PROPOSAL TO OFFER A NEW ACADEMIC PROGRAM/ MAJOR IN FALL 2005

(LONG FORM)

Proposed Name of Degree: Master of Science in Mathematics

Options/ Emphases in the Degree:

Faculty Proposing New Program: Ivona Grzegorczyk, Jorge Garcia, Jesse Elliott, Peter Smith, William Wolfe, Geoff Dougherty.

Review and Approval:

1. Curriculum Committee Approval:

Curriculum Chair: Date:

2. Academic Senate Approval:

Chair, Academic Senate: Date:

3. Administration Approval:

President (or designee):   Date:

PROCEDURE FOR SUBMITTING PROPOSALS FOR NEW PROGRAMS

A campus, in accordance with its approved academic master plan, submits detailed proposals for new degree major programs to the Office of Academic Program Planning for review and approval in the academic year preceding projected implementation. Approval of any degree major program is subject to campus assurances that financial support, qualified faculty, physical facilities and library holdings sufficient to establish and maintain the program will be available within current budgetary support levels. The proposal must follow the format below, and four copies should be sent to Academic Program Planning, Office of the Chancellor.

EXPLANATION:

With the rapid development of high-tech and computational sciences in the entire world, the need for graduate programs in computational sciences is acute. There is a global shortage of people with advanced mathematical, computational, and computer skills throughout the industry, especially in the greater Los Angeles area, and Ventura county. The MS program in Mathematics is broad in scope (applications include, Bioinformatics, Actuarial Sciences, Cryptography, Security, Image Recognition, Artificial Intelligence, Mathematics Education).
The Program will be of interest to students with undergraduate degrees in mathematical sciences, computer science, engineering, and others with strong computational background. MS degree in Mathematics is on the CSUCI Curriculum Plan as self–supporting programs scheduled to start in the Fall 2005. There is a waiting lists of students committed to apply. The program will be of service to graduates holding computational degrees, especially for professional working in local high-tech and computational industries, as well as the military personnel. We have letters from local industries in support of the program.

Our graduates will find the employment in local high-tech, information systems, and computational industries, businesses, educational institutions, military and local and federal government. Some students may elect to continue their education in various at graduate schools.

Since we are expecting a quite broad interest in our program, we propose that the program will start in the Fall 2005 as a self-supporting program, and when the university budgetary situation improves, we will offer also a state supported version.

1. **Definition of the Proposed Degree Major Program**

    a. **Name of the campus submitting the request, the full and exact designation (degree terminology) for the proposed degree major program, and academic year of intended implementation.**

       California State University Channel Islands
       Master of Science in Mathematics
       Fall 2005

    b. **Name of the department, departments, division or other unit of the campus that would offer the proposed degree major program. Identify the unit that will have primary responsibility.**

       This degree program is a result of cooperation between Mathematics and Computer Science faculty. The program will offer MS degree in Mathematics. **All** of the courses are shared between MS in Mathematics and MS in Computer Science programs, and students' specializations depend on the final project/ thesis and the electives chosen under the supervision of their Mathematics advisors.

       MS in Mathematics Program would offer the program initially through the Open University (the Extended Education Program).

c. **Name, title, and rank of the individual(s) primarily responsible for drafting the proposed degree major program.**

Peter Smith, PhD
Professor of Computer Science

William Wolfe, PhD
Professor of Computer Science

Geoff Dougherty
Professor of Physics

Ivona Grzegorczyk, PhD
Professor of Mathematics

Jesse Elliott
Assistant Professor of Mathematics

Jorge Garcia
Assistant Professor of Mathematics

d. **Objectives of the proposed degree major program.**

General Objectives:
1. Provide students with the opportunity to earn a Master degree in Computer Science or Mathematics from the California State University.
2. Prepare students for employment in a variety of highly sophisticated and complex high-tech and bio-tech industries, businesses, education systems, military and local and federal government
3. Prepare students for further study in graduate or professional schools.
4. Equip students with the depth, flexibility and mathematical skills that apply to variety of fields and offer various career opportunities, including consulting, scientific and technical positions in business and industry, research and development, national and industrial security or teaching positions.
5. Offer all CSUCI students the opportunity to broaden their knowledge and learn mathematical skills and computer technology that can be applied to various professional and personal situations.

