MATHEMATICAL, INFORMATION AND COMPUTER SCIENCES
APC SUBMISSION
FALL OF 2010 FOR 2011-12 ACADEMIC YEAR

ACTION ITEMS/SUBSTANTIVE CHANGES:

Proposal I:	To drop CSC132 (2) Introduction to Computer Science
Proposal II:	To drop ISS232 (2) Introduction to Computer Information Systems
Proposal III:	To add CSC133 (3) Introduction to Computer Science and Information Systems
Proposal IV:	To add CSC131 (1) Introduction to Information Systems (cross listed as the 2nd quad of CSC133)
Proposal V:	To drop CSC142 (2) Introduction to Computer Programming
Proposal VI:	To add CSC143 (3) Introduction to Computer Programming
Proposal VII:	To drop CSC154 (4) Fundamentals of Computer Science
Proposal VIII:	To add CSC153 (3) Fundamentals of Computer Science
Proposal IX:	To drop CSC373 (3) Computer Networking and ISS381 (1) Telecommunications
Proposal X:	To add CSC374 (4) Computer Networking and Security
Proposal XI:	To drop CSC494 (4) Software Project
Proposal XII:	To add CSC493 (3) Software Project
Proposal XIII:	To drop ISS312 (2) Operating Systems for Computer Information Systems
Proposal XIV:	To drop MTH232 (2) Linear Algebra
Proposal XV:	To drop MTH312 (2) Advanced Linear Algebra
Proposal XVI:	To add MTH233 (3) Linear Algebra
Proposal XVII:	To drop MTH334 (4) Applied Mathematics
Proposal XVIII:	To add MTH333 (3) Differential Equations
Proposal XIX:	To add MTH373 (3) Mathematical Modeling
Proposal XX:	To drop MTH344 (4) Discrete Mathematics
Proposal XXI:	To add MTH343 (3) Discrete Mathematics
Proposal XXII:	To drop CSC252 (2) Data Structures with Programming from the list of requirements for a BS degree in Math
Proposal XXIII:	To add CSC254 (4) Data Structures with Algorithms to the list of requirements for a BS degree in Math
Proposal XXIV:	To drop MTH412 (2) Complex Analysis
Proposal XXV:	To add MTH413 (3) Complex Analysis
Proposal XXVI:	To drop MTH121 (1) Graphical and Numerical Calculus
Proposal XXVII:	To add MTH121 (1) Calculus and Modeling
Proposal XXVIII:	To drop MTH432 (2) Real Analysis II and MTH452 (2) Abstract Algebra II
Proposal XXIX:	To drop CSC161 (1) Presentation Technology and CSC171 (1) Internet Ethics, Research and Publishing
Proposal XXX:	To rearrange topics in MTH164 (4) Calculus I and MTH174 (4) Calculus II to allow the Maple lab component to be moved from MTH164 to MTH174
Proposal XXXI:	To change the calculus requirement for the BS in CIS from MTH144 and MTH131 or MTH164 to MTH144 or MTH164
Proposal XXXII:	To add ISS242 (2) Visual Programming for Business Applications to the list of possible electives for the BS and BA in CS
Proposal XXXIII:	To substitute MTH373 (3) Mathematical Modeling for MTH334 (4) Applied Mathematics in the list of electives for the BA and BS in CS
Proposal XXXIV:	To add MTH362 (2) Calculus Based Statistics to the list of electives for a Minor in Math

Proposal XXXV:	To change the BS in Computer Information Systems to align with the curricular changes
Proposal XXXVI:	To drop the BA degree in Computer Information Systems
Proposal XXXVII:	To change the BS and BA in Computer Science to align with the curricular changes
Proposal XXXVIII:	To change the BS and BA in Mathematics to align with the curricular changes
Proposal XXXIX:	To change the Minor in Computer Information Systems to align with the curricular changes
Proposal XL:	To change the Minor in Computer Science to align with the curricular changes
Proposal XLI:	To change the Minor in Mathematics to align with the curricular changes

GLOBAL RATIONALE INFORMATION

The curricular changes proposed in this document are the result of a year-long program review process in the Department of Mathematical, Information and Computer Sciences (MICS). Several of the questions posed by the APC template can be answered a single time for all items in the proposal.

1. How has assessment data informed the proposed change and how recently has your department or school completed a program review? For example, have alumni, outside reviewers, etc., suggested improvements?

   MICS was the department which piloted the new Program Review (the links to our program review can be found on our home page www.pointloma.edu/mics). Phase I of the Program Review can be found at: https://portal.pointloma.edu/web/mathematical-information-and-computer-sciences/programreviewi and Phase II of the Program Review can be found at: https://portal.pointloma.edu/web/mathematical-information-and-computer-sciences/programreviewii. These two documents are web based and thus all the appendices are linked into the body of the document at the appropriate locations. The review involved a complete curriculum review and the involvement of all faculty, as well as participation by students and alumni. The program review also contains the comments of two external reviewers and the department's response to those comments.

2. What are comparable universities and colleges doing?
3. Is the change related to stipulations imposed by outside accrediting agencies (addressing standards, etc.)?

   While we do not have any external accrediting agencies involved in the disciplines in our department, there are guild standards. It is those standards that we used to review our curriculum. The Association of Computing Machinery and the Mathematical Association of America provide standards that are used by virtually all colleges and universities in the US. These standards are motivation for some of our curricular changes. To see the standards and how our old and proposed curriculum align to the standards please see the relevant appendices in Phase II of our Program Review.
   Proposed Computer Information Systems Curriculum
   https://portal.pointloma.edu/c/document_library/get_file?p_l_id=56493&groupId=11298&folderId=73946&name=DLFE-4118.pdf
   Proposed Computer Science Curriculum
   https://portal.pointloma.edu/c/document_library/get_file?p_l_id=56493&groupId=11298&folderId=73946&name=DLFE-4131.pdf
   Proposed Mathematics Curriculum
   https://portal.pointloma.edu/c/document_library/get_file?p_l_id=56493&groupId=11298&folderId=73946&name=DLFE-4132.pdf

   In addition, the changes in our curriculum follow some new guild suggestions for changes in pedagogy in our disciplines.

4. How does the proposed change relate to the mission of the university?

   The proposed changes update our curriculum and involve students more deeply in the applications (uses) of mathematics, computer science and computer information systems to solve problems in new fields. This equips our students to have more ways that they can serve the common good through their academic disciplines.

5. How does the change accommodate the department or school's learning outcomes for the major, minor, concentration, etc.? For instance, does the change help balance out the curriculum, or does it fill in a missing gap that would help strengthen the program? Does it add breadth or depth, etc.?

   As can be seen in the Program Review, we have a curriculum map for every major in our department (for both the old and the proposed curriculum). The curriculum maps for the proposed curriculum can be found at:
   Computer Information Systems
   https://portal.pointloma.edu/c/document_library/get_file?p_l_id=56493&groupId=11298&folderId=73946&name=DLFE-4141.pdf
   Computer Science
   https://portal.pointloma.edu/c/document_library/get_file?p_l_id=56493&groupId=11298&folderId=73946&name=DLFE-4142.pdf
   Mathematics
   https://portal.pointloma.edu/c/document_library/get_file?p_l_id=56493&groupId=11298&folderId=73946&name=DLFE-4143.pdf

   The curriculum was modified to support our learning outcomes as well as align with changing national standards. We also want to strengthen the mathematical and computational modeling ability of our students.

