

2.61 Program outcomes, program-specific outcomes, and course outcomes for all programs offered by the institution are stated and displayed in the website of the institution.

M.Tech in Aerospace Engineering (Guided Missiles)		
Programme Outcomes (PO)	Program Specific Outcomes PSO	Course Outcome (CO)
The students develop theoretical knowledge, critical thinking ability, problem-solving ability, ability to research and use the available tools in the areas of propulsion, aerodynamics, flight mechanics, guidance & control, and structures. As airborne systems are multi-disciplinary systems, the students also develop the ability to do interdisciplinary collaborative work along with the ability to communicate within their team and outside and also possess project management abilities.	The Aerospace Engineering program aims to fulfill the growing demand in industry and academia for personnel with research, development, and management skills who possess the ability to use modern tools in a multi-disciplinary and collaborative environment of Aerospace Technologies. With this in view, Graduate Students of the program are trained in attributes prescribed for responsible roles as Flight Test Engineers, Airborne System Designers, Aerodynamicists, Aircraft, and Aerospace Structural Analysis Engineers, Guidance and Control designers, Avionics Specialists, Aircraft and Rocket engine designers and technologists.	Guided Missiles: Students are provided knowledge in the spectrum of aerospace technologies in areas of propulsion, aerodynamics, flight mechanics, structures, and guidance & control, as applied to guided missiles. They are further given applied knowledge in one of the areas mentioned above by doing a project within the institute or with the industry. The course enables them to join any research and development organization as a design team member in the field of automated airborne weapon systems.

M.Tech in Aerospace Engineering (Air Armaments)		
Programme Outcomes (PO)	Program Specific Outcomes PSO	Course Outcome (CO)
The students develop theoretical knowledge, critical thinking ability, problem-solving ability, ability to research and use the available tools in the areas of propulsion, aerodynamics, flight mechanics, guidance & control, and structures. As airborne systems are multi-disciplinary systems, the students also develop the ability to do interdisciplinary collaborative work along with the ability to communicate within their team and outside and also possess	The Aerospace Engineering program aims to fulfill the growing demand in industry and academia for personnel with research, development, and management skills who possess the ability to use modern tools in a multi-disciplinary and collaborative environment of Aerospace Technologies. With this in view, Graduate Students of the program are trained in attributes prescribed for responsible	Air Armaments: The course provides an understanding of theoretical principles and operational and applied aspects of air armaments. The endeavor is to make the students appreciate the strengths and limitations of air armaments. This enables them to be a better evaluator of new weapons and its design as well as to become an enlightened user of such armaments. The students are provided with the background and understanding to be part of an armament design

project management abilities.	roles as Flight Test Engineers, Airborne System Designers, Aerodynamicists, Aircraft, and Aerospace Structural Analysis Engineers, Guidance and Control designers, Avionics Specialists, Aircraft and Rocket engine designers and technologists.	team.
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M.Tech in Aerospace Engineering (UAVs)

Programme Outcomes (PO)	Program Specific Outcomes PSO	Course Outcome (CO)
The students develop theoretical knowledge, critical thinking ability, problem-solving ability, ability to research and use the available tools in the areas of propulsion, aerodynamics, flight mechanics, guidance & control, and structures. As airborne systems are multi-disciplinary systems, the students also develop the ability to do interdisciplinary collaborative work along with the ability to communicate within their team and outside and also possess project management abilities.	The Aerospace Engineering program aims to fulfill the growing demand in industry and academia for personnel with research, development, and management skills who possess the ability to use modern tools in a multi-disciplinary and collaborative environment of Aerospace Technologies. With this in view, Graduate Students of the program are trained in attributes prescribed for responsible roles as Flight Test Engineers, Airborne System Designers, Aerodynamicists, Aircraft, and Aerospace Structural Analysis Engineers, Guidance and Control designers, Avionics Specialists, Aircraft and Rocket engine designers and technologists.	UAVs: Students are provided knowledge in the spectrum of aerospace technologies in areas of propulsion, aerodynamics, flight mechanics, structures, and guidance & control, as applied to aircraft design and automation. They are further given applied knowledge in the areas mentioned above by doing a project within the institute or with the industry. The students are enabled to join any research and development team for the design and development of aircraft or UAVs

M.Tech in Mechanical Engineering (Armament and Combat Vehicles)

Programme Outcomes (PO)	Program Specific PSO	Course Outcome (CO)
On completion of M. Tech. Programme, <i>the student</i> , are capable of	<ul style="list-style-type: none"> The specific outcome of the programme is to provide human resources equipped with advanced applied knowledge in the field of 	<ul style="list-style-type: none"> Collaboration with DRDO Labs, Ordnance factories, Indian Army, DPSUs, Defence private industries, and universities of repute in higher

