FACULTY OF SCIENCE

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In 1990, our Faculty came into being with the establishment of Naresuan University when it was upgraded from a campus of Srinakharinwirot University.

The first graduate program was offered in 1997 in Biology. At present 10 programs are available for the Master of Science degrees: Applied Physics, Biological Sciences, Biotechnology, Chemistry, Computer Science, Industrial Chemistry, Information Technology, Mathematics, Physics, and Statistics.

The university supports groups undertaking leading international research as "Centers of Excellence." Four of them are under the auspices of the Faculty, namely, (1) the Center of Excellence for Research in Mathematics, (2) Center for Excellence in Research in Petroleum, Petrochemicals and Advanced Materials, (3) Center of Excellence for Research in Biodiversity, and (4) Center of Excellence for Research in Biomaterials.

The Faculty of Science provides a specialist science laboratory that is open for other members of the university and the wider community. We have a variety of specialist science equipment, including a Scanning Electron Microscope (SEM), a Transmission Electron Microscope (TEM), a Nuclear Magnetic Resonance Spectrometer (NMR), a Fourier Transform Infrared Spectrometer (FT-IR), Flame Atomic Absorption Spectroscopy (FAAS), and a High Performance Liquid Chromatographer (HPLC).

In addition to full-time qualified staff from famous institutions at home and abroad, the Faculty regularly engages cutting-edge experts from the world over as visiting scholars. Our visiting professors come from Australia, Canada, the Czech Republic, India, Japan, South Korea, the UK, the USA, and Vietnam.

Owing to innovative faculty and student research and publications worthy of awards and patents, our Faculty is in the forefront of institutions of higher learning of its kind. Especially outstanding, is to be ranked as number one in Mathematics and Statistics among Thai universities in 2511.

Master of Science Program in **Applied Physics**

Research Focus

- Electronic-physics
- Energy Technology
- Sustainable Technology
- Nuclear Physics and High Energy Physics
- Material Physics

Structure of the Program

1. Credit Requirements *

Requirements	Option 1.2
Coursework	24
- Core Courses	18
- Electives	6
Required Non-credit Courses	5
Thesis	12
Total	**36**

* Minimum credits required

2. Core Courses

Requirements	Option 1.2	
	Course No.	Cr.
Advanced Mathematical Physics 1	271511	3
Classical Mechanics	271512	3
Electromagnetic Theory	271513	3
Quantum Physics	271514	3
Advanced Mathematical Physics 2	271515	3
Computational Physics	271521	3
Total	**6**	**18**

3. Electives

Requirements	Option 1.2	
	Course No.	Cr.
Physics and Astronomy Group		
Statistical Physics	271516	3
Radiation Physics for Applications	271531	3
Nuclear Reactor Theory	271532	3
High Energy Physics	271533	3
Nuclear Physics Theory	271534	3
Radiation Detection and Measurements	271535	3
Astronomical Instrumentation and Techniques	271541	3
CCD Theory and Application	271542	3
Astrophysics	271544	3
Geophysics and Earth Science	271545	3
Energy Group		
Heat Transfer	271551	3
Solar Energy System Design and Application	271552	3
Energy System Analysis and Design	271553	3
Renewable Energy	271554	3
Photovoltaic System	271555	3
Thermal Fluid Mechanics	271556	3
Biomass Application	271557	3
Heating Cooling Technmology	271558	3
Economic and Project Analysis for Energy Field	271559	3
Electronics Group		
Computer Programming for Applied Physics	271561	3
Discrete-time Signal Processing	271562	3
Semiconductor Physics and Devices	271563	3
Data Acquisition and Control System	271564	3
Operational Amplifier Circuit Application	271565	3
Microcontroller and Application	271566	3
Electromagnetic Radiation Field and Wave	271567	3
Advanced Electric Circuit Analysis	271568	3

Requirements	Option 1.2	
	Course No.	Cr.
Material Group		
Electroceramics	271571	3
Advanced X-ray	271572	3
Theory of Solids for Application	271573	3
Superconductor Physics	271574	3
Physical Metallurgy	271575	3
Material Characterization	271576	3
Applied Optical Interferometry	271581	3
Fiber Optics	271582	3
Special Problem	271593	3
Total	≥2	≥6

