

ACADEMIC CURRICULA
UNDERGRADUATE/ INTEGRATED
POST GRADUATE DEGREE
PROGRAMMES

(With exit option of Diploma)

(Choice Based Flexible Credit System)

Regulations 2021

Volume – 1

(Revised on July 2024)



SRM
INSTITUTE OF SCIENCE & TECHNOLOGY
(Deemed to be University u/s 3 of UGC Act, 1956)

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(Deemed to be University u/s 3 of UGC Act, 1956)

Kattankulathur, Chengalpattu District 603203,

Tamil Nadu, India

44. B.Tech. in Mechatronics Engineering (Immersive Technologies)

44. (a) Mission of the Department

| | |
|------------------|--|
| Mission Stmt – 1 | <i>To impart the principles of Mechatronics Engineering to produce engineers who are capable of competing on the global stage.</i> |
| Mission Stmt – 2 | <i>To excel at solving multidisciplinary challenges through structured teaching-learning methods and by providing state-of-the-art facilities.</i> |
| Mission Stmt – 3 | <i>To cultivate future leaders with a strong sense of integrity, communication, teamwork, and entrepreneurship</i> |

44. (b) Program Educational Objectives (PEO)

| | |
|---------|--|
| PEO – 1 | <i>Graduates will demonstrate a commitment to lifelong learning and career growth through participation and leadership in professional societies and organizations</i> |
| PEO – 2 | <i>Graduates will advance professionally with a competency to solve challenges in industry, research, and academia leading to sustainable development of the society</i> |
| PEO – 3 | <i>Graduates will be capable of solving ever-evolving-complex-system-integration problems through inter-disciplinary approaches.</i> |
| PEO – 4 | <i>Graduates will be versatile in dealing with systems from a variety of modern engineering and technology fields with ease.</i> |

44. (c) Mission of the Department to Program Educational Objectives (PEO) Mapping

| | Mission Stmt. - 1 | Mission Stmt. - 2 | Mission Stmt. - 3 |
|---------|-------------------|-------------------|-------------------|
| PEO - 1 | 2 | - | 3 |
| PEO - 2 | 3 | - | 2 |
| PEO - 3 | 2 | 3 | - |
| PEO - 4 | - | 3 | - |

3 – High Correlation, 2 – Medium Correlation, 1 – Low Correlation

44. (d) Mapping Program Educational Objectives (PEO) to Program Outcomes (PO)

| | Program Outcomes (PO) | | | | | | | | | | | | Program Specific Outcomes (PSO) | | |
|---------|-----------------------|------------------|---------------------------------|--|-------------------|--------------------------|------------------------------|--------|------------------------|---------------|------------------------|--------------------|---------------------------------|-------|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | PSO-1 | PSO-2 | PSO-3 |
| | Engineering Knowledge | Problem Analysis | Design/development of solutions | Conduct investigations of complex problems | Modern Tool Usage | The engineer and society | Environment & Sustainability | Ethics | Individual & Team Work | Communication | Project Mgt. & Finance | Life Long Learning | | | |
| PEO - 1 | - | - | - | | - | - | - | - | 2 | - | - | 1 | | | 1 |
| PEO - 2 | 2 | - | - | 3 | - | - | - | - | - | - | - | - | - | 2 | - |
| PEO - 3 | 2 | 3 | - | - | - | - | - | - | - | - | - | - | 3 | - | 2 |
| PEO - 4 | 2 | - | 3 | - | - | - | - | - | - | - | - | - | - | - | 2 |

3 – High Correlation, 2 – Medium Correlation, 1 – Low Correlation

PSO – Program Specific Outcomes (PSO)

| | |
|---------|--|
| PSO - 1 | <i>Graduates will apply scientific principles for modelling and simulation of multi-disciplinary engineering systems</i> |
| PSO - 2 | <i>Graduates will be able to interpret specifications of elements to design and develop an integrated system</i> |
| PSO - 3 | <i>Graduates will be able to develop solutions based on immersive technologies such as virtual reality, augmented reality and haptics for a variety of applications.</i> |