<ul style="list-style-type: none"> • Applying skill set developed in computing, mathematics, statistics, science, and engineering to identify, formulate, and solve engineering problems related to armaments and combat vehicles. • Understand the physics behind the problem in arriving at the optimum solution in the quickest possible time. • Design and conduct experiments - analyze and interpret data for design, development, manufacturing, and inspection of armament and combat vehicle components. • Logical troubleshooting of the problems arising with armaments and combat vehicles. • Associating with multi-disciplinary teams working on significant projects demanding global competencies on armaments and combat vehicles. • Collaborate with industries and reputed academic institutions for advanced training, research, and development. • Review the literature data - gap analysis - Defining the problem - Modeling & Simulation - Investigation - Discussion of results – report writing – concluding etc. • Understand professional, ethical, legal, security, and social issues and responsibilities. 	<p>armaments & combat vehicle technology to fulfill the needs of DRDO, Army, and Defence PSU's, thereby making the country self-reliance in Defence technology.</p> <ul style="list-style-type: none"> • The students can apply the knowledge of ordnance design, armour design, combat vehicle design, terramechanics, ballistics, gun, and fire control systems design, etc. along with numerical tools like CFD & FEM to integrate a system and resolve the technical problems using appropriate technology and software. 	<p>education, training, and research.</p> <ul style="list-style-type: none"> • We are providing the necessary skills/ tools required for logical troubleshooting of the problems while handling projects of multi-disciplinary nature in the field of armaments and combat vehicles. • The course outcomes will be instrumental in dealing with the recent and futuristic technologies in a war scenario with a focus on Armament and Combat Vehicles.
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M.Tech in Mechanical Engineering (Marine)		
Programme Outcomes (PO)	Program Specific Outcomes PSO	Course Outcome (CO)
<p>On completion of M. Tech. Programme, <i>the student, is</i> capable of</p> <ul style="list-style-type: none"> • Applying advanced skill set developed in computing, mathematics, statistics, engineering to identify, 	<ul style="list-style-type: none"> • We are applying advanced skill sets developed for design, development, manufacturing, and inspection of Marine components. • Know different marine systems and components 	<ul style="list-style-type: none"> • Understanding and applications of ship dynamics, Gas turbines, steam turbines, diesel engine & Nuclear Reactor principles • Vibration analysis of machine elements

<p>formulate, and solve complex engineering problems.</p> <ul style="list-style-type: none"> • Design and conduct experiments - analyze and interpret data for design, development, manufacturing, and inspection of components; • Understand the physics behind the problem in arriving at the optimum solution in the quickest possible time; • Possess skill set required for logical troubleshooting of the equipment. • Associate with multi-disciplinary teams working on significant projects demanding global competencies. • Collaborate with DRDO labs, DPSUs, industries, and universities of repute in higher education, training, and research, • Review the literature data - gap analysis- Defining the problem - Modeling & Simulation - Investigation - Discussion of results – report writing – concluding etc. • Understand professional, ethical, legal, security, and social issues and responsibilities. 	<p>and understand the physics behind the working at the component and system level.</p> <ul style="list-style-type: none"> • Know the thermodynamic & mechanical analysis of components to deduce its performance • Apply the knowledge and techniques learned in designing of a marine machine-like gears • To be able to understand engineering details behind different technical standard operating procedures related to safety, control and maintenance followed in marine industries in general • To be able to design and device new procedures to arrive at a solution for design or troubleshooting problems at the system/component level. 	<ul style="list-style-type: none"> • Design of marine gearboxes, coupling, bearings, and shafts • The understanding the basic principle behind the generation of noise and pollutants from ships engines • Understanding of noise and pollution control mechanisms.
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M.Tech in Mechanical System Design		
Programme Outcomes (PO)	Program Specific Outcomes PSO	Course Outcome (CO)
<p>On completion of M. Tech. Programme, <i>the student</i>, are capable of</p> <ul style="list-style-type: none"> • Applying skill set developed in computing, mathematics, statistics, science, and engineering to identify, formulate, and solve engineering problems. • Design and conduct experiments - analyze and 	<ul style="list-style-type: none"> •The specific outcome of the programme is to provide human resources equipped with advanced applied knowledge in the field of mechanical systems design and related technologies to fulfill the needs of DRDO, tri-services, and Defence PSU's thereby making the country self-reliant. •Apply advanced engineering 	<ul style="list-style-type: none"> • To design and develop mechanical components/ systems required for various Defence PSUs/ DRDO/ other private industries. • To provide necessary tools for troubleshooting of issues that occurred during actual operating conditions of various mechanical systems about Defence and civilian use.

<p>interpret data for design, development, manufacturing, and inspection of components;</p> <ul style="list-style-type: none"> • Understand the physics behind the problem in arriving at the optimum solution in the quickest possible time; • Possess skillset required for logical troubleshooting of the equipment. • Associate with multi-disciplinary teams working on significant projects demanding global competencies; • Collaborate with DRDO labs, DPSUs, industries, and universities of repute in higher education, training, and research, • Review the literature data - gap analysis- Defining the problem - Modeling & Simulation - Investigation - Discussion of results – report writing – concluding etc. • Understand professional, ethical, legal, security, and social issues and responsibilities. 	<p>principles and concepts to design mechanical systems within realistic constraints.</p> <ul style="list-style-type: none"> • Use modern design engineering tools for performance evaluation and optimization of mechanical components/ systems required for industry, DPSU's, and DRDO. 	<ul style="list-style-type: none"> • The course outcomes will be instrumental in dealing with the recent and futuristic technologies in a war scenario with a focus on the mechanical system design of Defence equipment.
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M.Tech in Robotics		
Programme Outcomes (PO)	Program Specific Outcomes PSO	Course Outcome (CO)
<p>On completion of M. Tech. Programme, <i>the student</i>, will be capable of</p> <ul style="list-style-type: none"> • Applying analytical skills and modelling methodologies to recognize, analyze, synthesize, and implement operational solutions developed in computing, mathematics, statistics, science, and engineering to identify, formulate, and solve engineering problems. • Demonstrate knowledge and understanding of the engineering and management principles and apply these to 	<ul style="list-style-type: none"> • The specific outcome of the programme is to provide human resources equipped with advanced applied knowledge in the field of Robotic systems and related technologies to fulfill the needs of DRDO, tri-services, and Defence PSU's, thereby making the country self-reliance in Robotics. • Associate with multi-disciplinary teams working on significant projects demanding global competencies. 	<ul style="list-style-type: none"> • Apply the knowledge of sensors, drives, actuators, controls, mechanical design, and modern software tools to integrate a system for performing specified tasks. • Understand the working principle of different types of industrial sensors and actuators with designing aspects, controlling mechanisms, and applications. • Analyze the current work conditions and can be able to suggest different Robots for the automation of the industry and domestic work

