

**Doctor of Philosophy Program in Biomolecular Science and Engineering (International Program)****Doctor of Philosophy (Biomolecular Science and Engineering)****3 Year****2.1: Research and Coursework (3-year program) BSE**

<b>Total Credits of the Program</b>	No less than	50	Credit
<b>Curriculum Structure</b>			
1) Core Courses	No less than	14	Credit
1.1) Seminar	No less than	2	Credit
BSE 671 Seminar III (GD)			1(0-0-0)
BSE 672 Seminar IV (GD)			1(0-0-0)
1.2) Professional Development		3	Credit (non credit)
BSE 661 Professional Development (SU)			3(3-0-6)
1.3) Leadership in Science and Engineering		3	Credit (non credit)
BSE 662 Leadership in Science and Engineering (SU)			3(3-0-6)
1.4) Compulsory Elective Core Courses	No less than	12	Credit
1.4.1) Core Course			
BSE 501 Fundamentals in Biomolecular Science (GD)			3(3-0-6)
BSE 502 Fundamentals in Biological Engineering (GD)			3(3-0-6)
BSE 503 Biophysical and Advanced Instrumental Principles (GD)			3(3-0-6)
BSE 504 Design, Module and Invention in Biological Engineering (GD)			3(3-0-6)
1.4.2) Frontiers in			
BSE 611 Synthetic and Systems Biology (GD)			3(3-0-6)
BSE 612 Biocatalysis and Mechanistic Enzymology (GD)			3(3-0-6)
BSE 613 Chemical Biology (GD)			3(3-0-6)
BSE 614 Structural Biology: Protein Crystallography and Modelling (GD)			3(1-2-3)
BSE 615 Frontiers in Biomolecular Science and Engineering (GD)			3(3-0-6)
1.4.3) Practical Laboratory Design for Effective Use of Biomolecules and Biological Systems in Industry			
BSE 521 Integrated Studies in Biomolecular Science and Engineering (GD)			3(1-3-3)
BSE 522 Laboratory Management and Regulation in Biological Science (GD)			3(3-0-6)
1.4.4) Applications of Biomolecules and Biological Systems in Innovation			
BSE 642 Biosensor and Electrochemistry (GD)			3(3-0-6)
BSE 643 Process Design for Sustainable Engineering (GD)			3(3-0-6)
1.4.5) Courses Offered by Other Schools			
CHE 501 Modeling of Molecules, Materials and Processes (GD)			3(3-0-6)
CHE 502 Chemical and Statistical Thermodynamics (GD)			3(3-0-6)
CHE 503 Chemical Kinetics and Reaction Engineering (GD)			3(3-0-6)
CHE 504 Transport Phenomena in Chemical and Biological Engineering (GD)			3(3-0-6)
CHE 556 Safety and Environmental Risk Analysis (GD)			3(3-0-6)
CHE 623 Advanced Catalysis and Electrocatalysis (GD)			3(3-0-6)
CHE 696 Selected Topics: "Advanced Materials" (GD)			3(3-0-6)
CHE 696 Selected Topics: "Advanced Zeolites in Catalysis" (GD)			3(3-0-6)
CHE 696 Selected Topics: "Crystallization" (GD)			3(3-0-6)
CHE 696 Selected Topics: "Solid State Chemistry I" (GD)			3(3-0-6)
CHE 696 Selected Topics: "Solid State Chemistry II" (GD)			3(3-0-6)

	CHE 696	Selected Topics: "Material Chemistry: Metal-Organic Frameworks - Characterization and Applications" (GD)		3(3-0-6)
	CHE 696	Selected Topics: "Modeling of Crystallization Processes" (GD)		3(3-0-6)
	CHE 696	Selected Topics: "Molecular Electrochemistry for Energy" (GD)		3(3-0-6)
	CHE 696	Selected Topics: "Sustainable Catalysis for Fine-Chemicals and Energy Production" (GD)		3(3-0-6)
	IST 502	Data Structures (GD)		3(3-0-6)
	IST 503	Algorithm Design and Analysis (GD)		3(3-0-6)
	IST 515	Computational Machine Intelligence and Applications (GD)		3(3-0-6)
	IST 525	Computer Architectures (GD)		3(3-0-6)
	IST 532	Embodied Artificial Intelligence (GD)		3(3-0-6)
	IST 696	Selected Topics: "Applications of Computational Intelligence for Brain-Computer Interface" (GD)		3(3-0-6)
	IST 696	Selected Topics: "Database Systems" (GD)		3(3-0-6)
	IST 696	Selected Topics: "Introduction to IST Research" (GD)		3(3-0-6)
	IST 696	Selected Topics: "Mathematical Foundation for Data Science" (GD)		3(3-0-6)
	IST 696	Selected Topics: "Robot Operating System" (GD)		3(3-0-6)
	IST 696	Selected Topics: "Computer Vision" (GD)		3(3-0-6)
	IST 696	Selected Topics: "Natural Language Processing" (GD)		3(3-0-6)
	IST 696	Selected Topics: "Probability" (GD)		3(3-0-6)
	IST 696	Selected Topics: "Network Optimization" (GD)		3(3-0-6)
	MSE 501	Thermodynamics and Kinetic Processes in Materials (GD)		3(3-0-6)
	MSE 502	Chemical Synthesis of Materials (GD)		3(3-0-6)
	MSE 503	Structure and Properties of Materials (GD)		3(3-0-6)
	MSE 504	Characterization of Materials (GD)		3(3-0-6)
	MSE 521	Advanced Synthesis for Organic and Inorganic and Biological Materials (GD)		3(3-0-6)
	MSE 541	Materials for Energy Environmental and Biological Applications (GD)		3(3-0-6)
	MSE 545	Catalytic Materials and Applications (GD)		3(3-0-6)
	MSE 624	Molecular Design of Functional Polymers (GD)		3(3-0-6)
	MSE 627	Qualitative Property Predictions for Transition Metal Complexes (GD)		3(3-0-6)
	MSE 667	Selected Topics: "Advanced NMR Analysis" (GD)		3(3-0-6)
	MSE 667	Selected Topics: "Coordination and Organometallic Chemistry" (GD)		3(3-0-6)
	MSE 667	Selected Topics: "Molecular Orbital Theory of the Transition Metal Complexes" (GD)		3(3-0-6)
	MSE 667	Selected Topics: "Solid State Chemistry" (GD)		3(3-0-6)
	MSE 667	Selected Topics: "Functional Porous Materials and Periodic Structures" (GD)		3(3-0-6)
	<b>1.4.6) General Courses</b>			
	BSE 652	Business foundation (GD)		3(3-0-6)
	BSE 653	Critical Thinking, Critical Writing, and Critical Skills for Researchers (GD)		3(3-0-6)
2) Thesis			No less than	36
	BSE 692	Thesis (SU)		Credit 0(0-0-0)