Learning Objectives:

Students will:

1. Demonstrate critical thinking, problem solving, and advanced mathematical skills by identifying, evaluating, analyzing, synthesizing and presenting fundamental and advanced mathematical and computer science issues and their applications.

2. Demonstrate the knowledge of current mathematical theories and broad technology use in industry, including a working knowledge of software development techniques in an industrial setting.

3

3. Be knowledgeable of emerging new technologies and industrial practices connected to the computer industry and demonstrate understanding of computing technologies in society.

4. Demonstrate cooperation skills by working effectively with others in interdisciplinary group settings – both inside and outside the classroom.

5. Demonstrate independent working and thinking skills by completing a graduate project and/or master thesis.

6. Demonstrate a sense of exploration that enables them to pursue rewarding careers in high-tech industries, bio-tech industries, businesses, education systems, military and local and federal government

7. Demonstrate flexibility, transferability and adaptability of their life-learning skills that are so important n fast changing national and international economy.

e. Total number of units required for the major. List of all courses, by catalog number, title, and units of credit, to be specifically required for a major under the proposed degree program. Identify those new courses that are (1) needed to initiate the program and (2) needed during the first two years after implementation (Complete Table 1). Include proposed catalog descriptions of all new courses.

32 Semester units required for the major.

Since CSUCI will begin admitting graduate students in Fall 2004, all courses are new and will be needed to initiate the program. These courses will be offered during the first two years (and subsequent years) after program implementation. See the following pages for Courses and Catalog Descriptions.

CORE COURSES (11 Units)

Choose 3 courses from the following list:

MATH 510 Probabilistic Methods And Measure Theory (3)
MATH 511 Functional Analysis (3)
COMP 510 Algorithms (3)
COMP 569 Artificial Intelligence (3)
PHYS 510 Advanced Image Analysis Techniques (3)

And required two units of:

Math 599 Graduate Seminar (1)

ELECTIVES (15 Units)*

Choose 5 Electives from the following list (at least 3 courses in mathematics):

Math/ COMP	581	3	Mathematical Methods in Artificial Intelligence
Math	511	3	Functional Analysis
Math	513	3	Advanced Algebra
Math	555	3	Actuarial Sciences
Math	565	3	Research in Mathematics Education
Math	582	3	Number Theory and Cryptography
Math	584	3	Algebraic Geometry and Coding Theory
Math	587	3	Markov Chains and Markov Processes
Math	588	3	Stochastic Analysis
PHYS	546	3	Pattern Recognition
COMP	520	3	Advanced Database Systems
COMP	524	3	Security
COMP	529	3	Network Computing
COMP	549	3	Human-Computer Interaction
COMP	550	3	Object-Oriented Software Engineering
COMP	569	3	Artificial Intelligence
COMP	571	3	Biologically Inspired Computing
COMP	572	3	Neural Networks
COMP	575	3	Multi-Agent Systems
COMP	578	3	Data Mining

 *other graduate or junior/senior courses may be included with advisors approval.

PROJECT OR MASTER THESIS - EMPHASIS (6 units)

Math   597   Master Thesis
or
 Math 598   Master Project

TOTAL CREDITS: 32 units

COURSE DESCRIPTIONS FOR CATALOG

COMP 510 Algorithms (3)
Design strategies for algorithms and data structures. Theoretical limits to space and time requirements. Time/space trade-offs. Categories of problems and algorithms. Applications to business, bioinformatics, engineering, telecommunications and other disciplines. Open problems in the field.

COMP 520 Advanced Database Systems (3)

Three hours lecture in the lab per week.
This graduate course covers advanced analysis of Relational Database Management Systems including their design and implementation. Topics include relational algebras, Entity Relation Diagrams, first, second, and third Normal Forms, data integrity constraints, triggers, query optimization, indexing, stored procedures, distributed databases, database administration issues, transaction processing and scheduling, object oriented database modeling, and data security

COMP 524 Security (3)

Three hours lecture in the lab per week.
A survey of security issues and techniques for stand-alone and networked computer systems including databases. Techniques such as auditing, risk analysis, cost-benefit analysis. Security standards. Application in various fields.

