

Doctor of Philosophy Program in Information Science and Technology (International Program)
Doctor of Philosophy (Information Science and Technology)
3 Year

2.1: Research and Coursework (3-year program) IST

Total Credits of the Program	No less than	51	Credit
Curriculum Structure			
1) Core Courses	No less than	15	Credit
1.1) Seminar		2	Credit
IST 697	IST 697 Seminar (GD)		1(0-0-0)
1.2) Professional Development		3	Credit (non credit)
IST 691	IST 691 Professional Development (SU)		3(3-0-6)
1.3) Leadership in Science and Engineering		3	Credit (non credit)
IST 692	IST 692 Leadership in Science and Engineering (SU)		3(3-0-6)
1.4) English for Academic Research		1	Credit
IST 698	IST 698 English for Academic Research (GD)		1(--)
1.5) Compulsory Elective Courses	No less than	12	Credit
1.5.1) Frontiers in Information Science and Technology			
IST 511	IST 511 Computer Network (GD)		3(3-0-6)
IST 512	IST 512 Operating System (GD)		3(3-0-6)
IST 513	IST 513 Programing Languages (GD)		3(3-0-6)
IST 514	IST 514 Data Manipulation for Applied Machine Intelligence (GD)		3(3-0-6)
IST 515	IST 515 Computational Machine Intelligence and Applications (GD)		3(3-0-6)
IST 516	IST 516 Robot Operating System (GD)		3(3-0-6)
IST 521	IST 521 Neural Networks (GD)		3(3-0-6)
IST 522	IST 522 Optimization and Numerical Methods (GD)		3(3-0-6)
IST 523	IST 523 Advanced Cloud Computing and Distributed System (GD)		3(3-0-6)
IST 524	IST 524 Advanced Big Data Management (GD)		3(3-0-6)
IST 525	IST 525 Computer Architectures (GD)		3(3-0-6)
IST 531	IST 531 Advanced Cyber Securities (GD)		3(3-0-6)
IST 532	IST 532 Embodied Artificial Intelligence (GD)		3(3-0-6)
IST 533	IST 533 Advanced Robotics (GD)		3(3-0-6)
IST 534	IST 534 Artificial Intelligence in Biomedical and Health Informatics (GD)		3(3-0-6)
IST 551	IST 551 Probability for Information Science (GD)		3(3-0-6)
IST 553	IST 553 Principles of Mathematical Analysis (GD)		3(3-0-6)
IST 555	IST 555 Convex and Combinatorial Optimization (GD)		3(3-0-6)
IST 557	IST 557 Network Optimization (GD)		3(3-0-6)
IST 571	IST 571 Computer Vision (GD)		3(3-0-6)
1.5.2) Frontiers in Energy and Materials Technology			
CHE 511	Principles of Biofuel Engineering (GD)		3(3-0-6)
CHE 512	Oil and Natural Gas Technologies (GD)		3(3-0-6)
CHE 513	Residue Oil Upgrading (GD)		3(3-0-6)
CHE 611	CHE 611 Electrochemical Engineering (GD)		3(3-0-6)
CHE 612	CHE 612 Electrochemical Energy Systems (GD)		3(3-0-6)
CHE 613	CHE 613 Fuel Processing Technologies (GD)		3(3-0-6)