6. What impact will it have on the size of the major, minor, etc.?

   As can be seen in the Proposals XXX – XXXV, the size of the majors and minors remains the same.

7. Will the change(s) be sustainable with human and financial resources?

   As can be seen by the course rotation at the end of this document, this proposal maintains the same teaching load in our department as we have been carrying in the past. You will note that we are showing a teaching load that is 6.5 units per year (13 units for a two year cycle of courses) lower than what we are currently teaching. However, our curricular changes are coming in two phases. This year's proposal reflects the majority of the changes; however we are working collaboratively in Rohr Science on the creation of a minor in Computational Science (see Phase II of the Program Review for details). It is expected that we will use the 13 units to create 3-4 new courses to support the minor that will be taken by MICS students as well as student in Biology, Chemistry and Physics.

8. State other rationale that you deem appropriate.

   Our changes have been supported by the external reviewers for our program.

Recorded Department/School Vote:
The changes were approved unanimously. We built the new curriculum for all majors collaboratively.

Library Impact:
No new holdings or services will be required to sustain these changes.

Technology Impact:
No additional software or computer lab usage will be necessary to sustain these changes.

Total course additions: 12

Total course deletions: 17

Total unit additions: 33

Total unit deletions: 38

Staffing impact/increase or decrease: None

To see a full explanation of the unit impact see the analysis at the end of this document.
Two year total of units (old): 404
Two year total of units (proposed curriculum): 391
Two year unit savings (to be used in course development): 13

Note that some of the units freed up by this change will be used in the development of our minor in Computational Science (to be submitted in the Fall of 2011)

DETAILED INFORMATION ABOUT THE PROPOSALS

Proposal I: **To drop CSC132 (2) Introduction to Computer Science**
Proposal II: **To drop ISS232 (2) Introduction to Computer Information Systems**
Proposal III: **To add CSC133 (3) Introduction to Computer Science and Information Systems**
Proposal IV: **To add CSC131 (1) Introduction to Information Systems (cross listed as the 2nd quad of CSC133)**
Unit change: -4 +3 = -1 (on an annual basis)

Rationale:
This collection of four proposals represents a change in our department curriculum to do two things:

- Expose both Computer Science and Computer Information Systems students to both fields in the freshman year. Many freshmen do not know the differences between the two fields and have chosen between them in a somewhat random fashion.
- Create greater efficiency in our curriculum. ISS232 has historically had low enrollments that do not justify teaching a two unit class annually to approximately 4-5 students.

Because CSC133 is a somewhat different class from what is typically available at a community college (CIS is often not combined with CS), we are creating CSC131 as a bridge class for those students. They will take the second quad of CSC133. Thus the class is cross listed with CSC133 and will require no additional faculty resources to teach. We have roughly 1-2 students per year that would need this class.

Catalog Copy and Learning Outcomes:

	CSC 131 (1) INTRODUCTION TO INFORMATION SYSTEMS An overview of the field of computer information systems. Topics will include networks and the internet, information security, databases, ethics, and information systems in business. Lecture two hours and laboratory two hours each week. Offered on a quad basis. *Prerequisite: Mathematics 113 (or equivalent).*
CSC 132 (2) INTRODUCTION TO COMPUTER SCIENCE An overview of the field of computer science, including computer architecture, operating systems and networks, algorithms, programming languages, software engineering, and the theory of computation. Lecture two hours and laboratory four hours each week. Offered on a Quad basis. *Prerequisite: Mathematics 113 (or equivalent).*	**CSC 133 (3) INTRODUCTION TO COMPUTER SCIENCE AND INFORMATION SYSTEMS** An overview of the fields of computer science and computer information systems. Topics will include scripting, algorithm development and efficiency, boolean logic and gates, computer organization, operating systems, networks and the internet, information security, ecommerce, databases, ethics, information systems in business, and enterprise architectures. Lecture two hours and laboratory two hours each week. *Prerequisite: Mathematics 113 (or equivalent).*
ISS 232 (2) INTRODUCTION TO COMPUTER INFORMATION SYSTEMS This course is an overview of the field of computer information systems and is intended to give the student a summary of the topics to be covered in the CIS major. The topics covered include an introduction to the computer-based information systems, computer hardware and software, and successful management of information systems. *Prerequisite: Computer Science 154.*	This course is being eliminated from the curriculum and key topics are being added to CSC133 (see above)

Learning Outcomes for CSC133:

- Students will understand the theory of algorithms and computation.
- Students will understand basic business principles as they relate to information management.
- Students will understand the interaction between hardware and software.
- Students will gain an understanding of, and appreciation for, the historical development, contemporary progress, and societal role of computer science and computer information systems.

Learning Outcomes for CSC131:

- Students will understand basic business principles as they relate to information management.
- Students will understand the interaction between hardware and software.
- Students will gain an understanding of, and appreciation for, the historical development, contemporary progress, and societal role of computer science and computer information systems.

Proposal V: **To drop CSC142 (2) Introduction to Computer Programming**
Proposal VI: **To add CSC143 (3) Introduction to Computer Programming**
Proposal VII: **To drop CSC154 (4) Fundamentals of Computer Science**
Proposal VIII: **To add CSC153 (3) Fundamentals of Computer Science**

Unit change: -6 +6 = 0 (on an annual basis)

Rationale:
This collection of four proposals represents a change in our department curriculum to rearrange content in our introductory programming classes. As we work on a Computational Science minor this shift will allow students in the sciences to develop fundamental programming skills by taking 3 units of programming (CSC143), this is not something that we could have accomplished in the 2 units of CSC142.

Catalog Copy and Learning Outcomes:

CSC 142 (2) INTRODUCTION TO COMPUTER PROGRAMMING Introduces the syntax of a high level programming language with emphasis on the programming environment and the use of the constructs of the language to write simple application programs. Lecture two hours and laboratory four hours each week. Offered on a Quad basis. *Prerequisite: Mathematics 113 (or equivalent).*	**CSC 143 (3) INTRODUCTION TO COMPUTER PROGRAMMING** Introduces the syntax of a high level programming language with emphasis on the programming environment and the use of the constructs of the language to write simple application programs. Topics include data types, sequential, conditional, and iterative statements, arrays, applets, simple graphical animation, the use and design of objects, and I/O. Lecture two hours and laboratory two hours each week *Prerequisite: Mathematics 113 (or equivalent).*
CSC 154 (4) FUNDAMENTALS OF COMPUTER SCIENCE In the context of a modern programming language, such topics as problem solving strategies, basic data structures, and data and procedural abstraction are discussed. Programming problems involve game playing and the use of a graphical user interface. Lecture two hours and laboratory four hours each week. *Prerequisites: Computer Science 142 with a grade of C- or higher.*	**CSC 153 (3) FUNDAMENTALS OF COMPUTER SCIENCE** As a continuation of CSC 143, this course deals with more advanced computing constructs and ideas. Topics include multi-dimensional arrays, inheritance, polymorphism, exception handling and recursion. More advanced graphics and GUIs are discussed and implemented as well. Problem solving strategies are discussed, and in addition to the weekly lab projects, the student will complete a fairly sophisticated game-based project. Lecture two hours and laboratory four hours each week. *Prerequisites: Computer Science 143 with a grade of C- or higher.*

Learning Outcomes CSC143:

- Students will be able to write correct and robust software.
- Students will understand the interaction between hardware and software.
- Students will be able to apply their technical knowledge to solve problems.
- Students will have experience in working as part of a team.