COMP 529. Network Computing (3)

Three hours of lecture in the lab per week.
Design and programming in Java of distributed systems that use telecommunication networks as their computing platform.

COMP 532 Computational Bioinformatics (3)

Three hours of lecture in the lab per week.
Contemporary computational models used in molecular biology and structures simulations will be introduced. Topics include dynamic programming, statistical/ information techniques for pattern recognition, algorithms for string alignments, structural superposition algorithms, computing with differential information, 3D motifs, Hidden Markov Models, phylogenetic trees, genetic algorithms.

Comp 549 Human-Computer Interaction (3)

Three hours lecture in the lab per week.
The design, development and analysis of effective interfaces to computer systems. Trends in graphical user interfaces.

COMP 550. Object-Oriented Software Engineering (3)

Three hours of lecture in the lab per week.
Fundamentals of Object-Oriented Design and Analysis. Designing systems with Unified Modeling Language (UML) and patterns. Applications to other fields.

COMP 566. Geometry and Computer Graphic (3)

Three hours of lecture in the lab per week.
Prerequisite:
Algorithms for geometric analysis and retrieval of 3D shapes from large 3D databases common in several fields, including computer graphics, computer-aided design, molecular biology, paleontology, and medicine. The focus of study will be recent methods for matching, registering, recognizing, classifying, clustering, segmenting, and understanding 3D data.

COMP 569 Artificial Intelligence (3)
Three hours of lecture in the lab per week.
The course covers the many aspects of how human intelligence might be encoded in computer programs and mechanisms such as robots. This includes topics in Natural Language Processing, Computer Vision, Expert Systems, and Automated Problem Solving.

COMP 571. Biologically Inspired Computing (3)
Three hours of lecture in the lab per week.
Study of computing paradigms that have roots in Biology including Neuromorphic Systems, Evolutionary Systems, Genetic Programming, Swarm Intelligence and Artificial Immune Systems.

COMP 572 Neural Networks (3)
Three hours of lecture in the lab per week.
Covers the basic ideas of distributed computation with many simple processing units, similar to the neurons of the brain. Topics include: Hopfield style networks applied to optimization problems, and the backpropagation method applied to pattern classification problems. Additional topics include associate memory, binary vs analog networks, simulated annealing.

COMP 575. Multi-Agent Systems (3)
Three hours of lecture in the lab per week.
 Fundamentals of Object-Oriented Design and Analysis. Designing systems with Unified Modeling Language (UML) and patterns.   Applications in various situations and fields.

COMP 578 Data Mining (3)
Three hours of lecture in the lab per week.
This graduate course covers the fundamentals of Data Mining. Topics include the analysis of patterns of data in large databases and data warehouses, the application of statistical pattern recognition, and data modeling and knowledge representation. Applications in large databases, gene hunting

COMP/MATH 581. Mathematical Methods in Artificial Intelligence (3)
Three hours of lecture in the lab per week.

Mathematical foundations for Artificial Intelligence: Trees and Search, Predicate Logic, The Theory of Resolution, Nonmonotonic Reasoning, Probability Theory, Bayesian Networks, Fuzziness and Belief Theory, Classifier Systems, Math for Neural Networks, Elements of Statistics, Decision Trees and Optimization.

Math 510 Probabilistic Methods And Measure Theory. (3)
Three hours of lecture in the lab per week.

Introduction to probabilistic methods. Topic include: sigma algebras, measures, integrals, Lebesgue measure, main convergence results and the change of variable results for integrals. Probabilistic methods in computational sciences are studied.

Math 511 Functional Analysis (3)
Three hours of lecture per week.
Metric spaces, function spaces, normed vector spaces, linear operators. Banach spaces, Hilbert spaces. Spectral theory. Fundamental theorems in functional analysis. Applications in various fields including computer science, bioinformatics, statistical analysis.