MSE 522	MSE 522 Synthesis and Processing of Electronic and Photonic Materials (GD)	3(3-0-6)
MSE 525	MSE 525 Electrochemical Processing of Materials (GD)	3(3-0-6)
MSE 541	MSE 541 Materials for Energy Environmental and Biological Applications (GD)	3(3-0-6)
MSE 542	MSE 542 Photovoltaic and Solar Cell Materials and Devices (GD)	3(3-0-6)
MSE 543	MSE 543 Sensor and Transducer Materials and Technology (GD)	3(3-0-6)
MSE 625	MSE 625 Semiconductor Materials, Devices, and Technology (GD)	3(3-0-6)
MSE 626	MSE 626 Surface Coating Technology (GD)	3(3-0-6)
MSE 642	MSE 642 Nano Electronic and Photonics Materials and Devices (GD)	3(3-0-6)
1.5.3) Petrobased Engineering and Advanced Materials		
CHE 521	CHE 521 Applied Catalysis (GD)	3(3-0-6)
CHE 522	CHE 522 Design and Preparation of Heterogeneous Catalysts (GD)	3(3-0-6)
CHE 621	CHE 621 Applied Surface and Colloid Chemistry (GD)	3(3-0-6)
CHE 622	CHE 622 Quantum Simulation of Molecules and Materials (GD)	3(3-0-6)
MSE 502	MSE 502 Chemical Synthesis of Materials (GD)	3(3-0-6)
MSE 504	MSE 504 Characterization of Materials (GD)	3(3-0-6)
MSE 514	MSE 514 Electrical, Magnetic, and Optical Properties of Materials (GD)	3(3-0-6)
MSE 524	MSE 524 Sol-Gel Nano Materials and Processing (GD)	3(3-0-6)
MSE 533	MSE 533 Thermal Analysis (GD)	3(3-0-6)
MSE 544	MSE 544 Advanced Ceramics and Applications (GD)	3(3-0-6)
MSE 545	MSE 545 Catalytic Materials and Applications (GD)	3(3-0-6)
MSE 616	MSE 616 Chemistry and Physics of Nanostructures (GD)	3(3-0-6)
MSE 619	MSE 619 Frontiers in Materials Science and Technology (GD)	3(3-0-6)
MSE 631	MSE 631 X-ray Science and Applications (GD)	3(3-0-6)
MSE 632	MSE 632 Surface Analysis and Spectroscopy (GD)	3(3-0-6)
MSE 633	MSE 633 Solid State Spectroscopy (GD)	3(3-0-6)
MSE 641	MSE 641 Magnetic Materials and Data Storage Materials and Technology (GD)	3(3-0-6)
1.5.4) Bioresource Engineering		
CHE 531	CHE 531 Biological Engineering (GD)	3(3-0-6)
CHE 532	CHE 532 Biomass and Biological Waste Utilization (GD)	3(3-0-6)
CHE 533	CHE 533 Food Chemistry and Microbiology (GD)	3(3-0-6)
CHE 631	CHE 631 Properties and Characterization of Biomaterials (GD)	3(3-0-6)
MSE 521	MSE 521 Advanced Synthesis for Organic and Inorganic and Biological Materials (GD)	3(3-0-6)
MSE 645	MSE 645 Composite and Hybrid Materials (GD)	3(3-0-6)
1.5.5) Molecular Design and Functional Polymers		
CHE 541	CHE 541 Polymer Structure and Property (GD)	3(3-0-6)
CHE 542	CHE 542 Polymerization Engineering (GD)	3(3-0-6)
CHE 543	CHE 543 Computational Polymer Science and Engineering (GD)	3(3-0-6)
CHE 544	CHE 544 Polymer Processing (GD)	3(3-0-6)
CHE 641	CHE 641 Polymers Physics (GD)	3(3-0-6)
MSE 526	MSE 526 Rheology and Processing of Polymers (GD)	3(3-0-6)
MSE 614	MSE 614 Elasticity and Plasticity in Materials and Viscoelasticity of Polymers (GD)	3(3-0-6)
MSE 621	MSE 621 Composite Materials and Processing (GD)	3(3-0-6)
MSE 624	MSE 624 Molecular Design of Functional Polymers (GD)	3(3-0-6)

	MSE 643	MSE 643 High-Performance Structural Materials (GD)		3(3-0-6)
1.5.6)		Green Process Engineering, Process Control, and Others		
	CHE 551	CHE 551 Advanced Process Control (GD)		3(3-0-6)
	CHE 552	CHE 552 Computer Process Control (GD)		3(3-0-6)
	CHE 553	CHE 553 Computer-aided Computation for Chemical Engineers (GD)		3(3-0-6)
	CHE 554	CHE 554 Chemical Reactor Analysis, Design and Scale-up (GD)		3(3-0-6)
	CHE 555	CHE 555 Energy Conservation and Management (GD)		3(3-0-6)
	CHE 556	CHE 556 Safety and Environmental Risk Analysis (GD)		3(3-0-6)
	CHE 557	CHE 557 Cleaner Technology, Life Cycle Assessment and Eco-Design (GD)		3(3-0-6)
	CHE 651	CHE 651 Control Theory (GD)		3(3-0-6)
	CHE 652	CHE 652 Model-Based Control (GD)		3(3-0-6)
	CHE 653	CHE 653 Multiphase Reactors (GD)		3(3-0-6)
	CHE 654	CHE 654 Multifunctional Reactors (GD)		3(3-0-6)
	MSE 515	MSE 515 Modeling and Simulation of Materials (GD)		3(3-0-6)
	MSE 523	MSE 523 Ceramic Processing (GD)		3(3-0-6)
	MSE 623	MSE 623 Advanced Cement-based Materials (GD)		3(3-0-6)
1.5.7)		Frontier Research, Selected Topics, Seminar and Thesis		
	IST 696	IST 696 Selected Topics: "Applications of Computational Intelligence for Brain-Computer Interface" (GD)		3(3-0-6)
	IST 696	IST 696 Selected Topics: "Database Systems" (GD)		3(3-0-6)
	IST 696	IST 696 Selected Topics: "Introduction to IST Research" (GD)		3(3-0-6)
	IST 696	IST 696 Selected Topics: "Mathematical Foundation for Data Science" (GD)		3(3-0-6)
	IST 696	IST 696 Selected Topics: "Modeling and Simulation of Complex Systems" (GD)		3(3-0-6)
	IST 696	IST 696 Selected Topics: "Network Optimization" (GD)		3(3-0-6)
	IST 696	IST 696 Selected Topics: "Probability" (GD)		3(3-0-6)
	IST 696	IST 696 Selected Topics: "Natural Language Processing" (GD)		3(3-0-6)
	IST 696	IST 696 Selected Topics: "Robot Operating System" (GD)		3(3-0-6)
	IST 696	IST 696 Selected Topics: "Computer Vision" (GD)		3(3-0-6)
2) Thesis			No less than	36
	IST 699	Thesis (SU)		Credit 0(0-0-0)