1 MSc in Mathematics Program

1.1 Mission

Graduating students possessing thorough understanding of mathematical concepts, theories, research, and recent developments of mathematics by providing an integrated academic environment and research addressing the needs of the community and bolstering the economy of knowledge

1.2 Goals

The program aims mainly at having students with the following traits:

- **Possession of a profound background in the foundations of graduate-level mathematical analysis, abstract algebra, and applied mathematics.**
- **Development of critical thinking and ability to synthesize different mathematical concepts to obtain definite conclusions for mathematical problems.**
- **Obtainment of solid theoretical and practical knowledge in a particular field of study.**
- **Ability to conduct a research project and effectively communicate its findings to the research community.**
- **Practice of essential academic attributes, such as: self-learning, independence, responsibility, professional ethics, intuition, and pro-activity.**

1.3 Graduate Attributes

Graduate attributes for which MSc in Mathematics students are prepared are as follows:

- **Profound background in postgraduate level mathematics.**
- **Use appropriate knowledge and skills to identify, formulate, analyze, and solve complex scientific problems.**
- **Work effectively either independently or as a member of a team.**
- **Communicate complex mathematical concepts within the community and with society at large.**
- **Apply professional ethics, accountability, and equity.**
- **Able to identify and address his own educational needs to maintain competence for adapting to new needs and environment.**

1.4 Student Admission

The Department of Mathematics is committed to the Unified Regulations of Postgraduate Studies at Saudi Universities and its Executive Regulations at King Khalid University.
And especially, Article 15 for the entrance exam, and Article 18 for the complementary courses.
Particularly, the department requires:

- **A bachelor's degree in mathematics.**

- **Proficiency in English verified through one of the following:**

Test	Required level
TOEFL-IBT	45
STEP	67
IELTS	4

- **Passing tests and personal interviews conducted by the department.**

If needed, all complementary courses that will be proposed must be passed with a grade of C or higher.

1.5 Program Learning Outcomes

Knowledge and understanding	
K1	Outline advanced knowledge and understanding that covers theories, principles, and concepts in mathematics.
K2	Write Critical awareness of techniques, practices, conventions and/or terminology relevant to mathematics.
K3	List Advanced knowledge and understanding of a range of established and specialized techniques of research and/or inquiry in mathematics.
Skills	
S1	Apply specialized theories, principles, and concepts to solve problems in complex and advanced contexts, in mathematics.
S2	Assess, objectively analyze, and focus on the key ideas, values, and theories; and offer innovative solutions to current issues and problems in diverse and advanced contexts in mathematics.
S3	Carry out advanced research using specialized techniques of research and inquiry in mathematics.
S4	Use quantitative and/or qualitative methods to process data and information in complex and advanced contexts, related to mathematics.
S5	Communicate in various forms to disseminate knowledge, skills, and research results related to mathematics.
S6	Identify, select, plan for (including resource planning), use and evaluate ICT applications and strategies to enhance the achievement of aims and desired outcomes.
Values	

V1	Work effectively, both independently and as part of an interdisciplinary group.
V2	Take full responsibility for initiating, identifying, amending, and achieving aims and desired outcomes, using new skills/ techniques as required.
V3	Able to articulate awareness of and demonstrate personal characteristics that positively impact the workplace and reflect integrity and professional and academic values when dealing with various issues.

1.6 Teaching and Learning Strategies to Achieve Program Learning Outcomes

Lectures, up-to-date textbooks, hand-outs, skills in using library and other learning resources, working groups, presentations, feedback, assignments, structured experiences in groups.