Math 555 Actuarial Sciences (3)
   Three hours of lecture.
The course provides a sound grounding in the mathematical, statistical and financial concepts needed for actuarial work, including technical and communication skills. Probability, statistics, data analysis, mathematical modeling. Risk analysis, pension plans, financial economics, and time series. Various software packages are used.

Math 565 Research in Mathematics Education (3)
Three hours of lecture per week,
Mathematical research methods in education. Current issues of college level curriculum including systems of geometry, algebra, precalculus, calculus, probability and statistics, linear algebra, differential equations, and discrete mathematics.

MATH 482. Number Theory and Cryptography (3)
Three hours of lecture per week.
Number theory, finite fields, polynomial rings, elliptic curves, public-key cryptography, zero-knowlege protocols, primality testing, factorization algorithms and applications.

Math 584 Algebraic Geometry and Coding Theory (3)
Three hours of lecture per week.
Algebraic varieties over algebraically closed fields and finite fields, Hamming codes, cyclic codes, BCH codes, alternant codes, Goppa codes, codes on graphs.

Math 587 Markov Chains and Markov Processes (3)
Three hours of lecture.
Topics include: Central Limit Theorem, Law of Large Numbers, Convergence Theorems, Markov Chains and Markov Processes. Applications in other fields, such as bioinformatics and computer science.

Math 588 Stochastic Analysis (3)
Three hours of lecture.
Topics include: Brownian motion, stochastic integrals, conditional expectation, Kolmogorv's Theorem, applications of Lebesgue Dominated Convergence Theorem. Introduction to Stochastic Differential Equations will be given.

Math 597 Master Thesis (1-6)
Supervised research in mathematical sciences or applications. All students are required to present their research at Graduate Seminar and write Master Thesis. Repeatable.

Math 598 Master Project (1-6)
Supervised industrial, educational or scientific project involving use of advanced mathematical methods. All students are required to present their projects at the Graduate Seminar. Repeatable.

Math 599 Graduate Seminar (1)
Oral presentations of current advancements in the field, reports on students' research, master thesis, and projects. Repeatable.

PHYS 510 Advanced Image Analysis Techniques (3)
Three hours of lecture in the lab per week.
Image processing course in the fundamentals of 2-D digital signal processing with emphasis in image processing techniques, image filtering design and applications. Programming exercises in Matlab (or Octave) will be used to implement the various processes, and their performance on synthetic and real images will be studied. Applications in medicine, robotics, consumer electronics and communications.

PHYS 546 Pattern Recognition (3)
Three hours of lecture in the lab per week.
New and emerging applications of pattern recognition - such as data mining, web searching, multimedia data retrieval, face recognition, and cursive handwriting recognition - require robust and efficient pattern recognition techniques. Statistical decision-making and estimation are regarded as fundamental to the study of pattern recognition. The course addresses the issue of analyzing pattern content by feature extraction and classification. The principles and concepts underpinning pattern recognition, and the evolution, utility and limitations of various techniques (including neural networks) will be studied. Programming exercises will be used to implement examples and applications of pattern recognition processes, and their performance on a variety of diverse examples will be studied.

> **f.** **List of elective courses, by catalog number, title, and units of credit that can be used to satisfy requirements for the major. Identify those new courses that are (1) needed to initiate the program and (2) needed during the first two years after implementation (Complete Table 1). Include proposed catalog descriptions of all new courses.**

Since CSUCI will begin admitting graduate students in Fall 2005, all courses are new and will be needed to initiate the program. MS students in Mathematics are required to complete 15 units of electives from the following list, including 9 units with MATH prefix.