4. Required Non-credit Courses

Requirements	Option 1.2	
	Course No.	Cr.
Research Methodology in Science and Technology	271591	3
Seminar 1	271691	1
Seminar 2	271692	1
Total	3	5

5. Thesis Credit Requirements

Requirements	Option 1.2	
	Course No.	Cr.
Thesis 1, Option 1.2	271597	3
Thesis 2, Option 1.2	271598	3
Thesis 3, Option 1.2	271599	6
Total	3	12

Master of Science Program in **Biological Sciences**

Research Focus

- Biodiversity
- Plant Sciences
- Animal Physiology
- Genetics and Molecular Biology
- Ecology and Environmental Sciences

Structure of the Program

1. Credit Requirements *

Requirements	Option 1.2
Coursework	24
- Core Courses	12
- Electives	12
Required Non-credit Courses	5
Thesis	12
Total	**36**

* Minimum credits required

2. Core Courses

Requirements	Option 1.2	
	Course No.	Cr.
Plant, Animal and Microbial Interactions	257531	3
Biological Sciences	257541	3
Metabolism and Responses in Organisms	257542	3
Scientific Communication	257543	3
Total	**4**	**12**

3. Electives

Requirements	Option 1.2	
	Course No.	Cr.
Plant Metabolism	257511	3
Pollen Biology	257512	3
Biochemistry of Plant Hormones	257513	3
Plant Ecophysiology	257514	3
Physiology of Environmental Adaptation	257521	3
Comparative Endocrinology	257522	3
Comparative Vertebrate Anatomy	257523	3
Population Ecology	257532	3
Ecotoxicology and Monitoring	257533	3
Environment and Sustainable Development	257534	3
Biosystematics	257544	3
Selected Topics in Biological Sciences	257545	3
Special Topics in Biological Sciences Research	257546	3
Total	**≥4**	**≥12**

4. Required Non-credit Courses

Requirements	Option 1.2	
	Course No.	Cr.
Research Methodology in Science and Technology	257501	3
Seminar in Biological Sciences 1	257502	1
Seminar in Biological Sciences 2	257503	1
Total	**3**	**5**

5. Thesis Credit Requirements

Requirements	Option 1.2	
	Course No.	Cr.
Thesis 1, Option 1.2	257591	3
Thesis 2, Option 1.2	257592	3
Thesis 3, Option 1.2	257593	6
Total	**3**	**12**

Master of Science Program in **Biotechnology**

Research Focus

- Enzyme Biotechnology
- Renewable Resource Technology
- Plant Cell Technology
- Molecular Biotechnology

Structure of the Program

1. Credit Requirements *

Requirements	Option 1.2
Coursework	24
- Core Courses	9
- Electives	15
Required Non-credit Courses	5
Thesis	12
Total	**36**

* Minimum credits required

2. Core Courses

Requirements	Option 1.2	
	Course No.	Cr.
Biotechnology	275511	3
Advanced Molecular Bioscience	275512	3
Instrumentation in Biotechnology	275572	3
Total	**3**	**9**

3. Electives

Requirements	Option 1.2	
	Course No.	Cr.
Advanced Gene Technology	275513	3
Environmental Biotechnology	275541	3
Biotechnology for Waste and Wastewater Treatment	275543	3
Biodegradation and Bioremediation	275544	3
Renewable Resources Technology	275545	3
Plant Genetics Resources	275554	3
Advanced Plant Biotechnology	275555	3
Advanced Plant Tissue Culture	275561	3
Bioinformatics	275573	3
Molecular Systematics and Evolution	275574	3
Special Topics in Biotechnology	275581	3
Total	**≥5**	**≥15**

4. Required Non-credit Courses

Requirements	Option 1.2	
	Course No.	Cr.
Research Methodology in Science and Technology	275571	3
Seminar in Biotechnology 1	275595	1
Seminar in Biotechnology 2	275596	1
Total	**3**	**5**