44. (e) Program Structure: B.Tech. in Mechatronics Engineering (Immersive Technologies)

| Humanities & Social Sciences including Management Courses (H) | | | | | | | |
|--|---------------------------|-----------------|---|---|---|--|--|
| Course Code | Course Title | Hours / Week | | | | | |
| | | L | T | P | C | | |
| 21LEH101T | Communicative English | 2 | 1 | 0 | 3 | | |
| 21LEH102T | Chinese | | | | | | |
| 21LEH103T | French | | | | | | |
| 21LEH104T | German | | | | | | |
| 21LEH105T | Japanese | 2 | 1 | 0 | 3 | | |
| 21LEH106T | Korean | | | | | | |
| 21LEH107T | Spanish | | | | | | |
| 21LEH108T | Russian | | | | | | |
| 21GNH101J | Philosophy of Engineering | 1 | 0 | 2 | 2 | | |
| 21PDH209T ¹ | Social Engineering | 2 | 0 | 0 | 2 | | |
| 21GNH401T | Behavioral Psychology | 2 | 1 | 0 | 3 | | |
| Total Credits 13 | | | | | | | |

| Engineering Science Courses (S) | | | | | | | |
|---------------------------------|--|-----------------|---|---|---|--|--|
| Course Code | Course Title | Hours / Week | | | | | |
| | | L | T | P | C | | |
| 21CSS101J | Programming for Problem Solving | 3 | 0 | 2 | 4 | | |
| 21MES101L ¹ | Basic Civil and Mechanical Workshop | 0 | 0 | 4 | 2 | | |
| 21MES102L ¹ | Engineering Graphics and Design | 0 | 0 | 4 | 2 | | |
| 21EES101T | Electrical and Electronics Engineering | 3 | 1 | 0 | 4 | | |
| 21MHS201T | Thermodynamics and Heat Transfer | 3 | 0 | 0 | 3 | | |
| 21DCS201P ¹ | Design Thinking and Methodology | 1 | 2 | 0 | 3 | | |
| 21CSS303T | Data Science | 2 | 0 | 0 | 2 | | |
| Total Credits 20 | | | | | | | |

| Non Credit Courses (M) | | | | | | | |
|------------------------|--|-----------------|---|---|---|---|--|
| Course Code | Course Title | Hours / Week | | | | | |
| | | L | T | P | C | | |
| 21PDM101L ¹ | Professional Skills and Practices | 0 | 0 | 2 | 0 | | |
| 21PDM102L ¹ | General Aptitude | 0 | 0 | 2 | | | |
| 21PDM201L ¹ | Verbal Reasoning | 0 | 0 | 2 | | | |
| 21PDM202L ¹ | Critical and Creative Thinking Skills | 0 | 0 | 2 | | | |
| 21PDM301L ¹ | Analytical and Logical Thinking Skills | 0 | 0 | 2 | | | |
| 21PDM302L ¹ | Employability Skills and Practices | 0 | 0 | 2 | | | |
| 21CYM101T ¹ | Environmental Science | 1 | 0 | 0 | | 0 | |
| 21LEM101T ¹ | Constitution of India | 1 | 0 | 0 | | 0 | |
| 21LEM102T ¹ | Universal Human Values – Introduction | 1 | 0 | 0 | | 0 | |
| 21LEM201T ¹ | Professional Ethics | 1 | 0 | 0 | | 0 | |
| 21LEM202T ¹ | Universal Human Values-II: Understanding Harmony and Ethical Human Conduct | 2 | 1 | 0 | 3 | | |
| 21LEM301T ¹ | Indian Art Form | 1 | 0 | 0 | 0 | | |
| 21LEM302T ¹ | Indian Traditional Knowledge | 1 | 0 | 0 | 0 | | |
| 21GNM101L ¹ | Physical and Mental Health using Yoga | 0 | 0 | 2 | 0 | | |
| 21GNM102L ¹ | National Service Scheme | | | | | | |
| 21GNM103L ¹ | National Cadet Corps | | | | | | |
| 21GNM104L ¹ | National Sports Organization | | | | | | |
| Total Credits 03 | | | | | | | |