<p>one's work, as a member and leader in a team, to manage projects and in multi-disciplinary environments.</p> <ul style="list-style-type: none"> • Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. • Shall develop flexibility of learning by being in pursuit of research and development, evolving technologies, and changing societal needs, thus keeping themselves professionally relevant. • Understand professional, ethical, legal, security, and social issues and responsibilities. 	<ul style="list-style-type: none"> • Collaborate with DRDO labs, DPSUs, industries, and universities of repute in higher education, training, and research, Review the literature data - gap analysis • Are expected to apply analytical skills and modelling methodologies to recognize, analyze, synthesize and implement operational solutions to engineering problems, product design and development, and manufacturing • Articulate designs, modelling, analysis, and testing of Mechatronics products, systems, and controllers using appropriate technology and software tools. 	<ul style="list-style-type: none"> • Provide solutions for tasks to be done by robots by utilizing current resources, and knowledge gained.
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M.Tech in Computer Science and Engineering (Cyber Security)		
Programme Outcomes (PO)	Program Specific Outcomes PSO	Course Outcome (CO)
<ul style="list-style-type: none"> • This programme is not only designed for Tri-services(Indian Army, Indian Navy and Indian Airforce), Coastguards, Scientists of DRDO, and Other PSU engineers but also open GATE students. • Curriculum addressing the critical domain of Cyber Security for Defence Forces and also for corporate/PSUs. • Theoretical and Practical Exposure in Cyber Security with comprehensive theory and lab sessions. • Training on Topics in the domain of Cyber Security Such as Cryptography, Digital Forensics, Ethical Hacking, Network Security, Malware Analysis, Reverse Engineering, etc. 	<ul style="list-style-type: none"> • The programme builds knowledge and skill-sets in the domain of Cyber Security. • Acquiring knowledge of various topics on Computer and Network Security • To develop practical skill-sets in programming, ethical hacking, network security, Digital forensics • It provides hands-on project exposure to DRDO/PSU projects and internship opportunities for students. • Improved placement opportunities for graduating students through exposure to industry-relevant topics. 	<ul style="list-style-type: none"> • Role of Cyber Security in ensuring computer and Network Security for Data storage, data processing, and data transfer. • Provides modules on core competencies for Cyber Security. • Practical knowledge through Lab modules and Project work. • Highly knowledgeable graduates with practical exposure. • Industry and R&D ready professionals matched to current requirements in Cyber Security

<ul style="list-style-type: none"> Exposure to the latest developments in the field of Cyber Security 		
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M.Tech in Computer Science and Engineering (Software Engineering and Intelligent Systems (SEIS))

Programme Outcomes (PO)	Program Specific Outcomes PSO	Course Outcome (CO)
<ul style="list-style-type: none"> This programme is not only designed for Tri-services(Indian Army, Indian Navy and Indian Airforce), Coastguards, Scientists of DRDO, and Other PSU engineers but also open GATE students. Curriculum addressing the critical domain of Software Engineering and Intelligent Systems for Defence Forces and also for corporate/PSUs. Theoretical and Practical Exposure in the Software Engineering and Intelligent Systems with comprehensive theory and lab sessions. Training on Topics in the domain of Software Engineering and Intelligent Systems Such as Project Management, Software Quality, Software Architecture and Design, Software Testing, Machine Learning, AI, Pattern Recognition, etc. Exposure to the latest developments in the field of Software Engineering and Intelligent Systems 	<ul style="list-style-type: none"> The programme builds knowledge and skill-sets in the domain of Software Engineering and Intelligent Systems Acquiring knowledge of various topics on Software Engineering and Intelligent Systems To develop practical skill-sets in programming, Project Management, Software Quality and Testing, Software Standards, Architecture, Design, Machine Learning, Applied AI, Pattern Recognition, Soft Computing, etc It provides hands-on project exposure to DRDO/PSU projects and internship opportunities for students. Improved placement opportunities for graduating students through exposure to industry-relevant topics. 	<ul style="list-style-type: none"> Role of Software Engineering and Intelligent Systems in Industry, Defence through case studies Provides modules on core competencies for Software Engineering and Intelligent Systems Practical knowledge through Lab modules and Project work. Highly knowledgeable graduates with practical exposure. Industry and R&D ready professionals matched to current requirements in Software Engineering and Intelligent Systems

M.Tech in Sensors Technology

Programme Outcomes (PO)	Program Specific Outcomes PSO	Course Outcome (CO)
<ul style="list-style-type: none"> To prepare students for research and teaching. To provide highly specialized courses adapted to the needs of DRDO labs, tri-services, and social life. 	<ul style="list-style-type: none"> The Objective of the Programme is to provide technology-oriented and applied knowledge in the field of Sensor Systems and Technology, with a focus on the DRDO requirements. At the end of the programme, 	<ul style="list-style-type: none"> Students are encouraged to work on Research-Oriented Seminar Topics They are Encouraged to Publish their project work in peer-reviewed Journals as well as participate/ present in