5. Thesis Credit Requirements

Requirements	Option 1.2	
	Course No.	Cr.
Thesis 1, Option 1.2	275590	3
Thesis 2, Option 1.2	275591	4
Thesis 3, Option 1.2	275592	5
Total	**3**	**12**

Master of Science Program in **Chemistry**

Research Focus

- Asymetric Synthesis
- Natural Product and Synthesis
- Bioorganic and Bioinorganic Synthesis and Applications
- Organic Light Emmiting Diode Chracterization and Applications
- Nanomagnetic Particles and Applications
- Analytical Devices
- Advanced Material Synthesis and Applications
- Selenium Enrichment and Applications
- Biomaterial and Applications
- Flow-based Analysis and Applications

Structure of the Program

1. Credit Requirements *

Requirements	Option 1.2
Coursework	24
- Core Courses	9
- Electives	15
Required Non-credit Courses	4
Thesis	12
Total	**36**

* Minimum credits required

2. Core Courses

Requirements	Option 1.2	
	Course No.	Cr.
Sample Preparations and Separation Techniques for Chemical Analysis	256557	3
Spectroscopic Method for Chemical Analysis	256552	3
Advanced Techniques for Structural Analysis	256561	3
Total	**3**	**9**

3. Electives

Requirements	Option 1.2	
	Course No.	Cr.
Organic Chemistry Module		
Physical Organic Chemistry	256522	3
Natural Products and Synthesis	256524	3
Photochemistry of Organic Compounds	256526	3
Organometallic Chemistry	256527	3
Applications of Transition Metals in Organic Synthesis	256528	3
Bioorganic Chemistry	256529	3
Current Topics in Organic Chemistry	256571	3
Advanced Free Radical Chemistry in Organic Compounds	256572	3
Nucleoside Chemistry	256573	3
Organic Chemistry of Polymers	277551	3
Inorganic Chemistry Module		
Coordination Chemistry	256533	3
Solid State Inorganic Chemistry	256534	3
Advanced Bioinorganic Chemistry	256535	3
Identification of Inorganic Compounds	256536	3
Current Topics in Inorganic Chemistry	256538	3
Molecular Imaging	256539	3
Physical Chemistry Module		
Advanced Physical Chemistry 1	256542	3
Quantum Chemistry and Molecular Structure	256543	3
Chemical Thermodynamics	256544	3
Chemical Kinetics	256545	3

Requirements	Option 1.2	
	Course No.	Cr.
Colloid and Surface Chemistry	256547	3
Current Topics in Physical Chemistry	256548	3
UV-Vis Absorption and Photoluminescence Spectroscopy	256549	3
Nanochemistry	256562	3
Analytical Chemistry Module		
Electroanalytical Chemistry	256554	3
Current Topics in Analytical Chemistry	256555	3
Instrumentation for Spectroscopy Techniques	256556	3
Advanced Chromatography	256558	3
Selected Topics in Analytical Chemistry	256581	3
Analytical Techniques in Biological and Environmental Samples	256582	3
Atmospheric Chemistry	256583	3
Chemical Toxicology	256584	3
Waste and Wastewater Management in Chemical Industry	277543	3
Total	≥5	≥15

4. Required Non-credit Courses

Requirements	Option 1.2	
	Course No.	Cr.
Research Methodology in Science and Technology	256511	3
Seminar	256594	1
Total	2	4

5. Thesis Credit Requirements

Requirements	Option 1.2	
	Course No.	Cr.
Thesis 1, Option 1.2	256591	3
Thesis 2, Option 1.2	256592	3
Thesis 3, Option 1.2	256593	6
Total	3	12

Master of Science Program in
Computer Science

Research Focus

- Bioinformatics
- Intelligent Systems
- Knowledge Representation and Reasoning
- Machine Learning

Structure of the Program

1. Credit Requirements*

Requirements	Option 1.2	Option 2.1
Coursework	24	30
- Core Courses	12	12
- Electives	12	18
Required Non-credit Courses	4	4
Thesis	12	-
Independent Study	-	6
Total	**36**	**36**

* Minimum credits required

Note: Option 2.1 runs for 3 semesters per academic year.