1.7 Thesis and its Requirements

1.7.1 Registration of the thesis:

Not Applicable

1.7.2 Scientific Supervision:

Not Applicable

1.7.3 Thesis Defense:

Not Applicable

1.8 Study Plan

Course Code	Course Title	Prerequisite Courses	Credit Hours
Level 1			
Mandatory			
6205MATH-4	Mathematical Analysis		4
6407MATH-4	Abstract Algebra		4
6605MATH-4	Numerical Analysis		4
Total credit hours			12
Level 2			
Mandatory			
6207MATH-4	Measure Theory		4
6409MATH-4	Linear Algebra		4
6607MATH-4	Differential Equations		4
Total credit hours			12
Level 3			
Mandatory			
6903MATH-3	Research Project Part (A)		3
Elective (three courses are chosen according to the specialty track after department's council approval).			
****MATH-3	Elective Course 1		3
****MATH-3	Elective Course 2		3

****MATH-3	Elective Course 3		3
Total credit hours			12
Level 4			
Mandatory			
6904MATH-3	Research Project Part (B)		3
Elective (one course is chosen according to the specialty track after department's council approval).			
****MATH-3	Elective Course 4		3
Total credit hours			6

Elective courses

Code	Course Name	Hr	Requisite
6209MATH-3	Complex Analysis	3	------
6210MATH-3	Functional Analysis	3	------
6211MATH-3	Theory of Partial Differential Equations	3	------
6212MATH-3	Special Topics in Analysis	3	------
6213MATH-3	Special Topics in Applied Analysis	3	------
6411MATH-3	Commutative Algebra	3	------
6412MATH-3	Number Theory	3	------
6413MATH-3	Special Topics in Algebra	3	------
6414MATH-3	Special Topics in Number Theory	3	------
6609MATH-3	Introduction to Dynamical Systems	3	------
6610MATH-3	Introduction to Graph Theory	3	------
6611MATH-3	Mathematical Modelling	3	------
6612MATH-3	Matrix Computation	3	------
6613MATH-3	Numerical Solutions of Differential Equations	3	------
6614MATH-3	Nonlinear Optimization	3	------
6615MATH-3	Special Topics in Applied Mathematics	3	------
6702MATH-3	Topology	3	------
6703MATH-3	Differential Geometry	3	------

Total credit hours for completing the program: 42 Hours.

2 Program Courses Short Description

2-1 Compulsory Courses

Level 1					
Level	**Course Code**	**Course Title**	**Prerequisite Courses**	**Credit Hours**	**Level/year**
1	6205MATH-4	Mathematical Analysis		4	1/1
	Course General Description				
	This course develops a deep understanding of Riemann integrability and its properties. It differentiates between pointwise and uniform convergence for sequences and series of functions. The course profoundly presents the main concepts and foundations of mathematical analysis. It focuses on the Riemann Stieltjes Integral, and Sequences and Series of Functions.				
	Essential References				
	▪ M. T. Apostol, Mathematical Analysis, 2nd Ed. Addison-Wesley Publishing Co, 1974. ▪ W. Rudin, Principles of Mathematical Analysis. 3rd Ed. McGraw Hill, 1976.				
Level	**Course Code**	**Course Title**	**Prerequisite Courses**	**Credit Hours**	**Level/year**
1	6407MATH-4	Abstract Algebra		4	1/1
	Course General Description				
	This course will cover some fundamental concepts, ideas, properties, and theorems of group theory. The basic topics in group theory that this course will focus on are: Binary operations, elementary properties of groups, cyclic groups, symmetric groups, subgroups, quotient groups, Lagrange's Theorem, Composition series and Solvable groups. As well as, the basic homomorphism theorems, group actions and their consequences like Cayley's Theorem and the Class Equation Theorem, p-subgroups, and Sylow's Theorems and their applications.				
	Essential References				
	▪ D. Dummit and R. Foote, Abstract Algebra, 3rd Edition, Prentice Hall 2004. ▪ J. Rotman, Advanced Modern Algebra, 2nd AMS 2010.				

Level	Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
1	6605MATH-4	Numerical Analysis		4	1/1
	Course general Description				
	The numerical analysis course presents basics of classical numerical methods and numerical integration. It presents the problem of numerical approximation of mathematical problems, both from the theoretical and methodological (algorithms) point of view. Students will use MATLAB software to study specific problems numerically.				
	Essential References				
	▪ J. Epperson, An Introduction to Numerical Methods and Analysis, Revised Ed., Wiley, 2007. ▪ K. Atkinson, An Introduction to Numerical Analysis, 2nd Ed., Wiley, 1989.				