<ul style="list-style-type: none"> • To be open to all, to cater to the many aspects of lifelong education in the broadest sense. • It is fostering global competencies among students. • We are collaborating with DRDO labs, industries, networking with the neighborhood, and fostering a closer relationship between the worlds of work and learning. • Inculcating a value system and quest for excellence in students. • We are promoting the use of advanced technology and best practices. • In addition to using advanced technology as a learning resource, managing the activities for the institution in a technology-enabled way is sure to contribute to effective Institutional functioning. 	<p>the student should be able to undertake R&D work, design and develop new sensor systems, and inspection, testing, and evaluation of different Equipment systems.</p>	<p>practice in national/ international Conferences.</p> <ul style="list-style-type: none"> • Students are provided with state-of-the-art laboratories and hence are exposed to the latest technology • Students are taught research ethics. • Teamwork is promoted by the teachers/ supervisors. • Overall, students passing out from the M. Tech. The course tends to be excellent professionals and Researchers.
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M.Tech in Laser & Electro-Optics		
Programme Outcomes (PO)	Program Specific Outcomes PSO	Course Outcome (CO)
<ul style="list-style-type: none"> • To prepare students for research and teaching • To provide highly specialized courses adapted to the needs of DRDO labs, tri-services, and social life. • To be open to all, to cater to the many aspects of lifelong education in the broadest sense. • Fostering global competencies among students • We are collaborating with DRDO labs, industries, networking with the neighborhood, and fostering a closer relationship between the worlds of work and learning. 	<ul style="list-style-type: none"> • The Objective of the Programme is to provide technology-oriented and applied knowledge in the field of Laser & Electro-Optics, with a focus on the DRDO requirements. • At the end of the programme, the student should be able to undertake R&D work and inspection, testing, and evaluation of Laser and Electro-optics Equipment systems. • In addition to using advanced technology as a learning resource, managing the activities for the institution in a technology-enabled way is sure to contribute to effective Institutional functioning. 	<ul style="list-style-type: none"> • Students are encouraged to work on Research-Oriented Seminar Topics • They are Encouraged to Publish their project work in peer-reviewed Journals as well as participate/ present in practice in national/ international Conferences. • Students are provided with state-of-the-art laboratories and hence are exposed to the latest technology • Students are taught research ethics. • Teamwork is promoted by the teachers/ supervisors. • Overall, students passing out from the M. Tech. The course tends to be excellent

<ul style="list-style-type: none"> • We are teaching a value system and quest for excellence in students. • We are promoting the use of advanced technology and best practices. • 		professionals and Researchers.
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M.Tech in Optoelectronics and Communication Systems(Optical Communication and Photonics)

Programme Outcomes (PO)	Program Specific Outcomes PSO	Course Outcome (CO)
<ul style="list-style-type: none"> • We are collaborating with DRDO labs, industries, networking with neighborhoods, and fostering a closer relationship between the worlds of work and learning. • Inculcating a value system and quest for excellence in students. • We are promoting the use of advanced technology and best practices. • In addition to using advanced technology as a learning resource, managing the activities for the institution in a technology-enabled way is sure to contribute to effective Institutional functioning. 	<ul style="list-style-type: none"> • The objective of the programme is to provide technology-oriented and applied knowledge in the field of Laser & Electro-Optics, with a focus on the DRDO requirements. • At the end of the programme, the student should be able to undertake R&D work and inspection, testing, and evaluation of Laser and Electro-optics Equipment systems 	<ul style="list-style-type: none"> • Students are taught research ethics. • Teamwork is promoted by the teachers/ supervisors. • Overall, students passing out from the M. Tech. The course tends to be competent professionals and Researchers.

M.Tech in Modelling and Simulation

Programme Outcomes (PO)	Program Specific Outcomes PSO	Course Outcome (CO)
<ul style="list-style-type: none"> • The department imparts higher education and training in the field of modelling and simulation to meet the defense, industries, and academic requirements of the country. • Various courses offered under this programme help to develop multiple mathematical models cutting across the boundaries and to understand simulation techniques. • After providing the appropriate training in computation and 	<ul style="list-style-type: none"> • The course aims at providing knowledge of methods and principles for building mathematical models for physical systems. Properties of models are also studied using simulation. • Students will understand Define, describe and apply basic concepts, various techniques of modelling in the context of a hierarchy of knowledge about a system and develop the 	<ul style="list-style-type: none"> • Acquire knowledge on utilizing these tools for a better project in their curriculum as well as they will be prepared to handle industry problems with confidence when it matters to use these tools in their employment. • Simplify a given model using static relations, the substitution of variables using constants, neglecting of small effects, and aggregation of states.

<p>simulation methods and imparting knowledge on contemporary issues, students are well equipped to tackle challenges in the related field.</p> <ul style="list-style-type: none"> • This is a unique capability which helps the students to establish themselves as a successful professional. • An ability to function on multi-disciplinary teams involving interpersonal skills. • An ability to identify, formulate, and solve engineering problems of multi-disciplinary nature. 	<p>capability to use the same to study systems through available software.</p> <ul style="list-style-type: none"> • Also, understand the different types of simulation techniques and simulate the models for optimum control by using relevant software tools/methods. Use of these tools for any engineering and real-time applications. 	<ul style="list-style-type: none"> • Using conservation laws and constitutive relationships and other physical relations to model mechanical (in one dimension), electrical and flow systems, and Combinations of these, in DAE (Differential-Algebraic Equations) or any other form and (if possible) in state-space representation. • Model and simulate mechanically (in one dimension) and electrical systems using the Computer tools with available resources. • Identify a model of a real system by choosing experiment setup, post-processing of data, model structure, and validation. • Calculate asymptotic bias and variance properties of a given linear identification problem. • Decide if a given simulation method is implicit or explicit and how many steps it consists of, and calculation of the local and global error and stability area for simple simulation methods.
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M.Tech in Electronics and Communication Engineering (Radar and Communications)		
Programme Outcomes (PO)	Program Specific Outcomes PSO	Course Outcome (CO)
<p>This programme is specifically designed to meet the requirements of Tri services (Indian Army, Indian Navy and Indian Air force), Coastguards, Scientists of DRDO, and Other PSU engineers along with GATE qualified Civilian students as well. The Programme Outcomes are:</p> <ul style="list-style-type: none"> • Basic and advanced level Curricula for all the students joined in this program. • Through Practical Exposure in the Radar and Communication 	<p>The Specific Outcome of this program are: Training human resources in the following system-level Core Courses and Electives:</p> <ul style="list-style-type: none"> • Microwave Engineering • Digital Communication • Antennas for Wireless Communications • Advanced Digital Signal Processing • EMI/EMC • Mathematics for Engineers • Radar Engineering 	<p>The final Course outcomes are:</p> <ul style="list-style-type: none"> • All the students in this course will have a basic and advanced level of training. • This course provided an opportunity for all the students can opt for their choice or profession-based training. • Accordingly- Indian Army officer has trained in the army related requirements, • Indian Navy, Indian Air force, DRDO, and PSU officers will be trained in their respective