Learning Outcomes CSC153:

- Students will be able to write correct and robust software.
- Students will understand the interaction between hardware and software.
- Students will be able to apply their technical knowledge to solve problems.
- Students will be able to speak and write about their work with precision, clarity and organization .

Proposal IX: **To drop CSC373 (3) Computer Networking and ISS381 (1) Telecommunications**
Proposal X: **To add CSC374 (4) Computer Networking and Security**

Unit change: -3-1 +4 = 0 (on an alternating year basis)

Rationale:
A review of our curriculum indicated that we were weak in the area of information security and that our computer networking class needed to be expanded to include additional information about security. Telecommunications is a specialized class in which very few students have enrolled. It is not considered a core competency in the guild standards and we do not have the faculty resources to teach this class.

Catalog Copy and Learning Outcomes:

CSC 373 (3) COMPUTER NETWORKING This course provides an introduction to modern computer network technologies. Students gain an understanding of networking fundamentals including layering and the OSI model, protocols, standards, and network services. LANS, MANS, WANS, Internet and wireless networks are covered. While theory is the focus of the class, some hands-on activities are included. Offered 2011-2012. *Prerequisite: Computer Science 154 and Junior standing.*	**CSC 374 (4) COMPUTER NETWORKING AND SECURITY** This course provides an introduction to modern computer network technologies. Students gain an understanding of networking fundamentals including layering and the OSI model, protocols, standards, and network services. LANS, MANS, WANS, Internet and wireless networks are covered. Network security will also be discussed. While theory is the focus of the class, some hands-on activities are included. Offered 2011-2012. *Prerequisite: Computer Science 153 and Junior standing.*
ISS 381 (1) TELECOMMUNICATIONS This course develops an awareness of how modern telecommunications systems are used to support organizational communication demand. Students gain knowledge of the issues related to the economics, design, and management of modern telecommunications systems. Topics include telecommunication technologies, standards, and industry regulations. Offered on a Quad basis. Offered 2011-2012. *Prerequisite: Computer Science 373.*	This course is being eliminated from the curriculum.

Learning Outcomes CSC374:

- Students will understand the interaction between hardware and software.

Proposal XI: **To drop CSC494 (4) Software Project**
Proposal XII: **To add CSC493 (3) Software Project**

Unit change: -4+3=-1 (on an alternating year basis, so -0.5 units per year)

Rationale:
After reviewing all that we needed to add to our Computer Science major to remain current with national standards, it became clear that we were going to have to reduce the number of units on a few courses to stay within the bounds of the definition for a BS at PLNU. This project based class has been reduced by a single unit and the projects assigned will be adjusted accordingly to fit into the allotted amount of units. One of the graduation requirements for all CS majors is the completion of a year-long honors project, a year-long service learning project, a year-long research project or an internship. For this reason we are not concerned about reducing this project class by a single unit.

Catalog Copy and Learning Outcomes:

CSC 494 (4) SOFTWARE PROJECT This course presents the student with a strong experience in software engineering. Students, working in teams, investigate, design, implement and present to their classmates a significant software project. The project should solve a significant, complex and generalizable problem, dealing with constraints and trade-offs in the solution. The course includes study of project management concerns such as planning, scheduling, and assessing progress. Offered 2010-2011. *Prerequisites: Computer Science 324 and Junior or Senior standing.*	**CSC 493 (3) SOFTWARE PROJECT** This course presents the student with a strong experience in software engineering. Students, working in teams, investigate, design, implement and present to their classmates a significant software project. The project should solve a significant, complex and generalizable problem, dealing with constraints and trade-offs in the solution. The course includes study of project management concerns such as planning, scheduling, and assessing progress. Offered 2012-2013. *Prerequisites: Computer Science 324 and Junior or Senior standing.*

Learning Outcomes CSC493:

- Students will be able to write correct and robust software.
- Students will be able to apply their technical knowledge to solve problems.
- Students will be able to speak and write about their work with precision, clarity and organization .
- Students will have experience in working as part of a team.

Proposal XIII: To drop ISS312 (2) Operating Systems for Computer Information Systems

Unit change: 0

Rationale:
ISS312 is the first quad of CSC314 (4) Operating Systems so it has been cross listed and thus had no impact in terms of load. Because we are eliminating the BA in Computer Information Systems (see Proposal XXXII), this class is no longer necessary.

Catalog Copy and Learning Outcomes:
N/A

Proposal XIV: **To drop MTH232 (2) Linear Algebra**
Proposal XV: **To drop MTH312 (2) Advanced Linear Algebra**
Proposal XVI: **To add MTH233 (3) Linear Algebra**

Unit change: -2-1+3=0 (note that MTH312 has been taught on an alternating year basis so annualized the change from dropping MTH312 is a reduction of 1 unit per year).

Rationale:
After reviewing curricular standards and ETS Major Field Test results, it became clear that we needed to add more information to the linear algebra class that all Math major take. In particular, students needed to see eigenvalues. Since MTH312 has been an elective, not all students have seen this material. The change reallocated units to accomplish this goal.

Catalog Copy and Learning Outcomes:

MTH 232 (2) LINEAR ALGEBRA A computational introduction to linear algebra with applications. A study of linear equations, matrix algebra, Euclidean spaces and subspaces supported by the use of a symbolic computer algebra system. Offered on a Quad basis. *Prerequisite: Mathematics 144 or 164.*	**MTH 233 (3) LINEAR ALGEBRA** A computational introduction to linear algebra with applications. A study of linear equations, matrix algebra, Euclidean spaces and subspaces, vector spaces, linear transformations, eigenvalues, eigenvectors, and inner products. *Prerequisite: Mathematics 144 or 164.*
MTH 312 (2) ADVANCED LINEAR ALGEBRA A continuation of Mathematics 232 with emphasis on the theory of vector spaces, linear transformations, eigenvalues, eigenvectors and inner products. Offered on a Quad basis. Offered 2010-2011. *Prerequisite: Mathematics 232.*	This course is being eliminated from the curriculum in order to increase the number of units of linear algebra in MTH233.

Learning Outcomes MTH233:

- Students will be able to demonstrate facility with algebraic structures (Algebra thread).
- Students will be able to speak and write about their work with precision, clarity and organization.
- Students will have experience in working as part of a team.
- Students will gain an understanding of, and appreciation for, the historical development, contemporary progress, and societal role of mathematics.

Proposal XVII: **To drop MTH334 (4) Applied Mathematics (alternating year class)**
Proposal XVIII: **To add MTH333 (3) Differential Equations (annual class)**
Proposal XIX: **To add MTH373 (3) Mathematical Modeling (alternating year class)**

Unit change: -2+3+1.5=2.5 (MTH334 and MTH373 are alternating year classes so the units were annualized).

Rationale:
After reviewing curricular standards and ETS Major Field Test results, it became clear that we needed to add more applied mathematics topics into our curriculum. This led to a number of proposed curricular adjustments. We are eliminating MTH334 (4) Applied Mathematics which was a course that included differential equations and a small amount of mathematical modeling. We are replacing it with MTH333 Differential equations which will be taught annually to better meet the needs of the students in the Physics and Engineering Department. MTH373 Mathematical Modeling will be taught on an alternating year basis and will be a problem driven class that will expand the knowledge of our students in the area of applied mathematics.