2. Core Courses

Requirements	Option 1.2		Option 2.1	
	Course No.	Cr.	Course No.	Cr.
Theory of Computation and Algorithms	254511	3	254511	3
Principles of Computer Architecture	254521	3	254521	3
Principles of Operating Systems	254522	3	254522	3
Computer Security and Cryptography	254524	3	254524	3
Total	4	12	4	12

3. Electives

Requirements	Option 1.2		Option 2.1	
	Course No.	Cr.	Course No.	Cr.
Principles of Programming Language	254512	3	254512	3
Distributed Processing Systems	254523	3	254523	3
Database Design and Administration	254531	3	254531	3
Software Engineering Methodology	254532	3	254532	3
Object-oriented Technology and Application	254534	3	254534	3
Web-based Technology	254535	3	254535	3
Principles of Computer Networks	254541	3	254541	3
Information and Network Security Management	254542	3	254542	3
Cloud Computing Fundamentals and Technologies	254543	3	254543	3
Principle of Artificial Intelligence	254552	3	254552	3
Data Warehousing and Data Mining	254553	3	254553	3
Mechatronic Design	254554	3	254554	3
Machine Learning	254555	3	254555	3
Theory and Principle of Information Retrieval	254556	3	254556	3
Intelligent Decision Support System	254557	3	254557	3
Multimedia Systems	254558	3	254558	3
Ontology Design and Modeling	254559	3	254559	3
Selected Topic in Computer Science	254561	3	254561	3
Total	**≥4**	**≥12**	**≥6**	**≥18**

4. Required Non-credit Courses

Requirements	Option 1.2		Option 2.1	
	Course No.	Cr.	Course No.	Cr.
Seminar 1	254591	1	254591	1
Research Methodology in Science and Technology	254593	3	254593	3
Total	**2**	**4**	**2**	**4**

5. Thesis/Independent Study Credit Requirements

Requirements	Option 1.2		Option 2.1	
	Course No.	Cr.	Course No.	Cr.
Thesis 1, Option 1.2	254594	3	-	-
Thesis 2, Option 1.2	254595	3	-	-
Thesis 3, Option 1.2	254596	6	-	-
Independent Study 1	-	-	254597	3
Independent Study 2	-	-	254598	3
Total	**3**	**12**	**2**	**6**

Master of Science Program in
Industrial Chemistry

Research Focus

- Advanced Material Synthesis and Applications
- Functionalized Natural Rubber
- Biomaterial and Applications
- Natural Fiber Polymer Composites
- Bioplastics Modifications
- Polymer Blend and Composites

Structure of the Program

1. Credit Requirements *

Requirements	Option 1.2
Coursework	24
- Core Courses	15
- Electives	9
Required Non-credit Courses	4
Thesis	12
Total	**36**

* Minimum credits required

2. Core Courses

Requirements	Option 1.2	
	Course No.	Cr.
Advanced Industrial Chemistry	277511	4
Investment and Management in Industrial Chemistry	277512	3
Material Characterization	277513	3
Techniques in Microstructure and Mechanical Properties of Materials	277518	2
Waste and Wastewater Management in Chemical Industry	277543	3
Total	**5**	**15**

3. Electives

Requirements	Option 1.2	
	Course No.	Cr.
General Chemistry Module		
Instrumentation for Spectroscopy Techniques	256556	3
Sample Preparations and Separation Techniques for Chemical Analysis	256557	3
Current Topics in Industrial Chemistry	277517	3
Ceramics Module		
Solid State of Ceramics	277521	3
Ceramic Processing	277522	3
Metallic Materials	277531	3
Structure and Thermodynamics of Metallic Materials	277532	3
Petrochemical and Polymer Module		
Organic Chemistry of Polymers	277551	3
Polymer Physics	277552	3
Polymer Processing Technology	277553	3
Rubber Science and Technology	277554	3
Petroleum and Petrochemical Industry	277561	3
Catalyst and Catalytic Process	277562	3
Polymer Blends and Composites	277555	3
Advanced Polymer Synthesis	277556	3
Total	**≥3**	**≥9**