Systems. • Training in the area of Like Radars, Communication Systems, Electronic Warfare Systems, Digital Signal processing, and their supporting courses.	<ul style="list-style-type: none"> • Advanced Wireless Communication • Detection and Estimation Theory Along with other supporting electives and project work in their own choice of areas. 	areas as per their choice, and GATE students can opt as per their interest as per their employability.
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M.Tech in Electronics Engineering (Defence Electronic Systems)

Programme Outcomes (PO)	Program Specific Outcomes PSO	Course Outcome (CO)
<p>This programme is designed explicitly for Tri services(Indian Army, Indian Navy and Indian Air force), Coastguards, Scientists of DRDO, and Other PSU engineers. The Programme Outcomes are:</p> <ul style="list-style-type: none"> • System-level Curricula for the middle-level human resources of Ministry of defense. • More Practical Exposure in the Defence Electronic Systems. • Training in the area of Defence Related Electronic Systems Like Radars, Communication Systems, Electronic Warfare Systems, Underwater Communication, etc. 	<p>This program is dedicated to only Tri services (Indian Army, Indian Navy and Indian Air force), Coastguards, Scientists of DRDO, and Other PSU engineers. The Specific Outcome of this program are: Training the human resources in the following system-level Core Courses and Electives:</p> <ul style="list-style-type: none"> • Advanced Communication Systems • Advanced Digital Signal Processing • Microwave And Radar Systems • Advanced Electronic Systems • Electro-Optic Systems • Mathematics for Engineers • Electronic Warfare • Embedded systems • Sonar Signal Processing, along with these courses, with a mandatory, to have the services and respective headquarters, define their Project. 	<p>The final Course outcomes are:</p> <ul style="list-style-type: none"> • All the students of this course will have revision in their core subject knowledge as they are in their middle-level profession and commanding their operations. • Accordingly- Indian Army officer has trained in the army related requirements, • Indian Navy officers will be training in the areas of Underwater, Sonar and Radar and Electronic Warfare, etc. • Similarly, the Indian Air force, DRDO, and PSU officers will be trained in their respective areas.

M.Tech in Electronics Engineering (Navigation Systems)

Programme Outcomes (PO)	Program Specific Outcomes PSO	Course Outcome (CO)
<p>This programme is specifically designed to meet the requirements of Tri services(Indian Army, Indian Navy and Indian Air force), Coastguards, Scientists of DRDO, and Other PSU engineers along</p>	<p>The Specific Outcome of this program are: Training human resources in the following system-level Core Courses and Electives:</p> <ul style="list-style-type: none"> • Global Navigational 	<p>The final Course outcomes are:</p> <ul style="list-style-type: none"> • All the students of this course will have a basic and advanced level of training in the area of Navigation Systems. • This course provided an

<p>with GATE qualified Civilian students as well.</p> <ul style="list-style-type: none"> • The Programme Outcomes are: Basic and advanced level Curricula for all the students joined in this program. • Through Practical Exposure in the Navigation System concepts related to Global, Regional, and augmented Navigation systems, along with Radio, Satellite, and Feature matching based navigation systems. 	<p>Satellite Systems</p> <ul style="list-style-type: none"> • Inertial Navigation Systems • Advanced Digital Signal Processing • Multi-Sensor Fusion for Navigation Systems • Inertial Sensors and system • Mathematics for Engineers • Navigation Lab (MATLAB+LABVIEW, C++) Along with these courses, students will opt for navigation-related Projects. 	<p>opportunity to all the students in Navigation System requirements for the Ministry of defense-related areas.</p> <ul style="list-style-type: none"> • Accordingly- Indian Army officer has trained in the army based Navigation-related requirements, • Similarly, the Indian Navy, Indian Air force, DRDO, and PSU officers will be trained in the Navigation System area as per their choice, and GATE students can opt as per their interest as per their employability in the field of Navigation systems.
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M.Tech in Electronics Engineering (Wireless Networks and Applications)