Catalog Copy and Learning Outcomes:

	MTH333 (3) DIFFERENTIAL EQUATIONS Ordinary differential equations, solutions by analytical and numerical methods in the context of real world applications. A brief introduction to partial differential equations and Fourier series. *Prerequisite: Mathematics 274*
MTH 334 (4) APPLIED MATHEMATICS Ordinary differential equations, Laplace transformation, Fourier analysis, partial differential equations, optimization, and mathematical modeling. Offered 2010-2011. *Prerequisite: Mathematics 274.*	This course is being eliminated from the curriculum.
	MTH 373 (3) MATHEMATICAL MODELING A problem based course that explores mathematical modeling techniques using a variety of computational methods. Also examines how mathematics can be applied to answer specific questions. Includes problems from biology, chemistry, physics, business and other non-mathematical disciplines. Written report and oral presentation are required. *Prerequisite: Mathematics 274 and 382*

Learning Outcomes MTH333:
- Students will be comfortable using technology to solve problems.
- Students will be able to apply their mathematical knowledge to solve problems.

Learning Outcomes MTH373
- Students will be comfortable using technology to solve problems.
- Students will be able to apply their mathematical knowledge to solve problems.
- Students will gain an understanding of, and appreciation for, the historical development, contemporary progress, and societal role of mathematics.
- Students will be able to speak and write about their work with precision, clarity and organization.

Syllabus Outline
MTH333 (3) Differential Equations

Faculty Information

Text Information

Standard PLNU information for syllabi (academic accommodations, grading policies, etc)

Course Content:

- Ordinary differential equations
- Solutions to ordinary differential equations using analytical methods
- Solutions to ordinary differential equations using numerical methods
- Introduction to partial differential equations
- Introduction to Fourier series

Learning Outcomes:

- Students will be comfortable using technology to solve problems.
- Students will be able to apply their mathematical knowledge to solve problems.

Syllabus Outline
MTH373 (3) Mathematical Modeling

Faculty Information

Text Information

Standard PLNU information for syllabi (academic accommodations, grading policies, etc)

Course Content:
A problem based course that explores:

- Mathematical modeling techniques using a variety of computational methods
- How mathematics can be applied answer specific questions.
- How to convey information from the model in writing and oral presentation.

The class will include problems from biology, chemistry, physics, business and other non-mathematical disciplines.

Learning Outcomes:

- Students will be comfortable using technology to solve problems.
- Students will be able to apply their mathematical knowledge to solve problems.
- Students will gain an understanding of, and appreciation for, the historical development, contemporary progress, and societal role of mathematics.
- Students will be able to speak and write about their work with precision, clarity and organization

Proposal XX: **To drop MTH344 (4) Discrete Mathematics (alternating year)**
Proposal XXI: **To add MTH343 (3) Discrete Mathematics (alternating year)**
Proposal XXII: **To drop CSC252 (2) Data Structures with Programming from the list of requirements for a BS degree in Math (cross listed with first quad of CSC254)**
Proposal XXIII: **To add CSC254 (4) Data Structures with Algorithms to the list of requirements for a BS degree in Math**

Unit change: -4+3-0= -1 (on an alternating year basis, so -0.5 units annually)

Rationale:
After reviewing curricular standards and ETS Major Field Test results, it became clear that we needed to add more applied mathematics topics into our curriculum. This led to a number of proposed curricular adjustments. We are reducing our Discrete Mathematics course by one unit. This is possible because at the same time we are increasing the number of units of Data Structures that Math students must take. This allows us to remove some topics from Discrete Mathematics that are included in Data Structures and will reduce some redundancy for CS and CIS majors who must take both classes.

Catalog Copy and Learning Outcomes:

MTH 344 (4) DISCRETE MATHEMATICS Sets, functions, propositional logic and switching theory, graphs including trees, matrices, induction and proof by contradiction, combinatorics, and probability. Selected applications from computer science included. Offered 2011-2012. *Prerequisite: Mathematics 131 and 144 or 164.*	**MTH 343 (3) DISCRETE MATHEMATICS** Sets, functions, propositional logic and switching theory, graphs including trees, matrices, induction and proof by contradiction, combinatorics, and probability. Selected applications from computer science included. Offered 2011-2012. *Prerequisite: Mathematics 144 or 164.* --- *Note that the units are decreased by reducing the time on some topics because CSC254 will now be required of mathematics majors and it covers Boolean algebra and other topics in this class.*
CSC 252 (2) DATA STRUCTURES WITH PROGRAMMING This course introduces students to advanced programming concepts such as pointers and dynamic memory allocation necessary to implement elementary data structures such as stacks, queues, linked lists, hash tables, and binary search trees. Three lecture hours and two lab hours each week. Students who have taken Computer Science 254 may not take this class for credit. Offered on a Quad basis. *Prerequisite: Computer Science 154 with a grade of C- or higher.*	We expect to eliminate this class from the curriculum, but we want to gather data on student learning and scheduling before removing it from our course listing.
CSC 254 (4) DATA STRUCTURES AND ALGORITHMS Standard data structures, including queues, stacks, trees, and graphs, as objects are defined and illustrated with associated dynamic storage management mechanisms; computational complexity is explored through the design and analysis of searching, sorting, and graph algorithms. Lecture three hours and laboratory two hours each week. *Prerequisite: Computer Science 154 with a grade of C- or higher.*	**CSC 254 (4) DATA STRUCTURES AND ALGORITHMS** Standard data structures, including queues, stacks, trees, and graphs, as objects are defined and illustrated with associated dynamic storage management mechanisms; computational complexity is explored through the design and analysis of searching, sorting, and graph algorithms. Lecture three hours and laboratory two hours each week. *Prerequisite: Computer Science 153 with a grade of C- or higher.*

Learning Outcomes MTH343:

- Students will be able to apply their mathematical knowledge to solve problems.
- Students will be able to demonstrate facility with algebraic structures (Algebra thread).
- Students will be able to write and understand proofs.
- Students will understand the theory of algorithms and computation.

Proposal XXIV: To drop MTH412 (2) Complex Analysis
Proposal XXV: To add MTH413 (3) Complex Analysis

Unit change: -2+3-0= 1 (on an alternating year basis, so 0.5 units annually)

Rationale:
After reviewing curricular standards and ETS Major Field Test results, it became clear that we needed to add more applied mathematics topics into our curriculum. This led to a number of proposed curricular adjustments. We are increasing students exposure to Complex Analysis , a tool useful in solving a number of real world problems. The catalog copy has not changed, but this adjustment allows us sufficient time to cover the listed topics with appropriate depth.

Catalog Copy and Learning Outcomes:

MTH 412 (2) COMPLEX ANALYSIS Complex numbers, analytic functions, integration, series, contour integration, residues and conformal maps. Offered on a Quad basis. Offered 2011-2012. *Corequisite: Mathematics 274.*	**MTH 413 (3) COMPLEX ANALYSIS** Complex numbers, analytic functions, integration, series, contour integration, residues and conformal maps. Offered 2011-2012. *Corequisite: Mathematics 274.* *Note that the units are increased because we could not cover all this material in 2 units.*

Learning Outcomes MTH413:

- Students will be able to apply their mathematical knowledge to solve problems.

Proposal XXVI: **To drop MTH121 (1) Graphical and Numerical Calculus**
Proposal XXVII: **To add MTH121 (1) Calculus and Modeling (to be cross listed with MTH164)**

Unit change: -1+0=-1 (taught annually)

Rationale:
MTH121 is intended to be bridge class to help students who have received AP credit for Calculus I make the transition to college level mathematics. Recent research (see our Program Review) indicates that a bridge class built around modeling is the best preparation for Calculus II. To allow our students who are enrolled in Calculus I at PLNU (MTH164) to have the same modeling experience, MTH121 will serve as a lab for MTH164. This means that the classes will be cross listed and all students in both classes will meet together one day per week.