4. Required Non-credit Courses

Requirements	Option 1.2	
	Course No.	Cr.
Research Methodology in Science and Technology	256511	3
Seminar	277514	1
Total	**2**	**4**

5. Thesis Credit Requirements

Requirements	Option 1.2	
	Course No.	Cr.
Thesis 1, Option 1.2	277597	3
Thesis 2, Option 1.2	277598	3
Thesis 3, Option 1.2	277599	6
Total	**3**	**12**

Master of Science Program in **Information Technology**

Research Focus

- Knowledge Representation and Reasoning
- Mobile Computing
- Business Intelligence for Enterprise System
- Technology for Community Development
- Geoinformatics and GIS

Structure of the Program

1. Credit Requirements *

Requirements	Option 1.2	Option 2.1
Coursework	24	30
- Core Courses	15	15
- Electives	9	15
Required Non-credit Courses	4	4
Thesis	12	-
Independent Study	-	6
Total	**36**	**36**

* Minimum credits required

Note: Option 2.1 runs for 3 semesters per academic year.

2. Core Courses

Requirements	Option 1.2		Option 2.1	
	Course No.	Cr.	Course No.	Cr.
Information Systems and Project Management	269511	3	269511	3
Information Technology Infrastructures	269514	3	269514	3
Advanced Database Systems	269516	3	269516	3
Information System Analysis and Design	269523	3	269523	3
Algorithms and Programming Principles	269541	3	269541	3
Total	**5**	**15**	**5**	**15**

3. Electives

Requirements	Option 1.2		Option 2.1	
	Course No.	Cr.	Course No.	Cr.
Information Technology Services in Organizations	269513	3	269513	3
Intelligent Information Systems	269515	3	269515	3
Global Information Technology	269517	3	269517	3
Electronic Commerce and Internet Marketing	269522	3	269522	3
Decision Support and Intelligent Systems	269524	3	269524	3
Knowledge Management Systems	269526	3	269526	3
Web Development and Technology	269527	3	269527	3
Quantitative Analysis for Decision Making	269531	3	269531	3
Distributed Systems and Applications	269542	3	269542	3
Knowledge Discovery and Data Mining	269543	3	269543	3
Principles of Software Engineering	269551	3	269551	3
Information Security Technologies	269552	3	269552	3
Mobile Technologies	269561	3	269561	3
Geo-informatics	269562	3	269562	3
Law and Ethics in Information Technology	269563	3	269563	3
Educational Technology	269564	3	269564	3
Special Topics in Information Technology	269518	3	269518	3
Research Topics in Information Technology	269519	3	269519	3
Total	**≥3**	**≥9**	**≥5**	**≥15**

4. Required Non-credit Courses

Requirements	Option 1.2		Option 2.1	
	Course No.	Cr.	Course No.	Cr.
Seminar in Information Technology	269593	1	269593	1
Research Methodology in Science and Technology	269594	3	269594	3
Total	**2**	**4**	**2**	**4**

5. Thesis/Independent Study Credit Requirements

Requirements	Option 1.2		Option 2.1	
	Course No.	Cr.	Course No.	Cr.
Thesis 1, Option 1.2	269597	3	-	-
Thesis 2, Option 1.2	269598	3	-	-
Thesis 3, Option 1.2	269599	6	-	-
Independent Study 1	-	-	269590	2
Independent Study 2	-	-	269591	2
Independent Study 3	-	-	269592	2
Total	**3**	**12**	**3**	**6**

Master of Science Program in **Mathematics**

Research Focus

- Analysis Group
- Algebra Group
- Applied Mathematics Groups

Structure of the Program

1. Credit Requirements *

Requirements	Option 1.2
Coursework	24
- Core Courses	9
- Electives	15
Required Non-credit Courses	2
Thesis	12
Total	**36**

