Lab | 0 | 0 | 2 | 1 |
| 17. | ISWE411L | Deep Learning | 3 | 0 | 0 | 3 |
| 18. | ISWE412L | Blockchain Technologies | 3 | 0 | 0 | 3 |
| 19. | ISWE413L | Robotic Process Automation | 3 | 0 | 0 | 3 |
| 20. | ISWE414L | Modern Full Stack Development | 3 | 0 | 0 | 3 |
| 21. | ISWE415L | Cyber Security | 3 | 0 | 0 | 3 |
| 22. | ISWE416L | Big Data Analytics | 3 | 0 | 0 | 3 |
| 23. | ISWE417L | Quantum Computing | 3 | 0 | 0 | 3 |
| 24. | ISWE418L | Low code Application Development | 3 | 0 | 0 | 3 |
| 25. | ISWE419L | Metaverse | 3 | 0 | 0 | 3 |
| 26. | ISWE420L | Cyber Physical Systems | 3 | 0 | 0 | 3 |
| 27. | ISWE421L | Cognitive Computing | 3 | 0 | 0 | 3 |
| 28. | ISWE422L | Multicore Computing | 3 | 0 | 0 | 3 |
| 29. | ISWE423L | Dynamic Program Analysis | 3 | 0 | 0 | 3 |
| 30. | ISWE424L | Formal Methods for Software Engineering | 3 | 0 | 0 | 3 |
| 31. | ISWE425L | Game Theory and its Applications | 3 | 0 | 0 | 3 |
| 32. | ISWE391J | Technical Answers for Real World Problems | | | | 3 |
| 33. | ISWE392J | Design Project | | | | 3 |
| 34. | ISWE393J | Laboratory Project | | | | 3 |
| 35. | ISWE394J | Product Development Project | | | | 3 |
| 36. | ISWE396J | Reading Course | | | | 3 |
| 37. | ISWE397J | Special Project | | | | 3 |
| 38. | ISWE398J | Simulation Project | | | | 3 |
| **Total Credits** | | | **30** | | | |

## Open Elective Courses

Engineering Disciplines| Projects | Sciences | Humanities | SocialSciences | Liberal Arts | Economics | Finance | Entrepreneurship | Management | Skills | Reading
-    **15**

## Projects and Internships

| S.No. | Course Code | Course Name | L | T | P | C |
|-------|-------------|-------------|---|---|---|---|
| 1. | ISWE399J | Industrial Internship | | | | 01 |
| 2. | ISWE498J | Project I | | | | 14 |
| 3. | ISWE499J | Project II / Internship (One Semester) | | | | 20 |
| **Total Credits** | | | | **35** | | |

## Non-Graded Credit Requirement

| S.No. | Course Code | Course Name | L | T | P | C |
|-------|-------------|-------------|---|---|---|---|
| 1. | ISWE101N | Introduction to Engineering | | | | 01 |
| 2. | ISSC101N | Essence of Traditional Knowledge | | | | 02 |
| 3. | ISSC102N | Indian Constitution | | | | 02 |
| 4. | ICHY102N | Environmental Sciences | | | | 02 |
| 5. | IEXC100N | Extracurricular Activities | | | | 02 |
| 6. | IHUM101N | Ethics and Values | | | | 02 |
| **Total Credits** | | | | **11** | | |