| Open Elective Courses (O) (Any 3 Course) | | | | | | | |
|---|-----------------|-----------------|---|---|---|--|--|
| Course Code | Course Title | Hours / Week | | | | | |
| | | L | T | P | C | | |
| 21MHO301T | Smart Farming | 3 | 0 | 0 | 3 | | |
| Total Credits 03 | | | | | | | |

| Basic Science Courses (B) | | | | | | | |
|---------------------------|---|-----------------|---|---|---|--|--|
| Course Code | Course Title | Hours / Week | | | | | |
| | | L | T | P | C | | |
| 21MAB101T | Calculus and Linear Algebra | 3 | 1 | 0 | 4 | | |
| 21CYB101J | Chemistry | 3 | 1 | 2 | 5 | | |
| 21BTB103T | Biology | 2 | 0 | 0 | 2 | | |
| 21MAB102T | Advanced Calculus and Complex Analysis | 3 | 1 | 0 | 4 | | |
| 21PYB104J | Physics: Mechanics | 3 | 1 | 2 | 5 | | |
| 21MAB201T | Transforms and Boundary Value Problems | 3 | 1 | 0 | 4 | | |
| 21MAB202T | Numerical Methods | 3 | 1 | 0 | 4 | | |
| 21MAB301T | Probability and Statistics | 3 | 1 | 0 | 4 | | |
| Total Credits 32 | | | | | | | |

| Professional Core Courses (C) | | | | | | | |
|-------------------------------|--|-----------------|---|---|---|--|--|
| Course Code | Course Title | Hours / Week | | | | | |
| | | L | T | P | C | | |
| 21MHC101P ¹ | Elements of Mechatronics Systems | 2 | 1 | 0 | 3 | | |
| 21MHC201T | Electrical actuators and Drives | 3 | 0 | 0 | 3 | | |
| 21MHC202J | Analog and Digital Electronics | 2 | 0 | 2 | 3 | | |
| 21MHC203J | Fluid power system and Automation | 2 | 0 | 2 | 3 | | |
| 21MHC204L ¹ | Electrical Actuators and Drives Laboratory | 0 | 0 | 2 | 1 | | |
| 21MHC205T | Microcontroller and Embedded Systems | 3 | 0 | 0 | 3 | | |
| 21MHC206T | Mechanics of Solids and Fluids | 3 | 0 | 0 | 3 | | |
| 21MHC207L ¹ | Microcontroller and Embedded Systems Laboratory | 0 | 0 | 2 | 1 | | |
| 21MHC208L ¹ | Mechanics of Solids and Fluids Laboratory | 0 | 0 | 2 | 1 | | |
| 21MHC209T | Project Management and Industrial Practices | 2 | 1 | 0 | 3 | | |
| 21CSC206T | Artificial Intelligence | 2 | 1 | 0 | 3 | | |
| 21MHC301T | System Dynamics and Control | 3 | 0 | 0 | 3 | | |
| 21MHC302J | Design and Analysis of Machine Elements | 2 | 0 | 2 | 3 | | |
| 21MHC303J | Measurement, Sensors and Interfaces | 2 | 0 | 2 | 3 | | |
| 21MHC304L ¹ | Modelling and Control Laboratory | 0 | 0 | 2 | 1 | | |
| 21MHC305J | Manufacturing Processes | 2 | 0 | 2 | 3 | | |
| 21MHC306T | Kinematic Analysis and Dynamics of Mechanisms | 3 | 0 | 0 | 3 | | |
| 21MHC307P ¹ | Model Based Systems Engineering | 1 | 2 | 0 | 3 | | |
| Total Credits 46 | | | | | | | |

| Project Work, Seminar, Internship in Industry / Higher Technical Institutions (P) | | | | | | | |
|--|-------------------|-----------------|---|----|----|----|--|
| Course Code | Course Title | Hours / Week | | | | | |
| | | L | T | P | C | | |
| 21GNP301L ¹ | Community Connect | 0 | 0 | 2 | 1 | | |
| 21MHP302L ¹ | Project | 0 | 0 | 6 | 3 | | |
| 21MHP303T ¹ | MOOC | 3 | 0 | 0 | | | |
| 21MHP401L | Major Project | 0 | 0 | 30 | | 15 | |
| 21MHP402L | Major Project | 0 | 0 | 20 | 10 | | |
| 21MHP403L | Internship# | 0 | 0 | 10 | 5 | | |
| Total Credits 19 | | | | | | | |