* Minimum credits required

2. Core Courses

Requirements	Option 1.2	
	Course No.	Cr.
Functional Analysis	252515	3
Linear Algebra and Matrix Theory	252523	3
Topology	252561	3
Total	**3**	**9**

3. Electives

Requirements	Option 1.2	
	Course No.	Cr.
Measure Theory	252513	3
Complex Analysis	252514	3
Set-Valued Analysis	252516	3
Fixed Point Theory and Applications	252517	3
Distribution Theory	252518	3
Equilibrium and Optimization Theory	252519	3
Matrix Analysis	252524	3
Advanced Abstract Algebra 1	252525	3
Algebraic Semigroup Theory	252526	3
Ring and Module Theory 1	252527	3
Ring and Module Theory 2	252528	3
Advanced Abstract Algebra 2	252529	3
Graph Theory and Applications	252534	3
Formal Concept Analysis	252535	3
Fuzzy Theory and Applications	252541	3
Computational Mathematics	252552	3
Design and Analysis of Algorithms	252553	3
Methods of Applied Mathematics	252572	3
Advanced Ordinary Differential Equations	252574	3
Partial Differential Equations	252575	3
Mathematical Modeling	252576	3
Applied Linear Algebra	252577	3
Calculus of Variation	252578	3
Numerical Analysis	252579	3
Special Topics in Algebra	252582	3
Special Topics in Computational Mathematics	252585	3
Special Topics in Applied Mathematics	252586	3
Total	**≥5**	**≥15**

4. Required Non-credit Courses

Requirements	Option 1.2	
	Course No.	Cr.
Seminar 1	252580	1
Seminar 2	252581	1
Total	**2**	**2**

5. Thesis Credit Requirements

Requirements	Option 1.2	
	Course No.	Cr.
Thesis 1, Option 1.2	252590	3
Thesis 2, Option 1.2	252591	3
Thesis 3, Option 1.2	252592	6
Total	**3**	**12**

Master of Science Program in **Physics**

Research Focus

- Mathematical Physics
- Astrophysics and Space Weather
- Relativistic Theory and Cosmology
- Nuclear Physics and High Energy Physics
- Solid State Physics and Material Physics
- Optics and Spectroscopy
- Quantum Physics

Structure of the Program

1. Credit Requirements *

Requirements	Option 1.2
Coursework	24
- Core Courses	18
- Electives	6
Required Non-credit Courses	5
Thesis	12
Total	**36**

* Minimum credits required

2. Core Courses

Requirements	Option 1.2	
	Course No.	Cr.
Mathematical Methods for Physicists 1	261503	3
Classical Dynamics	261512	3
Quantum Theory 1	261515	3

Requirements	Option 1.2	
	Course No.	Cr.
Quantum Theory 2	261516	3
Statistical Mechanics	261523	3
Classical Electrodynamics	261543	3
Total	**6**	**18**

3. Electives

Requirements	Option 1.2	
	Course No.	Cr.
Mathematical Methods for Physicists 2	261504	3
General Relativity 1	261518	3
General Relativity 2	261519	3
Physical Optics and Photonics	261533	3
Quantum Field Theory 1	261546	3
Quantum Field Theory 2	261547	3
Nuclear and Particle Physics 1	261553	3
Nuclear and Particle Physics 2	261554	3
Nuclear Reaction Theory	261555	3
Nuclear Radiation Physics	261556	3
Nuclear Reactor Physics	261557	3
Cosmic Rays	261558	3
Advanced Solid State Physics	261563	3
High Energy Physics	261559	3
Quantum Many-Body Theory	261565	3
Astrophysics	261574	3
Atomic and Molecular Physics	261585	3
Computational Physics	271521	3
Total	**≥2**	**≥6**

4. Required Non-credit Courses

Requirements	Option 1.2	
	Course No.	Cr.
Seminar 1	261591	1
Seminar 2	261592	1
Research Methodology in Science and Technology	261593	3
Total	**3**	**5**