Catalog Copy and Learning Outcomes:

MTH 121 (1) GRAPHICAL AND NUMERICAL CALCULUS A refresher course to deepen the insights of calculus concepts for those taking Mathematics 131 after completing a calculus course. Graded Credit/No Credit. *Corequisite: Mathematics 131, and a score of 3 or more on AP 114 or AP 115 or credit for a calculus course from another institution.*	**MTH 121 (1) CALCULUS AND MODELING** An introduction to mathematical modeling using mathematical concepts from Calculus I. Graded Credit/No Credit. *Prerequisite: A score of 3 or more on AP 114 or AP 115 or credit for a calculus course from another institution.*

Learning Outcomes MTH121:

- Students will be able to demonstrate facility with analytical concepts (Real Analysis thread).
- Students will be able to demonstrate facility with algebraic structures (Algebra thread).
- Students will be able to apply their mathematical knowledge to solve problems.
- Students will be comfortable using technology to solve problems.

Proposal XXVIII: To drop MTH432 (2) Real Analysis II and MTH452 (2) Abstract Algebra II

Unit change: -2+-2=-4 (each taught on an alternating year basis, so the annual unit change is -2)

Rationale:
A review of the activities of peer schools (Calvin, Wheaton, Westmont and others) indicates that typical undergraduate programs are now including 4 units each of Real Analysis and Abstract Algebra rather than the 6 units of each that has been traditional. Our current curriculum requires students to take:

MTH424 (4) Real Analysis I
MTH444 (4) Abstract Algebra I
One of
MTH432 (2) Real Analysis II
MTH452 (2) Abstract Algebra II

Our proposed changes to just require 4 units of each is also substantiated by curriculum standards. We are going to make this reduction in our curriculum and then pay attention to our ETS Major Field test results to see if this reduction has any adverse effects on student learning outcomes.

Catalog Copy and Learning Outcomes:
N/A

Proposal XXIX: **To drop CSC161 (1) Presentation Technology and CSC171 (1) Internet Ethics, Research and Publishing**

Unit change: -1+-1=-2

Rationale:
These courses do not have the enrollments to justify teaching them. Often when we have offered them, we have had to cancel them because of the low number of students enrolled (e.g. Spring 2011 CSC161 has 2 students enrolled and will be cancelled).

Catalog Copy and Learning Outcomes:
N/A

Proposal XXX: **To rearrange topics in MTH164 (4) Calculus I and MTH174 (4) Calculus II to allow the Maple lab component to be moved from MTH164 to MTH174**

Unit change: 0 (taught annually)

Rationale:
After a number of years, we have come to the conclusion that having calculus students learn Maple (a specific symbolic manipulation software package) as part of MTH164 (4) Calculus I was creating a number of pedagogical challenges and frustrating the students. In addition, we have had to teach students who brought in AP credit for Calculus I the software in a one day per week lab (MTH131). We have come to the conclusion that it would be better for the students to learn this tool in the second semester of calculus, MTH174. In order to accomplish this, we have to move some topics from MTH174 back into MTH164. In doing this we are not stepping outside the norm of material taught in standard Calculus I and II classes and national standards. MTH131 will still be taught so that the rare student who does not need Calculus II (AP credit, community college credit or a few rare GE transfer situations) can take the one unit class. The prerequisite for MTH131 will be changed to reflect this curricular rearrangement.

Catalog Copy and Learning Outcomes:

MTH 131 (1) COMPUTER AIDED CALCULUS Introduction to the use of a computer algebra system to complement the knowledge of calculus. *Corequisite: Mathematics 144 or a score of 3 or higher on AP 114 or AP 115.*	**MTH 131 (1) COMPUTER AIDED CALCULUS** Introduction to the use of a computer algebra system to complement the knowledge of calculus. *Prerequisite: Mathematics 144, Mathematics 164 or a score of 3 or higher on AP 114 or AP 115.*
MTH 164 (4) CALCULUS I–GE Calculus of the elementary functions of one variable, supported by the use of computer graphics and a symbolic computer algebra system. Limits, continuity, derivatives, integration and applications. *Prerequisites: Mathematics 123 and 133, or equivalent.*	**MTH 164 (4) CALCULUS I–GE** Calculus of the elementary functions of one variable. Limits, continuity, derivatives, methods of integration and applications. *Prerequisites: Mathematics 123 or 133, or equivalent.*
MTH 174 (4) CALCULUS II A continuation of Calculus I. Methods of integration, sequences, series, elementary differential equations, polar coordinates and parametric equations. *Prerequisites: Mathematics 131 and 144 or 164.*	**MTH 174 (4) CALCULUS II** A continuation of Calculus I supported by the use of computer graphics and a symbolic computer algebra system. Methods of integration, sequences, series, elementary differential equations, polar coordinates and parametric equations. *Prerequisite: Mathematics 144 or 164.*

Learning Outcomes MTH164:

- Students will be able to demonstrate facility with analytical concepts (Real Analysis thread).
- Students will be able to demonstrate facility with algebraic structures (Algebra thread).
- Students will understand the theory of algorithms and computation .
- Students will be able to speak and write about their work with precision, clarity and organization.

Learning Outcomes MTH174:

- Students will be able to demonstrate facility with analytical concepts (Real Analysis thread).
- Students will be able to demonstrate facility with algebraic structures (Algebra thread).
- Students will understand the theory of algorithms and computation.
- Students will be comfortable using technology to solve problems.

Proposal XXXI: **To change the calculus requirement for the BS in CIS from MTH144 and MTH131 or MTH164 to MTH144 or MTH164**

Unit change: 0

Rationale:
MTH131 was formerly a component of MTH164 so in order for a student to be prepared for MTH174, the student needed to take MTH164, or MTH144 and MTH131. Now that MTH131 is becoming a component of MTH174, this requirement can be changed to MTH164 or MTH144.

Catalog Copy and Learning Outcomes:
N/A

Proposal XXXII: **To add ISS242 (2) Visual Programming for Business Applications to the list of possible electives for the BS and BA in CS**

Unit change: 0

Rationale:
This class in visual programming is required for our Computer Information Systems majors. The knowledge in it would make a suitable elective for our Computer Science majors and it was an editorial oversight that it has not been listed among the CS electives.

Catalog Copy and Learning Outcomes:

ISS 242 (2) Visual Programming for Business Applications
The course focuses on core concepts and features of Visual Basic programming, such as graphic user interface programming, object-oriented programming, event-driven programming, and web based programming. This class is built around programming real world business applications. Offered 2012-2013.
Prerequisite: Computer Science 153

Learning Outcomes ISS242:

- Students will be able to write correct and robust software.
- Students will be able to speak and write about their work with precision, clarity and organization.
- Students will be able to apply their technical knowledge to solve problems.

Proposal XXXIII: To substitute MTH373 (3) Mathematical Modeling for MTH334 (4) Applied Mathematics in the list of electives for the BA and BS in CS

Unit change: 0

Rationale:
MTH334 Applied Mathematics is being replaced by MTH333 Differential equations and MTH373 Mathematical Modeling. The mathematical modeling alternative provides background for a CS student interested in scientific computing.

Catalog Copy and Learning Outcomes:

MTH 373 (3) MATHEMATICAL MODELING
A problem based course that explores mathematical modeling techniques using a variety of computational methods. Also examines how mathematics can be applied to answer specific questions. Includes problems from biology, chemistry, physics, business and other non-mathematical disciplines. Written report and oral presentation are required.