Level 2

Level	Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
2	6207MATH-4	Measure Theory		4	2/1
	Course general Description				
	This course provides the essential foundations of measure theory and integration. Measure theory found numerous applications in the theory of differential equations, functional analysis, and fractal geometry; it is used to give a mathematical foundation to probability theory and statistics. It gives a natural extension of the Riemann integral which allows for better understanding of the fundamental relations between differentiation and integration.				
	Essential References				
	▪ Donald L. Cohen. Measure Theory, Second Edition. Birkhauser, 2013. ▪ B. Folland, Real Analysis: Modern Techniques and Their Applications, Wiley, 2nd Ed. (2007).				

Level	Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
2	6409MATH-4	Linear Algebra		4	2/1
	Course general Description				
	In this course, we assimilate the basic concepts of vector spaces and subspaces, eigenvalues and eigenvectors, linear transformations, and dual spaces. Inner product				

	spaces, orthogonal and orthonormal bases, unitary, Hermitian, and normal matrices will be also deeply studied.
	Essential References
	▪ **S. Friedberg, A. Insel, L. Spence, Linear Algebra, 5th Ed., 2018, Pearson** ▪ **K. Hoffman, R. Kunze, Linear Algebra, 2nd Ed., 1973, Prentice-Hall.**

Level	Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
2	6607MATH-4	Differential Equations		4	2/1
	Course general Description				
	The course of differential equations will cover ordinary differential equations, classification of differential equations, and use different methods to find an analytical solution. Furthermore, students will study the system of differential equations and explain the qualitative behavior of the solutions of linear systems and demonstrate some trajectories solutions using mathematical software. The course demonstrates deep understanding of the general definitions and concepts of differential equations. In this course, the mathematical software will be adopted to plot phase portrait and trajectories solutions of a linear system.				
	Essential References				
	▪ **Zill, Dennis G, A First Course in Differential Equations, 10th Ed., Brooks/Cole Cengage (2013).** ▪ **G. Strang, Differential Equations and Linear Algebra, Wellesley-Cambridge (2014).** ▪ **W. E. Boyce and R. C. Di Prima, Elementary Differential Equations and Boundary Value Problems, Wiley (2009).**				

Level 3

Level	Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
3	6903MATH-3	Research Project Part (A)		3	3/2
	Course general Description				
	Selected special topics in mathematics. The topic requires the approval of the Postgraduate Studies Committee at the department. Transferable skills such as mathematical software, communication, self-management, and planning. This course aims to provide students with knowledge and understanding of research methods and training in a special topic in mathematics that will help to accomplish the research project in Research Project Part 2. The course provides students with scientific research skills and transferable skills such as mathematical software,				

	communication, self-management to plan and prepare a defendable research proposal for a specific topic in mathematics. Given the diversity of research interests and the tracks of the program, the department will assign an advisor for each student to integral Research Project Part 1 and Research Project Part 2.
	Essential References
	▪ **References will be fixed according to the chosen topics.**

Level	Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
3	****MATH-3	Elective Course 1		3	3/2
	Course general Description				
	See Section 2.2 below for a complete list of Elective Courses.				
	Essential References				

Level	Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
3	****MATH-3	Elective Course 2		3	3/2
	Course general Description				
	See Section 2.2 for a complete list of Elective Courses.				
	Essential References				

Level	Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
3	****MATH-3	Elective Course 3		3	3/2
	Course general Description				
	See Section 2.2 for a complete list of Elective Courses.				
	Essential References				