Programme Outcomes (PO)	Program Specific Outcomes PSO	Course Outcome (CO)
<p>This programme is specifically designed to meet the requirements of Tri services (Indian Army, Indian Navy and Indian Air force), Coastguards, Scientists of DRDO, and Other PSU engineers along with GATE qualified Civilian students as well.</p> <p>The Programme Outcomes are:</p> <ul style="list-style-type: none"> • Basic and advanced level Curricula for all the students joined in this program. • 2.Through Practical Exposure in the Wireless Networks and Applications, including IoT and Embedded application. 	<p>The Specific Outcome of this program are:</p> <ul style="list-style-type: none"> • Training human resources in the following system-level Core Courses and Electives: • Digital Communications • Advanced Wireless Communications • Embedded Systems • Advanced Computer Networks • Sensor Systems • Mathematics for Engineers • EE Labs + Computations Lab • Cognitive Radios • Secure Wireless Sensor along with other supporting electives and project work in their particular choice of areas of Wireless Networks and Applications. 	<p>The final Course outcomes are:</p> <ul style="list-style-type: none"> • All the students of this course will have a basic and advanced level of training in the area of Wireless Networks and Applications. • This course provided an opportunity for all the students in Wireless Networks and Applications for the Ministry of defense-related areas. • Accordingly- Indian Army officer has trained in the army based Navigation-related requirements, • Similarly, Indian Navy, Indian Air force, DRDO, and PSU officers will be trained in Wireless Networks and Applications area as per their choice, and GATE students can opt as per their interest as per their employability in the field of Navigation systems

M.Tech in Material Science and Chemical Technology (Chemical Science and Technology)

Programme Outcomes (PO)	Program Specific Outcomes PSO	Course Outcome (CO)
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<ul style="list-style-type: none"> • This unique programme offers a blend of advanced chemical sciences and technology and develops critical thinking • Identify, formulate and analyze chemical technology problems • To prepare students for research in interdisciplinary areas and to join academia/industry • Learn about ethical principles and commit to professional ethics and responsibilities 	<ul style="list-style-type: none"> • Should have the capability to analyze, comprehend, design & develop solutions to chemical technology challenges • Students will demonstrate an appropriate level of expertise in chemical technology and fundamentals of chemical sciences and chemical technology • Students will have high-level proficiency in research work 	<ul style="list-style-type: none"> • To learn the basics of various analytical techniques and their applications in characterization of materials. • Learning of various types of polymers and their applications in composites, devices. • To learn about the energetic of chemical reaction and study in depth of combustion process. • To teach the design of series of chemical steps and their integration for large scale manufacturing. • To understand the fundamentals of chemistry and their applications in various areas. • To synthesize energetic materials and study their properties. • To teach the fundamentals of Nano science and technology • Safety aspects during handling, management of hazardous materials and relevant laws.
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M.Tech in Material Science and Chemical Technology (Energetic Materials Polymers)		
Programme Outcomes (PO)	Program Specific Outcomes PSO	Course Outcome (CO)
<ul style="list-style-type: none"> • Apply the knowledge of High Energy Materials and polymers to the solutions of complex defence technological problems • To have knowledge and skills to carry out research/investigation in interdisciplinary areas and work independently 	<ul style="list-style-type: none"> • The students should understand the concepts of High Energy Materials, Polymers their synthesis, property studies, and their applications in the field of defence and allied areas. • Develop the capability to analyze, comprehend, design of energetic materials, and polymeric composites and provide solutions to new problems in this field. • To study the concept of nuclear, chemical, and 	<ul style="list-style-type: none"> • To learn the basics of various analytical techniques and their applications in characterization of materials. • Learning of various types of polymers and their applications in composites, devices. • To learn about the energetic of a chemical reaction and study in-depth of the combustion process. • To teach the design of a series of chemical steps and their integration for large scale manufacturing. • To understand the fundamentals of chemistry and

	biological warfare and protections to personnel and equipment.	<p>their applications in various areas.</p> <ul style="list-style-type: none"> • To synthesize energetic materials and study their properties • To study various types of explosives, synthesis and property evaluation. • Types of Propellants, manufacture, and testing.
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M.Tech in Materials Engineering		
Programme Outcomes (PO)	Program Specific Outcomes PSO	Course Outcome (CO)
<p>Materials Engineering postgraduate programs are to produce postgraduates who:</p> <ul style="list-style-type: none"> • Apply their Metallurgical and Materials Engineering education to address the full range of technical and societal problems with creativity, imagination, confidence, and responsibility. • Actively seek out positions of leadership within their profession and their community. • Serve as ambassadors for engineering by exhibiting the highest ethical and professional standards, and by communicating the importance and excitement of this dynamic field. • Retain the intellectual curiosity that motivates lifelong learning and allows for a flexible response to the rapidly evolving challenges. • Uphold professionalism in the science and technology industry. • Remain at the forefront of the metallurgical and Materials Engineering through continuous professional development. • Create a significant impact on their organization and society at national and international levels. 	<p>Materials Engineering has adopted the following outcomes;</p> <ul style="list-style-type: none"> • An ability to apply knowledge of mathematics science and engineering. • An ability to design and conduct experiments, as well as to analyze and interpret data. • An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. • An ability to function on multi-disciplinary teams. • An ability to identify, formulate, and solve engineering problems. • An understanding of professional and ethical responsibility. • An ability to communicate effectively. • The broad education is necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context. 	<ul style="list-style-type: none"> • Understand the terminology associated with engineering thermodynamics and know contemporary issues related to metallurgical thermodynamics. • Knowledge of phase equilibria in two-component and multi-component systems Estimate thermodynamic properties of an alloy in the stable or liquid state of ideal and a real mixture. • Predict the phase transformations in an alloy system with an understanding of phase diagrams. • Prepare the specimens for metallographic examination with best practice, can operate the optical microscope and understand, interpret, analyze the microstructure of materials. • Classify the different mechanical testing methods with their inherent merits and limitations. • Apply various test methods for characterizing the physical properties of materials. • Recommend materials testing techniques based upon desired results, perform fundamental statistical analysis on data, and summarily present test results in a concise written format. • Classify different types of polymers and composites and