| Professional Elective Courses (E) (Any 7 Courses) | | | | | | | |
|--|---|--------------|---|---|---|--|--|
| Course Code | Course Title | Hours / Week | | | C | | |
| | | L | T | P | | | |
| Foundation Courses (Minimum Two Courses) | | | | | | | |
| 21MHE422L ¹ | Creative Programming | 0 | 0 | 6 | 3 | | |
| 21MHE423T | Foundations of Immersive Technologies | 3 | 0 | 0 | 3 | | |
| 21MHE424T | System Integration in XR Technologies | 3 | 0 | 0 | 3 | | |
| Key Technologies (Minimum Three Courses) | | | | | | | |
| 21MHE425J | Virtual Reality and Its Applications | 2 | 0 | 2 | 3 | | |
| 21MHE426J | Augmented and Mixed Reality | 2 | 0 | 2 | 3 | | |
| 21MHE427J | Haptics | 2 | 0 | 2 | 3 | | |
| 21MHE428L ¹ | Capstone Project | 0 | 0 | 6 | 3 | | |
| 21MHE427T | Interaction Design and Prototyping for XR | 2 | 1 | 0 | 3 | | |
| 21MHE428T | Immersive Game Design and Development | 2 | 1 | 0 | 3 | | |

| Professional Elective Courses (E) | | | | | | | |
|--|--|--------------|---|---|---|---------------|----|
| Course Code | Course Title | Hours / Week | | | C | | |
| | | L | T | P | | | |
| Technology Enablers (Minimum One Course) | | | | | | | |
| 21MHE429J | Computer Vision for X-Reality | 2 | 0 | 2 | 3 | | |
| 21MHE430J | AI for X-Reality | 2 | 0 | 2 | 3 | | |
| 21MHE431J | Computer Graphics for X-Reality | 2 | 0 | 2 | 3 | | |
| Applications and XR Enterprise | | | | | | | |
| 21MHE432T | Innovation, Entrepreneurship, and Enterprise | 3 | 0 | 0 | 3 | | |
| 21MHE433T | X-Reality in Industries | 3 | 0 | 0 | 3 | | |
| 21MHE434T | Brain Computer Interface in Immersive Technologies | 3 | 0 | 0 | 3 | | |
| | | | | | | Total Credits | 21 |



44. (f) Implementation Plan: B.Tech. in Mechatronics Engineering (Immersive Technologies)