Level 4

Level	Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
4	6904MATH-3	Research Project Part (B)		3	4/2
	Course general Description				
	In this course, the individual research projects will be self-directed under the guidance of supervisors. The report will be expected to follow-on from the				

	research/project proposal in Research Project Part 1, which will be refined based on the feedback received from the assessment of the proposal. There will be an interim review presentation to tutors and peers. This course aims to further develop the approved proposal at the end of Research Project Part 1, based on the feedback provided by the committee and the continuing guidance of the assigned supervisor. The research project will interpret research findings and discuss their significance. communicate concepts and individual standpoints fluently and effectively in writing or presenting in a clear, logical, concise, and accurate professional style.				
	Essential References				
	References will be fixed according to the chosen topics.				
Level	**Course code**	**Course Title**	**Prerequisite Courses**	**Credit Hours**	**Level/year**
4	****MATH-3	Elective Course 4		3	4/2
	Course general Description				
	See Section 2.2 for a complete list of Elective Courses.				
	Essential References				

2-2 Elective Courses

Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
6209MATH-3	Complex Analysis		3	3 |4/2
Course General Description				
This course focuses on Holomorphic functions; Cauchy's theorem; Calculus of residues; Conformal mappings; Schwarz lemma; Riemann mapping theorem. The course introduces students to the theory of functions of complex variables. The course gives students solid foundations to base their understanding of more advanced material later and enables them to acquire computational skills and learn to use new and effective tools they will need in virtually any kind of future mathematical work.				
Essential References				
▪ S. Lang, Complex Analysis, Graduate Texts in Mathematics 103, Springer; 4th Ed. (2003). ▪ L. Ahlfors, Complex Analysis, McGraw-Hill Education, 3rd Ed. (1979).				

Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year

6210MATH-3	Functional Analysis		3	3 |4/2

Course General Description

This course provides the essential foundations of functional analysis which plays an increasing role in applied and pure mathematics. Essentially, a review of the theory of metric spaces, Banach spaces and linear operators will be investigated. That allows to develop some key theorems of functional analysis.

Essential References

- E. Kreyszig, Introductory Functional Analysis with Applications, 1st Ed., Wiley (1989).
- W. Rudin, Functional Analysis, 2nd Ed., McGraw Hill (1991).

Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
6211MATH-3	Theory of Partial Differential Equations		3	3 |4/2

Course General Description

This is an elective course, which studies the basis of Partial Differential Equations. It presents the Fundamentals of partial differential equations and some important solving methods. Also, existence and uniqueness theory and properties of solutions are discussed.

Essential References

- E. Zachmanoglou and D. Thoe, "Introduction to Partial Differential Equations with Applications", Dover, 1986.
- H. Brezis, "Functional Analysis, Sobolev spaces and Partial Differential Equations", Springer, 2011.

Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
6212MATH-3	Special Topics in Analysis		3	3 |4/2

Course General Description

This is an elective course, which studies a selected advanced topic (or more than one topic) in Analysis and its applications. The topics are to be determined by the department's Analysis committee upon approval of the Postgraduate Studies Committee. The approval of the department's council is also required.

Essential References

- D. Dummit and R. Foote, Abstract Algebra, 3rd Edition, Prentice Hall, 2004.
- T. Hungerford, Algebra, 1st Ed., Springer, 2003.

Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
6213MATH-3	Special Topics in Applied Analysis		3	3 |4/2

Course General Description

This is an elective course, which studies a selected advanced topic (or more than one topic) in Applied Analysis. The choice of topic(s) is suggested by the course instructor and approved by the graduate committee. The course demonstrates a deep understanding of the material relevant to the chosen topic. It gives and comprehends examples and counterexamples for concepts relevant to the chosen topic.

Essential References

- Relevant essential references will be selected by the advisor.

Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
6411MATH-3	Commutative Algebra		3	3 |4/2

Course General Description

This is an elective course, which studies the basic theory of rings and modules, ring homomorphism and module Homomorphism. The course will cover the topics of prime and maximal ideals, colon ideals, primary ideals and nil radical, quotient rings, quotient modules, polynomial rings, exact sequences, commutative diagrams, free modules, torsion modules, and torsion-free modules.

Essential References

- M.F. Atiyah and I.G. Macdonald, Introduction to commutative algebra. Addison-Wesley Publishing Co., Reading Mass.-London-Don Mills, Ont. 1969.

Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
6412MATH-3	Number Theory		3	3 |4/2

Course General Description

This course has a major focus on learning fundamental methods in number theory. Both the knowledge about arithmetic techniques as well as the analysis of the congruence structure and algebraic number theory will be useful for the students. This course will cover some fundamental concepts, ideas, properties, and theorems of elementary and algebraic number theory. This includes divisibility, multiplicative functions, congruences, primitive roots, quadratic reciprocity, number fields, rings of integers, quadratic and cyclotomic number fields.

Essential References

- I. Niven, H. Zuckerman, and H. Montgomery, An Introduction to the Theory of

Numbers, Wiley, 1991.

Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
6413MATH-3	Special Topics in Algebra		3	3 |4/2

Course General Description

This is an elective course, which studies a selected advanced topic (or more than one topic) in Algebra and/or Number Theory and their applications. The topics are to be determined by the department's Algebra committee upon approval of the Postgraduate Studies Committee. The approval of the department's council is also required.

Essential References

- References will be fixed according to the chosen topics.

Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
6414MATH-3	Special Topics in Number Theory		3	3 |4/2

Course General Description

This is an elective course, which studies elementary number theory and its applications to information system cryptography, coding theory. Thes students will learn how number theory is used in coding and cryptography to securely transmit information over insecure channels of communication. Most of the modern types of information system (cryptography, and coding theory) rely on number theory for their theoretical background. This course introduces elementary number theory, with an emphasis on those parts that have applications to information systems and shows how the theory can be applied to cryptography and security of information system. The topics are to be determined by the department's Algebra committee upon approval of the Postgraduate Studies Committee. The approval of the department's council is also required.

Essential References

- References will be fixed according to the chosen topics.

Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
6609MATH-3	Introduction to Dynamical Systems		3	3 |4/2

Course General Description

Dynamical system is the mathematical formalization of phenomenon that evolves in space and/or time. It provides tools for analysis and simulation of many biological, physical, chemical, ecological, economical, and even social systems. This course aims to provide the student with both a solid basis in dynamical systems theory and the necessary understanding

of the approaches, methods, results, and terminology used in the modern applied mathematics literature.

Essential References

- M. Hirsch, S. Smale & R. Devaney, Differential Equations, Dynamical Systems and an Introduction to Chaos, Elsevier, Waltham (2013, 3rd ed.).
- K.T. Alligood, T.D. Sauer, J.A. Yorke, Chaos (An Introduction to Dynamical Systems), Springer, 1996.
- C. Chicone, Ordinary Differential Equations with Applications, Springer, New York (2006).
- J. Guckenheimer & P. Holmes, Nonlinear Oscillations, Dynamical Systems and Bifurcations of Vector Fields, Springer, New York (1983).
- J. Hale, Ordinary Differential Equations, Krieger, Malabar (1980); republished by Dover, Mineola (2009).
- J. Meiss, Differential Dynamical Systems, SIAM, Philadelphia (2017, 2nd ed.).
- S. Wiggins, Introduction to Applied Nonlinear Dynamical Systems and Chaos, Springer, New York (2003).

Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
6610MATH-3	Introduction to Graph Theory		3	3 |4/2

Course General Description

This course is a practical introduction to solving problems that can be modelled as discrete objects called graphs. It is intimately related to different branches of mathematics. The purpose of this course is two-fold: formally study fundamental concepts in graph theory such as flows and connectivity (e.g., Menger's theorem), planarity (coloring), Eulerian and Hamiltonian graphs, and use graph theory as a modelling tool for some applications.

Essential References

- N. Hartsfield and G. Ringel, Pearls in Graph Theory - A Comprehensive Introduction, Academic Press (1994).
- J. A. Bondy, and U.S.R. Murty, Graph Theory, (Graduate Texts in Mathematics), Springer-Verlag (2008).
- M. Bona, A Walk-Through Combinatorics - An Introduction to Enumeration and Graph Theory, 3rd Ed, World Scientific Publishing Co. (2011).

- R. Diestel, Graph Theory, 5th Ed. Springer (2017).
- B. Bollobas, Modern Graph Theory, Springer (1998).
- J. A. Bondy and U. S. R. Murty, Graph Theory with Applications, Elsevier (1982).

Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
6611MATH-3	Mathematical Modelling		3	3 |4/2

Course General Description

The primary aim of this course is to develop understanding of applied mathematics as a thought-process and a toolbox for the study of real-world phenomenon. It will focus on introducing concepts/tools from different parts of mathematics, both continuous and discrete such as Differential Equations, Optimization, Analysis, Linear Algebra, etc to explain how to build and refine models for various applications. The secondary but equally important aim is the development of good habits of understanding, communicating, and writing mathematical tools and models as applied to a real-world problem.

Essential References

- Mark M. Meerschaert , Mathematical Modeling, 4th edition, Academic Press, 2013.
- E. Beltrami, Mathematics for Dynamic Modeling, Academic Press, 1987.

Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
6612MATH-3	Matrix Computation		3	3 |4/2

Course General Description

This course is a practical introduction to modern numerical linear algebra presenting several matrix decomposition methods alongside their applications in the solution of system of linear equations, least squares, and eigenvalue problems. Students should be able to analyze stability of several methods and implement them using mathematical software.

Essential References

- James W. Demmel. Applied Numerical Analysis. SIAM, 1997.

Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
6613MATH-3	Numerical Solutions of Differential Equations		3	3 |4/2

Course General Description

Many applications problems lead to partial differential equations in which analytic solutions are rarely available or too complicated. Finite difference and finite element methods are often easy to use but powerful to obtain an approximate solution of the PDEs.

It is strongly believed that the knowledge of finite difference and finite element methods for PDEs is necessary for mathematicians, scientists, and engineers, who are interested in solving their problems approximately. It is a required course in many universities. This course is designed for students in applied mathematics to learn the basic theories and algorithms of finite difference methods for differential equations including elliptic, parabolic, and hyperbolic PDE's. Also, this course gives a brief introduction about the finite element method. In this introductory, we will start theoretical foundations and algorithm implementations for one-dimensional problems. The discussion of two-dimensional problems, some commonly used finite element spaces, error analysis, and other related topics including some applications of the finite element method will then be followed.

Essential References

- **Z. Li and Z. Qiao and T. Tang, Numerical Solution of Differential Equations: Introduction to Finite Difference and Finite Element Methods, University Printing House, Cambridge CB2 8BS, United Kingdom, 2017.**

Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
6614MATH-3	Nonlinear Optimization		3	3 |4/2

Course General Description

This course aims to introduce students to the fundamentals of nonlinear continuous optimization. Both theoretical and algorithmic aspects are to be covered. The first part is devoted to basic algorithms for unconstrained optimization, and the second part covers essentials topics in convex optimization.

Essential References

- **S. Boyd and L. Vandenberghe. Convex optimization. Cambridge university press, 2004.**

Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
6615MATH-3	Special Topics in Applied Mathematics		3	3 |4/2

Course General Description

This is an elective course, which studies a selected advanced topic (or more than one topic) in Applied Mathematics. The topics are to be determined by the department's Applied Mathematics committee upon approval of the Postgraduate Studies Committee. The approval of the department's council is also required.

Essential References

- **References will be fixed according to the chosen topics.**

Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
6702MATH-3	Topology		3	3 |4/2

Course General Description

This course provides the essential of point set topology treated in a profound fashion. It is designed to provide students with an intense foundation in fundamental concepts of point-set topology. The student will be familiar with basic problems in topological space, Metric Spaces. Further with connectedness, compactness, density, basis, compactification, and fundamental group.

Essential References

- J. Munkres, Topology, 2nd Ed., Prentice Hall (2000).

Course Code	Course Title	Prerequisite Courses	Credit Hours	Level/year
6703MATH-3	Differential Geometry		3	3 |4/2

Course General Description

This course is an introduction to differential geometry, which provides the geometric foundation for the revolutionary relativity theory of Einstein. This course introduces students to the key concepts and techniques of Differential Geometry.

Essential References

- John M. Lee, Introduction to Smooth Manifolds, Springer-Verlag New York (2003).