Learning Outcomes MTH373

- Students will be comfortable using technology to solve problems.
- Students will be able to apply their mathematical knowledge to solve problems.
- Students will gain an understanding of, and appreciation for, the historical development, contemporary progress, and societal role of mathematics.
- Students will be able to speak and write about their work with precision, clarity and organization.

Proposal XXXIV: **To add MTH362 (2) Calculus Based Statistics to the list of electives for a Minor in Math**

Unit change: 0

Rationale:
We have a number of students in Biology and Chemistry who have chosen to earn a minor in mathematics. As part of the requirements for their major they must take MTH362 Calculus Based Statistics, a statistics class that focuses on scientific examples. Allowing this course to count toward the Math minor, makes it easier for the students to complete the necessary units for a minor.

Catalog Copy and Learning Outcomes:

MTH 362 (2) CALCULUS BASED STATISTICS
A first course in descriptive and inferential statistics for general students who have taken calculus. Topics include experimental design, sampling and sampling distributions, point estimation and hypothesis testing supported by the use of statistical software. Not applicable toward a major in Mathematics. Offered on a Quad basis.

Learning Outcomes MTH362

- Students will be comfortable using technology to solve problems.
- Students will be able to apply their mathematical knowledge to solve problems.
- Students will have experience in working as part of a team.

Proposal XXXV: **To change the BS in Computer Information Systems to align with the curricular changes**
Proposal XXXVI: **To drop the BA degree in Computer Information Systems**
Proposal XXXVII: **To change the BS and BA in Computer Science to align with the curricular changes**
Proposal XXXVIII: **To change the BS and BA in Mathematics to align with the curricular changes**

Unit change: The overall impact in terms of units can best be seen in the unit loading summary.

Rationale:
The Bachelor of Science is the core degree in our department. The BA degrees in our three majors are typically used by students who are either double majors or who have a significant emphasis outside the department that is preparing them for graduate school (e.g. pre-med or pre-law). We have not seen any significant interest in the BA in Computer Information Systems so we are eliminating that degree. The curriculum needs to be adjusted to reflect the changes. See the following pages for the new curriculum.

Computer Information Systems BS (Old)

LOWER-DIVISION REQUIREMENTS

COURSE	TITLE	UNITS
ISS 232	Introduction to Computer Information Systems	2
ISS 242	Visual Programming for Business Applications	2
CSC 132	Introduction to Computer Science	2
CSC 142	Introduction to Computer Programming	2
CSC 154	Fundamentals of Computer Science	4
CSC 254	Data Structures and Algorithms	4
MTH 164	Calculus I*	4
MTH 203	Introduction to Statistics	3
BUS 212	Principles of Management	4
ECO 102	Economics II (Microeconomics)	3
	TOTAL	**30-31**

Mathematics 144 and 131 may substitute for Mathematics 164

UPPER-DIVISION REQUIREMENTS

COURSE	TITLE	UNITS
ISS 324	Software Engineering	4
ISS 381	Telecommunications	1
ISS 414	Database Management Systems	4
ISS 424	Internet Applications Development	4
ISS 481	Senior Seminar in Computer Information Systems	1
CSC 314	Operating Systems	4
CSC 373	Computer Networking	3

Choose one sequence from:

ISS 472	Internship in Computer Information Systems	2
ISS 496 (2) *AND* ISS 497 (1)	Service Learning in Computer Information Systems I and II	3
ISS 498 (2) *AND* ISS 499 (1)	Independent Research in Computer Information Systems I and II	3
HON 498 (2) *AND* Honors 499 (1)	Honors Project I and II	3

Computer Information Systems BS

LOWER-DIVISION REQUIREMENTS

COURSE	TITLE	UNITS
ISS 242	Visual Programming for Business Applications	2
CSC 133	Introduction to Computer Science and Information Systems	3
CSC 143	Introduction to Computer Programming	3
CSC 153	Fundamentals of Computer Science	3
CSC 254	Data Structures and Algorithms	4
MTH 164	Calculus I*	4
MTH 203	Introduction to Statistics	3
BUS 212	Principles of Management	4
ECO 102	Economics II (Microeconomics)	3
	TOTAL (7 of these units GE)	29

Mathematics 144 may substitute for Mathematics 164

UPPER-DIVISION REQUIREMENTS

COURSE	TITLE	UNITS
ISS 324	Software Engineering	4
ISS 414	Database Management Systems	4
ISS 424	Internet Applications Development	4
ISS 481	Senior Seminar in Computer Information Systems	1
CSC 314	Operating Systems	4
CSC 374	Computer Networking and Security	4

Choose one sequence from:

ISS 472	Internship in Computer Information Systems	2
ISS 496 & ISS 497	Service Learning in Computer Information Systems I (2) and II (1)	3
ISS 498 & ISS 499	Independent Research in Computer Information Systems I (2) and II (1)	3
HON 498 & HON 499	Honors Project I (2) and II (1)	3

CIS BS (old) (continued)

7-8 additional units chosen from:

ISS 472	Internship in Computer Information Systems	2
ISS 496	Service Learning in Computer Information Systems I	2
ISS 497	Service Learning in Computer Information Systems II	1
ISS 498	Independent Research in Computer Information Systems I	2
ISS 499	Independent Research in Computer Information Systems II	1
CSC 412	Topics in Computer Science	2
CSC 494	Software Project	4
ACC 201	Principles of Financial Accounting	4
BUS 201	Legal Environment of Business	4
BUS 313	Administrative Communication	4
BUS 332	Principles of Marketing	4
BUS 374	Industrial Organizational Psychology/Human Resources	4
HON 498	Honors Project I	2
HON 499	Honors Project II	1
	TOTAL	**31**
	Total Units in Major (7 GE units)	**62**

Note: An elective class may not count as both upper-division core and a required "additional elective."

New CIS BS (continued)

5-6 additional units chosen from:

ISS 472	Internship in Computer Information Systems	2
ISS 496 & ISS 497	Service Learning in Computer Information Systems I (2) and II (1)	3
ISS 498 & ISS 499	Independent Research in Computer Information Systems I (2) and II (1)	3
CSC 412	Topics in Computer Science	2
CSC 493	Software Project	3
ACC 201	Principles of Financial Accounting	4
BUS 201	Legal Environment of Business	4
BUS 313	Administrative Communication	4
BUS 332	Principles of Marketing	4
BUS 374	Industrial Organizational Psychology/Human Resources	4
HON 498 & HON 499	Honors Project I (2) and II (1)	3
	TOTAL	**29**

Total units for major 58 (51 without GE).

Max units for BS is 59 without GE classes.