COMP	520	3	Advanced Database Systems
COMP	524	3	Security

COMP	529	3	Network Computing
COMP	549	3	Human-Computer Interaction
COMP	550	3	Object-Oriented Software Engineering
COMP	569	3	Artificial Intelligence
COMP	571	3	Biologically Inspired Computing
COMP	572	3	Neural Networks
COMP	575	3	Multi-Agent Systems
COMP	578	3	Data Mining
COMP/Math	581	3	Mathematical Methods in Artificial Intelligence
Math	511	3	Functional Analysis
Math	555	3	Actuarial Sciences
Math	565	3	Research in Mathematics Education
Math	582	3	Number Theory and Cryptography
Math	584	3	Algebraic Geometry and Coding Theory
Math	587	3	Markov Chains and Markov Processes
Math	588	3	Stochastic Analysis
PHYS	546	3	Pattern Recognition

COURSE DESCRIPTIONS FOR CATALOG

See above descriptions

g. If any formal options, concentrations, or special emphases are planned under the proposed major, explain fully.

h. Course prerequisites and other criteria for admission of students to the proposed degree major program, and for their continuation in it.
-Except as noted below, all courses are open to matriculated and graduate students of the University.
-Students seeking admission to the Master of Science in Mathematics Program must be officially accepted into CSUCI graduate MS Mathematics Program.
-Student should provide at least two letters of recommendation.
- Students must remain in good academic standing.

LIST OF COURSES WITH PREREQUISITES – all graduate courses require graduate standing or permission of the instructor:

COMP	510	3	Algorithms (3)
PHYS	510	3	Advanced Image Analysis Techniques (3)
COMP	520	3	Advanced Database Systems
COMP	524	3	Security
COMP	529	3	Network Computing
COMP	549	3	Human-Computer Interaction
COMP	550	3	Object-Oriented Software Engineering
COMP	569	3	Artificial Intelligence

COMP	571	3	Biologically Inspired Computing
COMP	572	3	Neural Networks
COMP	575	3	Multi-Agent Systems
COMP	578	3	Data Mining
COMP/Math	581	3	Mathematical Methods in Artificial Intelligence
Math	510	3	Probabilistic Methods And Measure Theory
Math	511	3	Functional Analysis
Math	555	3	Actuarial Sciences
Math	565	3	Research in Mathematics Education
Math	582	3	Number Theory and Cryptography
Math	584	3	Algebraic Geometry and Coding Theory
Math	587	3	Markov Chains and Markov Processes
Math	588	3	Stochastic Analysis
PHYS	546	3	Pattern Recognition
Math	597	1-6	Master Thesis
Math	598	1-6	Master Project
Math	599	1	Graduate Seminar

i. **Explanation of special characteristics of the proposed degree major program, e.g., in terminology, units of credit required, types of course work, etc.**

- This degree program is a result of cooperation between Mathematics and Computer Science faculty. The program will offer MS degree in Mathematics. All of the courses are shared with MS in Computer Science program.
-The program contains up-to-date technical, theoretical and intellectual achievements in the field of Mathematics.
-It stresses modern computer applications in highly developing fields such as statistical analysis, bioinformatics, artificial intelligence, pattern recognition, computer graphics and mathematics education.
-By requiring graduate projects or thesis (6 units), it implements the distinguishing characteristics of all CSUCI programs: an interdisciplinary and service learning approach to higher education.

j. **For undergraduate programs, provisions for articulation of the proposed major with community college programs.**

k. **Provision for meeting accreditation requirements, where applicable, and anticipated date of accreditation request.**

2. **Need for the Proposed Degree Major Program**

a. **List of other California State University campuses currently offering or projecting the proposed degree major program; list of neighboring institutions, public and private, currently offering the proposed degree major program.**

Most other CSU campuses offer a Master of Science in Mathematics. However, three nearby private institutions (California Lutheran, Pepperdine, Westmont) do not offer these degrees.

b. **Differences between the proposed program and programs listed in Section 2a above.**

-The CSUCI Program will provide an opportunity to earn a MS in Mathematics degree to students in the local service area – and offer all students access to a highly desired high-tech and educational positions in a unique program that stresses an interdisciplinary learning approach.
- This degree program is a result of cooperation between Mathematics and Computer Science faculty and stresses modern, scientific approach through mathematical analysis of underlying ideas. All of the courses are shared between the MS in Mathematics and MS in Computer Science programs.

- The program is designed to reflect rapidly changing needs of computational industries and educational needs, and to address the sophisticated applications and computational issues (for example in bioinformatics, data mining, computer graphics, internet development, security issues).