	<ul style="list-style-type: none"> • A recognition of the need for, and an ability to engage in life-long learning. • A knowledge of contemporary issues. • An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice. • An ability to independently carry out research/investigation and development work to solve practical problems • An ability to write and present a substantial technical report/document • Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The skill should be a level higher than the requirements in the appropriate bachelor program. • An ability to attain, identify, and apply knowledge of mathematics, soft computing & soft skill, and management for various academic and industrial needs. • Students should be able to use techniques and modern engineering tools for engineering practices in their immediate employment or entrepreneurial activities 	<p>their structure-property relationships.</p> <ul style="list-style-type: none"> • It understands the properties of different kinds of polymers and composites. • We are designing and processing new types of polymers and composites. • Understands the working principles of different advanced processes. • Synthesize nanostructured materials by advanced processing methods. • Perform experiments with best practices and understands the advantages and limitations of different processes. • Interpret and analyze the data and present the results in a concise, written format. • Recommend a suitable method for modifying the material properties. • Interpret theories and give recommendations where appropriate • Acquire knowledge on the chosen topic and apply the knowledge, experience, and skills learned. • Produce a thesis of publishable quality • Effectively present and defend research orally. • Serve in any of the academic, Industrial and Research Organizations
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M.Tech in Material Science and Chemical Technology (Materials Science and Technology)		
Programme Outcomes (PO)	Program Specific Outcomes PSO	Course Outcome (CO)
The objectives of the Metallurgical and Materials Engineering postgraduate programs are to produce postgraduates who:	The Department of Metallurgical and Materials Engineering has adopted the following Outcomes as its Program Outcomes. These are that our postgraduates have:	<ul style="list-style-type: none"> • Understand the terminology associated with engineering thermodynamics and know contemporary issues related to metallurgical

<ul style="list-style-type: none"> • Apply their Metallurgical and Materials Engineering education to address the full range of technical and societal problems with creativity, imagination, confidence, and responsibility. • Actively seek out positions of leadership within their profession and their community. • Serve as ambassadors for engineering by exhibiting the highest ethical and professional standards, and by communicating the importance and excitement of this dynamic field. • Retain the intellectual curiosity that motivates lifelong learning and allows for a flexible response to the rapidly evolving challenges. • Uphold professionalism in the science and technology industry. • Remain at the forefront of the metallurgical and Materials Engineering through continuous professional development. • Create a significant impact on their organization and society at national and international levels. 	<ul style="list-style-type: none"> • An ability to apply knowledge of mathematics, science, and engineering • An ability to design and conduct experiments, as well as to analyze and interpret data • An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. • An ability to function on multi-disciplinary teams. • An ability to identify, formulate, solve problems. • An understanding of professional and ethical responsibility. • An ability to communicate effectively. • The broad education is necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context. • A recognition of the need for, and an ability to engage in life-long learning. • A knowledge of contemporary issues. • An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice. • An ability to independently carry out research/investigation and development work to solve practical problems • An ability to write and present a substantial technical report/document • Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The proficiency should be a 	<ul style="list-style-type: none"> thermodynamics. • Knowledge of phase equilibrium in two-component and multi-component systems Estimate thermodynamic properties of an alloy in the stable or liquid state of ideal and a real mixture • Predict the phase transformations in an alloy system with an understanding of phase diagrams. • Prepare the specimens for metallographic examination with best practice, can operate the optical microscope and understand, interpret, analyze the microstructure of materials • Classify the different mechanical testing methods with their inherent merits and limitations • Apply various test methods for characterizing physical properties of materials • Recommend materials testing techniques based upon desired results, perform fundamental statistical analysis on data, and summarily present test results in a concise written format. • Classify different types of polymers and composites and their structure-property relationships. • Understanding the properties of different kinds of polymers and composites • We are designing and processing new types of polymers and composites. • Understands the working principles of different advanced processes • Synthesize nano-structured materials by advanced processing methods.
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	<p>level higher than the requirements in the appropriate bachelor program.</p> <ul style="list-style-type: none"> • An ability to attain, identify, and apply knowledge of mathematics, soft computing & soft skill, and management for various academic and industrial needs. • Students should be able to use techniques and modern engineering tools for engineering practices in their immediate employment and entrepreneurial activities 	<ul style="list-style-type: none"> • Perform experiments with best practices and understands the advantages and limitations of different processes • Interpret and analyze the data and present the results in a concise written format • Recommend a suitable method for modifying the material properties. • Interpret theories and give recommendations where appropriate • Produce a thesis of publishable quality • Effectively present and defend research orally • Serve in any of the academic, Industrial and Research Organizations
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M.Tech in Corrosion Technology		
Programme Outcomes (PO)	Program Specific Outcomes PSO	Course Outcome (CO)
<ul style="list-style-type: none"> • The main objective of the programme is to develop fundamental and in-depth knowledge in theory for degradation and corrosion of materials in various environments and to present existing protection strategies for the prevention of corrosion in different contexts. • The programe concerns the fundamental theory of the thermodynamics and kinetics of the corrosion process of metals and alloys. It also polymer materials both in the atmosphere and water solutions. Focus is put on electrochemical aspects and the influences of the properties of the metals and their oxides on the corrosion behavior, which is exemplified by different 	<p>Students M Tech Corrosion Technology will have demonstrated:</p> <ul style="list-style-type: none"> • An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics • An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. • An ability to communicate effectively with a range of audiences 	<ul style="list-style-type: none"> • Understand the terminology associated with engineering thermodynamics and know contemporary issues related to metallurgical thermodynamics. • Knowledge of phase equilibria in two-component and multi-component systems Estimate thermodynamic properties of an alloy in the stable or liquid state of ideal and a real mixture • Predict the phase transformations in an alloy system with an understanding of phase diagrams. • Prepare the specimens for metallographic examination with best practice, can operate the optical microscope and understand, interpret, analyze the microstructure of materials.