Computer Science BS (old)

LOWER-DIVISION REQUIREMENTS

COURSE	TITLE	UNITS
CSC 132	Introduction to Computer Science	2
CSC 142	Introduction to Computer Programming	2
CSC 154	Fundamentals of Computer Science	4
CSC 254	Data Structures and Algorithms	4
MTH 164	Calculus I	4
MTH 174	Calculus II	4
	TOTAL	**20**

UPPER-DIVISION REQUIREMENTS

COURSE	TITLE	UNITS
CSC 314	Operating Systems	4
CSC 324	Software Engineering	4
CSC 354	Design and Analysis of Algorithms	4
CSC 394	Programming Languages	4
CSC 412	Topics in Computer Science	2
CSC 422	Theory of Computation	2
CSC 454	Computer Architecture and Assembly Language	4
CSC 481	Senior Seminar in Computer Science	1
CSC 494	Software Project	4
MTH 344	Discrete Mathematics	4
Choose one sequence from:		
CSC 496 (2) *AND* CSC 497 (1) Service Learning in Computer Science I and II		3
CSC 498 (2) *AND* CSC 499 (1) Independent Research in Computer Science I and II		3
ISS 472	Internship in Computer Information Systems	2
HON 498 (2) *AND* HON 499 (1) Honors Project I and II		3

Computer Science BS

LOWER-DIVISION REQUIREMENTS

COURSE	TITLE	UNITS
CSC 133	Introduction to Computer Science and Information Systems	3
CSC 143	Introduction to Computer Programming	3
CSC 153	Fundamentals of Computer Science	3
CSC 254	Data Structures and Algorithms	4
MTH 164	Calculus I	4
MTH 174	Calculus II	4
	TOTAL (4 units GE)	21

UPPER-DIVISION REQUIREMENTS

COURSE	TITLE	UNITS
CSC 314	Operating Systems	4
CSC 324	Software Engineering	4
CSC 354	Design and Analysis or Algorithms	4
CSC 374	Computer Networking and Security	4
CSC 394	Programming Languages	4
CSC 412	Topics in Computer Science	2
CSC 422	Theory of Computation	2
CSC 454	Computer Architecture and Assembly Language	4
CSC 481	Senior Seminar in Computer Science	1
CSC 493	Software Project	3
MTH 343	Discrete Mathematics	3
	Choose one sequence from:	
CSC 496 & CSC 497	Service Learning in Computer Science I (2) and II (1)	3
CSC 498 & CSC 499	Independent Research in Computer Science I (2)and II (1)	3
ISS 472	Internship in Computer Information Systems	2
HON 498 & HON 499	Honors Project I (2) and II (1)	3

CS BS (old) (continued)

7-8 additional units chosen from:

CSC 373	Computer Networking	3
CSC 412	Topics in Computer Science	2
CSC 491	Independent Study in Computer Science	1-4
CSC 496	Service Learning in Computer Science I	2
CSC 497	Service Learning in Computer Science II	1
CSC 498	Independent Research in Computer Science I	2
CSC 499	Independent Research in Computer Science II	1
ISS 414	Data Base Management Systems	4
ISS 424	Internet Applications Development	4
ISS 472	Internship in Computer Information Systems	2
MTH 203	Introduction to Statistics *	3
MTH 232	Linear Algebra	2
MTH 274	Calculus III	4
MTH 312	Advanced Linear Algebra	2
MTH 334	Applied Mathematics	4
MTH 382	Mathematical Statistics*	2
MTH 392	Mathematical Probability	2
HON 498	Honors Project I	2
HON 499	Honors Project II	1
	TOTAL	**43**

** Only one of these two courses may apply as a Computer Science elective, not both.*
Note: An elective class may not count as both upper-division core and a required "additional elective."

New CS BS (continued)

4-5 additional units chosen from:

CSC 412	Topics in Computer Science	2
CSC 491	Independent Study in Computer Science	1-4
CSC 496 & CSC 497	Service Learning in Computer Science I (2) and II (1)	3
CSC 498 & CSC 499	Independent Research in Computer Science I (2)and II (1)	3
ISS 242	Visual Programming for Business Applications	2
ISS 414	Database Management Systems	4
ISS 424	Internet Applications Development	4
ISS 472	Internship in Computer Information Systems	2
MTH 203	Introduction to Statistics*	3
MTH 232	Linear Algebra	2
MTH 274	Calculus III	4
MTH 373	Mathematical Modeling	3
MTH 382	Mathematical Statistics*	2
MTH 392	Mathematical Probability	2
HON 498 & HON 499	Honors Project I (2) and II (1)	3
	TOTAL	**42**

Total units 63 (59 without GE).

Max units for BS is 59 without GE classes.

** Only one of these two courses may apply as a Computer Science elective, not both.*
Note: An elective class may not count as both upper-division core and a required "additional elective."

CS BS (old) (continued)

Recommended Electives for Computer Science Tracks

Graduate School: Calculus III, Computer Networking, Introduction to Statistics or Mathematical Probability and Mathematical Statistics.

Industry - Business Application Development: Database Management Systems, Internet Application Development, Internship in Computer Information Systems or work experience as a student programmer.

Industry - Technical Computing Fields (e.g., scientific programming, aerospace, game development): Calculus III, Linear Algebra, University Physics, Internship in Computer Information Systems or work experience as a student programmer.

New CS BS (continued)

Recommended Electives for Computer Science Tracks

Graduate School: Calculus III, Introduction to Statistics or Mathematical Probability and Mathematical Statistics, Honors Project or Independent Research in Computer Science.

Industry - Business Application Development: Database Management Systems, Internet Application Development, Internship in Computer Information Systems or work experience as a student programmer.

Industry - Technical Computing Fields (e.g., scientific programming, aerospace, game development): Calculus III, Linear Algebra, University Physics, Internship in Computer Information Systems or work experience as a student programmer.

Computer Science BA (old)

LOWER-DIVISION REQUIREMENTS

COURSE	TITLE	UNITS
CSC 132	Introduction to Computer Science	2
CSC 142	Introduction to Computer Programming	2
CSC 154	Fundamentals of Computer Science	4
CSC 254	Data Structures and Algorithms	4
MTH 164	Calculus I *	4
MTH 174	Calculus II *	4
	TOTAL	**17-20**

Mathematics 144 and 131 may substitute for the sequence Mathematics 164 and Mathematics 174.

UPPER-DIVISION REQUIREMENTS

COURSE	TITLE	UNITS
CSC 314	Operating Systems	4
CSC 324	Software Engineering	4
CSC 354	Design and Analysis of Algorithms	4
CSC 394	Programming Languages	4
CSC 454	Computer Architecture and Assembly Language	4
CSC 481	Senior Seminar in Computer Science	1
MTH 344	Discrete Mathematics	4
Choose one sequence from:		
CSC 496 (2) *AND* CSC 497 (1) Service Learning in Computer Science I and II		3
CSC 498 (2) *AND* CSC 499 (1) Independent Research in Computer Science I and II		3
ISS 472	Internship in Information Systems	2
HON 498 (2) *AND* HON 499 (1) Honors Project I and II		3

Computer Science BA

LOWER-DIVISION REQUIREMENTS

COURSE	TITLE	UNITS
CSC 133	Introduction to Computer Science and Information Systems	3
CSC 143	Introduction to Computer Programming	3
CSC 153	Fundamentals of Computer Science	3
CSC 254	Data Structures and Algorithms	4
MTH 164	Calculus I*	4
MTH 174	Calculus II*	4
	*MTH 144 may substitute for this sequence	
	TOTAL (4 units GE)	17-21

UPPER-DIVISION REQUIREMENTS

COURSE	TITLE	UNITS
CSC 314	Operating Systems	4
CSC 324	Software Engineering	4
CSC 354	Design and Analysis or Algorithms	4
CSC 394	Programming Languages	4
CSC 454	Computer Architecture and Assembly Language	4
CSC 481	Senior Seminar in Computer Science	1
MTH 343	Discrete Mathematics	3
	Choose one sequence from:	
CSC 496 & CSC 497	Service Learning in Computer Science I (2) and II (1)	3
CSC 498 & CSC 499	Independent Research in Computer Science I (2)and II (1)	3
ISS 472	Internship in Computer Information Systems	2
HON 498 & HON 499	Honors Project I (2) and II (1)	3