5. Thesis Credit Requirements

Requirements	Option 1.2	
	Course No.	Cr.
Thesis 1, Option 1.2	261597	3
Thesis 2, Option 1.2	261598	3
Thesis 3, Option 1.2	261599	6
Total	**3**	**12**

Master of Science Program in **Statistics**

Research Focus

- Sample Survey
- Bayesian Statistics
- Optimal Design
- Categorical Analysis
- Biostatistics

Structure of the Program

1. Credit Requirements *

Requirements	Option 1.1	Option 1.2	Option 2.1
Coursework	-	24	30
- Core Courses	-	12	12
- Electives	-	12	18
Required Non-credit Courses	4	4	4
Thesis	36	12	-
Independent Study	-	-	6
Total	**36**	**36**	**36**

* Minimum credits required

2. Core Courses

Requirements	Option 1.1		Option 1.2		Option 2.1	
	Course No.	Cr.	Course No.	Cr.	Course No.	Cr.
Theory of Probability	-	-	255531	3	255531	3
Theory of Inferential Statistics	-	-	255532	3	255532	3
Sampling Techniques and Applications	-	-	255552	3	255552	3
Experimental Designs	-	-	255562	3	255562	3
Total	-	-	4	12	4	12

3. Electives

Requirements	Option 1.1		Option 1.2		Option 2.1	
	Course No.	Cr.	Course No.	Cr.	Course No.	Cr.
Regression Analysis and Applications	-	-	255524	3	255524	3
Applied Multivariate Analysis	-	-	255525	3	255525	3
Statistical Methods for Quality Improvement	-	-	255526	3	255526	3
Statistical Forecast and Applications	-	-	255527	3	255527	3
Nonparametric Statistics and Applications	-	-	255528	3	255528	3
Linear Models	-	-	255533	3	255533	3
Stochastic Processes	-	-	255534	3	255534	3
Bayesian Statistics	-	-	255535	3	255535	3
Categorical Data Analysis	-	-	255536	3	255536	3
Decision Theory	-	-	255537	3	255537	3
Statistical Methods in Epidemiology	-	-	255541	3	255541	3
Statistical Methods in Clinical Trials	-	-	255542	3	255542	3
Survival Analysis	-	-	255543	3	255543	3
Response Surface Methodology	-	-	255563	3	255563	3
Operations Research	-	-	255571	3	255571	3
Linear Programming and Integer Programming	-	-	255572	3	255572	3
Inventory Control	-	-	255573	3	255573	3
Game Theory	-	-	255574	3	255574	3
Queuing Theory and Applications	-	-	255575	3	255575	3
Statistical Simulation	-	-	255576	3	255576	3
Special Topics in Statistics 1	-	-	255581	3	255581	3
Special Topics in Statistics 2	-	-	255582	3	255582	3
Special Topics in Operations Research	-	-	255583	3	255583	3
Special Topics in Statistical Research	-	-	255584	3	255584	3
Special Topics in Biostatistics	-	-	255585	3	255585	3
Total	-	-	≥4	≥12	≥6	≥18

4. Required Non-credit Courses

Requirements	Option 1.1		Option 1.2		Option 2.1	
	Course No.	Cr.	Course No.	Cr.	Course No.	Cr.
Research Methodology in Science and Technology	255511	3	255511	3	255511	3
Seminar	255586	1	255586	1	255586	1
Total	**2**	**4**	**2**	**4**	**2**	**4**

5. Thesis/Independent Study Credit Requirements

Requirements	Option 1.1		Option 1.2		Option 2.1	
	Course No.	Cr.	Course No.	Cr.	Course No.	Cr.
Thesis 1, Option 1.1	255593	9	-	-	-	-
Thesis 2, Option 1.1	255594	9	-	-	-	-
Thesis 3, Option 1.1	255595	9	-	-	-	-
Thesis 4, Option 1.1	255596	9	-	-	-	-
Thesis 1, Option 1.2	-	-	255591	3	-	-
Thesis 2, Option 1.2	-	-	255592	9	-	-
Independent Study	-	-	-	-	255587	6
Total	**4**	**36**	**2**	**12**	**1**	**6**