<p>corrosion types. Existing corrosion protection strategies, including surface treatments and coatings, are described, and the choice of material is discussed from a corrosion point of view.</p> <ul style="list-style-type: none"> • In addition to lectures and exercises, the course includes invited lectures from the Triservices, DRDO's, DPSU's, Indian industry addressing aspects related to corrosion protection and a group project in which a specific corrosion relevant case is analyzed and discussed both in an oral and a written report. 	<ul style="list-style-type: none"> • An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts. • An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives. • An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to conclude. • An ability to acquire and apply new knowledge as needed, using appropriate learning strategies. • Acquire knowledge on the chosen topic and apply the knowledge, experience, and skills learned. 	<ul style="list-style-type: none"> • Classify the different mechanical testing methods with their inherent merits and limitations • Apply various test methods for characterizing the physical properties of materials. • The course contains background for understanding different corrosion processes, protection methods, and materials selection with practical examples. • Based on the physical-chemical theory, the student shall be able to evaluate if corrosion can occur under specific operating conditions in given equipment or construction. • The student shall be able to propose the right materials, design, and operation requirements to reduce the likelihood of corrosion in new equipment and constructions. • The student shall also be able to propose necessary laboratory and field tests and take part in research programs to solve specific corrosion problems. • Besides, the student shall be able to perform troubleshooting and select corrosion monitoring methods. • Interpret theories and give recommendations where appropriate • Acquire knowledge on the chosen topic and apply the knowledge, experience, and skills learned. • Produce a thesis of publishable quality • Effectively present and defend research orally • Serve in any of the academic, Industrial, and Research
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M.Tech in Technology Management

Programme Outcomes (PO)	Program Specific Outcomes PSO	Course Outcome (CO)
<ul style="list-style-type: none"> • The Objective of Technology Management is to give a postgraduate degree in management. • The technology management programme provides overall knowledge of various areas of management discipline. • It provides managerial implications as well as the educational implications of the management terminologies. • To imbibe the Technology capabilities amongst the Tri-Service Officers, DRDO Scientists & DPSU engineers and civilian students • To emphasize the need for adequate knowledge and competence in technology to overcome the time & cost overruns of various defence projects & programs. • This programme enhances the overall capability in academic and research with application-based study. • To enrich the book of knowledge in management perspective for sustainability in the competitive environment. 	<ul style="list-style-type: none"> • Practical exposure to concept development methodologies will support in establishing an industry-institute interface. • This programme teaches to boost up the decision ability of students. • It helps to reach a satisfactory solution for different critical scenarios effectively and efficiently. • It concentrates more on Technology diffusion, Technology acquisition, and technology transfer for the industry as well as the tri-service perspective. • Acquiring knowledge of changing the role of Managerial leadership leads to managing high risk in handling technology and high-performance building teams. • To imbibe the managerial qualities to make the best decision at a corporate, tactical, and functional level. • The programme is more focused on transferring the technology from the lab to the land. • It provides real-life case studies from Industry, DRDO, Armed Forces, and DPSUs. 	<ul style="list-style-type: none"> • Role of technology in creating wealth, integrating different techniques, and its application. • Gives highlights of core competencies for technology development. • To provide guidelines for open innovation in technology management • Driving the economy for R&D activities through strategic aspects. • It provides strategies to mitigate cost and time overrun. • Role of management for manufacturing and integration for working towards industry 4.0. • Acquiring, analyzing, and implementing knowledge management in learning organizations. • System thinking and data analytics helps to forecast the optimal decision in business. • We are competing for the future through human resource management and organizational behavior concepts. • To understand the critical-to-quality concepts to increase overall productivity. • To gain the maximum market share and market growth through a robust supply chain network.

M.Sc in Food Technology

Programme Outcomes (PO)	Program Specific Outcomes PSO	Course Outcome (CO)
<ul style="list-style-type: none"> • This unique programme offers a blend of advanced Food Science and Technology and 	<ul style="list-style-type: none"> • Should have the capability to analyze, comprehend, design & develop solutions 	<ul style="list-style-type: none"> • Students are exposed to learn the basics and various analytical techniques and their

<p>develops critical thinking.</p> <ul style="list-style-type: none"> • Identify, formulate, and analyze Food Technology problems. • To prepare students for research in interdisciplinary areas and to join academia/industry. • Learn about ethical principles and commit to professional ethics and responsibilities 	<p>to Food Technology challenges</p> <ul style="list-style-type: none"> • Students will demonstrate an appropriate level of expertise in Food Technology and the fundamentals of Food Science and Food Technology. • Students will have high-level proficiency in research work. 	<p>applications in Food analysis.</p> <ul style="list-style-type: none"> • Food Chemistry, Food Microbiology course provides knowledge to analyze them in terms of energy and food quality. • Learning of various types of Engineering principles and applications in Food Processing and preservation. • Advanced Food technology provides new thinking to students for future solutions in the field of Food Technology.
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PG Diploma in Integrated Safety Engineering		
Programme Outcomes (PO)	Program Specific Outcomes PSO	Course Outcome (CO)
<ul style="list-style-type: none"> • This programme is designed to understand the fundamentals of fire engineering and other related safety aspects. • This programme will provide students to tackle the problems associated with fire, especially in energetic materials and electrical fields. 	<ul style="list-style-type: none"> • Should have the capability to analyze, comprehend the causes of fire and combustion mechanism • Should be acquainted with all safety norms towards the prevention of fire and also the control procedure 	<ul style="list-style-type: none"> • Students are exposed to learn the basics of combustion, heat transfer. • Students will learn about fire safety, industrial safety, and electrical safety. • The students are taught about various relevant fire regulations and safety norms.