| Semester - I | | | | | | |
|------------------------|---|--------------|---|---|----|--|
| Course Code | Course Title | Hours / Week | | | | |
| | | L | T | P | C | |
| 21LEH101T | Communicative English | 2 | 1 | 0 | 3 | |
| 21MAB101T | Calculus and Linear Algebra | 3 | 1 | 0 | 4 | |
| 21PYB104J | Physics: Mechanics | 3 | 1 | 2 | 5 | |
| 21MES102L ¹ | Engineering Graphics and Design | 0 | 0 | 4 | 2 | |
| 21EES101T | Electrical and Electronics Engineering | 3 | 1 | 0 | 4 | |
| 21CYM101T ¹ | Environmental Science* | 1 | 0 | 0 | 0 | |
| 21PDM101L ¹ | Professional Skills and Practices | 0 | 0 | 2 | 0 | |
| 21LEM101T ¹ | Constitution of India | 1 | 0 | 0 | 0 | |
| Total Credits | | | | | 18 | |
| Semester - II | | | | | | |
| Course Code | Course Title | Hours / Week | | | | |
| | | L | T | P | C | |
| 21LEH102T | Chinese | 2 | 1 | 0 | 3 | |
| 21LEH103T | French | | | | | |
| 21LEH104T | German | | | | | |
| 21LEH105T | Japanese | | | | | |
| 21LEH106T | Korean | | | | | |
| 21LEH107T | Spanish | | | | | |
| 21LEH108T | Russian | | | | | |
| 21GNH101J | Philosophy of Engineering | 1 | 0 | 2 | 2 | |
| 21MAB102T | Advanced Calculus and Complex Analysis | 3 | 1 | 0 | 4 | |
| 21CYB101J | Chemistry | 3 | 1 | 2 | 5 | |
| 21MHC101P ¹ | Elements of Mechatronics systems | 2 | 1 | 0 | 3 | |
| 21CSS101J | Programming for Problem Solving | 3 | 0 | 2 | 4 | |
| 21BTB103T | Biology | 2 | 0 | 0 | 2 | |
| 21MES101L ¹ | Basic Civil and Mechanical Workshop | 0 | 0 | 4 | 2 | |
| 21PDM102L ¹ | General Aptitude* | 0 | 0 | 2 | 0 | |
| 21GNM101L ¹ | Physical and Mental Health using Yoga | 0 | 0 | 2 | 0 | |
| 21GNM102L ¹ | National Service Scheme | | | | | |
| 21GNM103L ¹ | National Cadet Corps | | | | | |
| 21GNM104L ¹ | National Sports Organization | | | | | |
| Total Credits | | | | | 25 | |
| Semester - IV | | | | | | |
| Course Code | Course Title | Hours / Week | | | | |
| | | L | T | P | C | |
| 21MAB202T | Numerical methods | 3 | 1 | 0 | 4 | |
| 21CSC206T | Artificial Intelligence | 2 | 1 | 0 | 3 | |
| 21MHC205T | Microcontroller and Embedded Systems | 3 | 0 | 0 | 3 | |
| 21MHC206T | Mechanics of Solids and Fluids | 3 | 0 | 0 | 3 | |
| 21MHC207L ¹ | Microcontroller and Embedded Systems Laboratory | 0 | 0 | 2 | 1 | |
| 21MHC208L ¹ | Mechanics of Solids and Fluids Laboratory | 0 | 0 | 2 | 1 | |
| 21MHC209T | Project Management and Industrial Practices | 2 | 1 | 0 | 3 | |
| 21DCS201P ¹ | Design Thinking and Methodology | 1 | 2 | 0 | 3 | |
| | Professional Elective – I | 3 | 0 | 0 | 3 | |
| 21PDM202L ¹ | Critical and Creative Thinking Skills* | 0 | 0 | 2 | 0 | |
| Total Credits | | | | | 24 | |
| Semester - VI | | | | | | |
| Course Code | Course Title | Hours / Week | | | | |
| | | L | T | P | C | |
| 21CSS303T | Data Science | 2 | 0 | 0 | 2 | |
| 21MHC305J | Manufacturing Processes | 2 | 0 | 2 | 3 | |
| 21MHC306T | Kinematic Analysis and Dynamics of Mechanisms | 3 | 0 | 0 | 3 | |
| 21MHC307P ¹ | Model Based Systems Engineering | 1 | 2 | 0 | 3 | |
| | Professional Elective – III | 3 | 0 | 0 | 3 | |
| 21MHP302L ¹ | Project | 0 | 0 | 6 | 3 | |
| 21MHP303T ¹ | MOOC | 3 | 0 | 0 | | |
| O | Open Elective – II | 3 | 0 | 0 | 3 | |
| 21PDM302L ¹ | Employability Skills and Practices* | 0 | 0 | 2 | 0 | |
| 21LEM302T ¹ | Indian Traditional Knowledge | 1 | 0 | 0 | 0 | |
| Total Credits | | | | | 20 | |
| Semester - VIII | | | | | | |

#Students have to register either 21MHP401L or 21MHP402L and 21MHP403L both in eighth semester

| Course Code | Course Title | Hours / Week | | | |
|----------------------|---------------|--------------|---|----|-----------|
| | | L | T | P | C |
| 21MHP401L | Major Project | 0 | 0 | 30 | 15 |
| 21MHP402L | Major Project | 0 | 0 | 20 | 10 |
| 21MHP403L | Internship# | 0 | 0 | 10 | 5 |
| Total Credits | | | | | 15 |





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