- The program provides local industry related projects and internships with the local high –tech companies.

f. Professional uses of the proposed degree major program.

The Master of Science Mathematics will prepare students for a variety of high-tech industrial positions or advanced mathematics education positions. The Degree would also prepare students for further graduate education in computational fields.

g. The expected number of majors in the year of initiation and three years and five years thereafter. The expected number of graduates in the year of initiation and three years and five years thereafter.

	Number of Majors*	Number of Graduates*
Initiation Year	20	0
Third year	40	20
Fifth year	100	20

•from CSU Channel Islands Enrollments Models

3. Existing Support Resources for the Proposed Degree Major Program

> **a. Faculty members, with rank, appointment status, highest degree earned, date and field of highest degree, and professional experience (including publications if the proposal is for a graduate degree), who would teach in the program.**

BRIEF FACULTY BIOGRAPHIES (up to 3 relevant publications listed).

Ivona Grzegorczyk
Professor of Mathematics
PhD in Mathematics, UC Berkeley, 1990
Mathematics Professor since 1990
Extensive experience in the areas of algebraic geometry, moduli problems, applied mathematics, mathematics education.

Selected publications:
1. On Newstead's Conjecture on Vector Bundles on Algebraic Curves, **Mathematichen Annallen 300, 521-541(1994).**
2. Mathematics and Fine Arts, **Kendall/Hunt publishing Co., (2000)** .

3. Geography of Brill-Noether Loci for Small Slopes (with L. Brambila-Paz and P. Newstead), **Journal of Algebraic Geometry. 6 (1997).**

Peter Smith
Professor of Computer Science
PhD in Computer Studies, Lancaster University, 1975
Computer Science Professor since 1980
Extensive experience in the areas of data structures and algorithms

Selected publications:
1. Applied Data Structures with C++ , Jones and Bartlett, 2004
2. Experiments with word-by-word compression of English text using lexicons, **Computer Journal**, 1992.
3. Experiments with a very fast substring search algorithm, **Software-Practice and Experience**, 1991.

William Wolfe
Professor of Computer Science
PhD in Mathematics, CUNY, 1976
Computer Science Professor since 1988
Extensive experience in Neural Networks, Artificial Intelligence, Databases.

Selected publications:
1. Student Peer Reviews in an Upper Division Mathematics Class, **Exchanges**: The Online Journal of Teaching and Learning in the CSU, September
2. Thee Scheduling Algorithms Applied to the Earth Observing Systems Domain **INFORMS Journal on Management Science**, Vol. 46, No. 1, January 2000 pp. 148-
3. A Fuzzy Hopfield-Tank TSP Model **INFORMS Journal on Computing**, Vol. 11, No. 4, Fall 1999 pp. 329-

Andrzej Bieszczad
Visiting Professor of Computer Science
PhD in Computer Engineering, Carleton University, 1996
Visiting Professor since 2003

Selected publications:
1. White T., Pagurek B., and Bieszczad A. (1999), *Network Modeling For Management Applications Using Intelligent Mobile Agents*, **Journal of Network and Systems Management, September, 1999.**
2. Bieszczad, A., White, T., Pagurek, B. (1998), *Mobile Agents for Network Management*, **IEEE Communications Surveys, September, 1998.**
3. Bieszczad, A. and Pagurek, B. (1998), *Neurosolver: Neuromorphic General Problem Solver*, Information Sciences: **An International Journal 105 (1998), pp. 239-277, Elsevier North-Holland, New York, NJ.**

Geoffrey Dougherty
Professor of Physics
Ph.D. in Biophysics, University of Keele, 1979
Medical Imaging/Physics Professor since 1986
Extensive experience in medical imaging, image analysis, and bioengineering.

Selected publications:

1. Dougherty, G and Henebry, G. Lacunarity analysis of spatial pattern in CT images of vertebral bone for assessing osteoporosis. **Med. Eng. Phys., 2002, 24**, 129-138.
2. Dougherty, G. and Kawaf Z. The point spread function revisited: image restoration using 2-D convolution. **Radiography, 2001, 7**, 255-262.
3. Dougherty, G. and Henebry, G. Fractal signature and lacunarity in the measurement of the texture of trabecular bone in clinical CT images. **Med. Eng. Phys., 2001, 23**, 369-380.

Jesse Elliot
Assistant Professor of Mathematics
PhD in Mathematics, UC Berkeley, 2003
Mathematics Professor since 2003
Experience in commutative algebra and number theory.

Selected publications:
1. Witt-Burnside Rings (dissertation), **UC Berkeley, 2003**
2. Binomial Rings (preprint on website)

Jorge Garcia
Assistant Professor of Mathematics
PhD in Mathematics, U-W Madison, 2002
Mathematics Professor since 2002
Extensive experience in Stochastic Processes, Large Deviations, Stochastic   Integrals, Probability, Markov Processes and Measure Theory.

Selected publications:
1. An Extension of the Contraction Principle, **Journal of Theoretical Probability,** October, 2003.
2. A Large Deviation Principle for Stochastic Integrals, **Journal of Theoretical Probability,** April, 2004.

- Three additional full-time professors in the Computer Science and Mathematics areas are planned for Fall 2005

- Other CSUCI full-time science faculty will offer interdisciplinary and computation intensive application courses.

This program will require classroom space, computer laboratory space, library materials, library electronic databases and the use of Information Technology (IT) resources.

4. **Additional Support Resources Required**

   b. **Any special characteristics of the additional faculty or staff support positions needed to implement the proposed program.**

This program is self-supporting and will be administered through the Extended Education office. Faculty and staff positions will be coordinated and supported by the Extended Education.

c. The amount of additional lecture and/or laboratory space required to initiate and sustain the program over the next five years. Indicate any additional special facilities that will be required. If the space is under construction, what is the projected occupancy date? If the space is planned, indicate campus-wide priority of the facility, capital outlay program priority, and projected date of occupancy.

The program will use the existing classroom space and new computer labs that are being developed. Since all students are going to be technology literate, some of the courses (or part if the courses) will be offered on-line. This would give the opportunity for local working professionals to participate in the program.

d. Additional library resources needed. Indicate the commitment of the campus to purchase or borrow through interlibrary loan these additional resources.

No additional library resources needed above the existing CSUCI Library acquisition program. The faculty is working with the Library staff to assure an appropriate level and subject distribution of library resources.

e. Additional equipment or specialized materials that will be (1) needed to implement the program and (2) needed during the first two years after initiation. Indicate the source of funds and priority to secure these resource needs.

No new needs beyond those planned during the development of the campus facilities.

5. Abstract of the Proposal and Proposed Catalog Description

MASTER OF SCIENCE in MATHEMATICS

Contact person: Ivona Grzegorczyk, Professor of Mathematics
Phone: (805) 437-8868   Fax: (805) 437-8864
Web Page: http://www.csuci.edu
Email: ivona.grze@csuci.edu

DEGREE OFFERED:
Master of Science in Mathematics

THE PROGRAM: The MS in Mathematics degree at Channel Islands offers latest, cutting edge education for various applied field and mathematics education. The program will prepare students for careers in high-tech, industries, businesses, education systems, military and local and federal government, where interdisciplinary, dynamic and innovative professionals with computational skills are increasingly sought. Students will be given a strong background in mathematics, as well as skills to conduct an independent applied or educational research. The program will stress interdisciplinary applications in other computational sciences, mathematics education and business.

CORE COURSES (11 Units)

Choose 3 courses from the following list:

MATH 510 Probabilistic Methods And Measure Theory (3)
MATH 511 Functional Analysis (3)
COMP 510 Algorithms (3)
COMP 569 Artificial Intelligence (3)
PHYS 510 Advanced Image Analysis Techniques (3)

Required two units:

Math 599 Graduate Seminar (1)

ELECTIVES (15 Units) *

Choose 5 Electives from the following list (at least 3 courses in Mathematics):

COMP	520	3	Advanced Database Systems
COMP	524	3	Security
COMP	529	3	Network Computing
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Math   598   Master Project

   TOTAL CREDITS: 32 units