CS BA (old) (continued)

2-3 additional units chosen from:

COURSE	TITLE	UNITS
CSC 412	Topics in Computer Science	2
CSC 422	Theory of Computation	2
CSC 491	Independent Study in Computer Science	1-4
CSC 494	Software Project	4
CSC 496	Service Learning in Computer Science I	2
CSC 497	Service Learning in Computer Science II	1
CSC 498	Independent Research in Computer Science I	2
CSC 499	Independent Research in Computer Science II	1
ISS 414	Data Base Management Systems	4
ISS 424	Internet Applications Development	4
ISS 472	Internship In Computer Information Systems	2
MTH 203	Introduction to Statistics*	3
MTH 232	Linear Algebra	2
MTH 274	Calculus III	4
MTH 312	Advanced Linear Algebra	2
MTH 334	Applied Mathematics	4
MTH 382	Mathematical Statistics*	2
MTH 392	Mathematical Probability	2
HON 498	Honors Project I	2
HON 499	Honors Project II	1
	TOTAL	**30**
	Total units	**47-50**

** Only one of these two courses may apply as a Computer Science elective, not both.*
Note: An elective class may not count as both upper-division core and a required "additional elective."

New CS BA (continued)

3-4 additional units chosen from:

CSC 374	Computer Networking and Security	4
CSC 412	Topics in Computer Science	2
CSC 422	Theory of Computation	2
CSC 491	Independent Study in Computer Science	1-4
CSC 493	Software Project	3
CSC 496 & CSC 497	Service Learning in Computer Science I (2) and II (1)	3
CSC 498 & CSC 499	Independent Research in Computer Science I (2) and II (1)	3
ISS 242	Visual Programming for Business Applications	2
ISS 414	Database Management Systems	4
ISS 424	Internet Applications Development	4
ISS 472	Internship in Computer Information Systems	2
MTH 203	Introduction to Statistics*	3
MTH 232	Linear Algebra	2
MTH 274	Calculus III	4
MTH 373	Mathematical Modeling	3
MTH 382	Mathematical Statistics*	2
MTH 392	Mathematical Probability	2
HON 498 & HON 499	Honors Project I (2) and II (1)	3
	***** Only one of these may be taken	
	TOTAL	**30**

Total units 47-51 (43-47 without GE).
Max units for BA is 48 without GE classes.

** Only one of these two courses may apply as a Computer Science elective, not both.*
Note: An elective class may not count as both upper-division core and a required "additional elective."

Mathematics BS (old)

LOWER-DIVISION REQUIREMENTS

COURSE	TITLE	UNITS
MTH 164	Calculus I	4
MTH 174	Calculus II	4
MTH 232	Linear Algebra	2
MTH 242	Number Theory with Proofs	2
MTH 274	Calculus III	4
CSC 142	Introduction to Computer Programming	2
CSC 154	Fundamentals of Computer Science	4
CSC 252	Data Structures with Programming	2
PHY 241	University Physics I	4
	TOTAL	**28**

UPPER-DIVISION REQUIREMENTS

COURSE	TITLE	UNITS
MTH 352	History of Mathematics	2
MTH 382	Mathematical Statistics	2
MTH 424	Real Analysis I	4
MTH 432	Real Analysis II	2
	OR	
MTH 452	Abstract Algebra II	2
MTH 444	Abstract Algebra I	4
MTH 481	Senior Seminar in Mathematics	1
MTH 492	Special Topics in Mathematics	2
Choose one course from:		
MTH 312	Advanced Linear Algebra	2
MTH 412	Complex Analysis	2
Choose one course from:		
MTH 334	Applied Mathematics	4
MTH 344	Discrete Mathematics	4
Choose one sequence from:		
MTH 496 (2) *AND* 497 (1) Service Learning in Mathematics I and II		3
MTH 498 (2) *AND* 499 (1) Independent Research in Mathematics I and II		3
HON 498 (2) *AND* HON 499 (1) Honors Project I and II		3

Mathematics BS

LOWER-DIVISION REQUIREMENTS

COURSE	TITLE	UNITS
MTH 164	Calculus I	4
MTH 174	Calculus II	4
MTH 233	Linear Algebra	3
MTH 242	Number Theory with Proofs	2
MTH 274	Calculus III	4
CSC 143	Introduction to Computer Programming	3
CSC 153	Fundamentals of Computer Science	3
CSC 254	Data Structures with Programming	4
PHY 241	University Physics I	4
	TOTAL (8 units GE)	31

UPPER-DIVISION REQUIREMENTS

COURSE	TITLE	UNITS
MTH 352	History of Mathematics	2
MTH 333	Differential Equations	3
MTH 382	Mathematical Statistics	2
MTH 424	Real Analysis	4
MTH 444	Abstract Algebra	4
MTH 481	Senior Seminar in Mathematics	1
MTH 492	Special Topics in Mathematics	2
	Choose two courses from:	
MTH 343	Discrete Mathematics	3
MTH 373	Mathematical Modeling	3
MTH 413	Complex Analysis	3
	Choose one sequence from:	
MTH 496 & MTH 497	Service Learning in Mathematics I (2) and II (1)	3
MTH 498 & MTH 499	Independent Research in Mathematics I (2) and II (1)	3
HON 498 & HON 499	Honors Project I (2) and II (1)	3

Math BS (old) (continued)
Seven additional elective units from:

COURSE	TITLE	UNITS
MTH 312	Advanced Linear Algebra	2
MTH 334	Applied Mathematics	4
MTH 344	Discrete Mathematics	4
MTH 392	Mathematical Probability	2
MTH 402	Topics in Geometry	2
MTH 412	Complex Analysis	2
MTH 432	Real Analysis II	2
MTH 452	Abstract Algebra II	2
MTH 463	Secondary School Mathematics	3
MTH 471	History of Mathematics Study Tour	1
MTH 491	Independent Studies in Mathematics	1-4
MTH 492	Special Topics in Mathematics	2
MTH 496	Service Learning in Mathematics I	2
MTH 497	Service Learning in Mathematics II	1
MTH 498	Independent Research in Mathematics I	2
MTH 499	Independent Research in Mathematics II	1
HON 498	Honors Project I	2
HON 499	Honors Project II	1
	TOTAL	**32**

New Math BS (continued)
5 additional units chosen from:

MTH 343	Discrete Mathematics	3
MTH 373	Mathematical Modeling	3
MTH 392	Mathematical Probability	2
MTH 402	Topics in Geometry	2
MTH 413	Complex Analysis	3
MTH 463	Secondary School Mathematics	3
MTH 471	History of Mathematics Study Tour	1
MTH 491	Independent Studies in Mathematics	1-4
MTH 492	Special Topics in Mathematics	2
MTH 496 & MTH 497	Service Learning in Mathematics I (2) and II (1)	3
MTH 498 & MTH 499	Independent Research in Mathematics I (2) and II (1)	3
HON 498 & HON 499	Honors Project I (2) and II (1)	3
	TOTAL	**32**

Note: A student planning on going to graduate school is recommended to take 2 units of MTH491 that covers Real II or Abstract II.

Total units 63 (55 without GE)
Max units for BS is 59 without GE classes.

Math BS (old) (continued)

RECOMMENDED ELECTIVES FOR MATHEMATICS TRACKS:

Graduate School: Abstract Algebra II and Real Analysis II, Advanced Linear Algebra, Complex Analysis.
Teaching: The university's agreement with the State of California requires students seeking a Single Subject Teaching Credential in Mathematics to take Topics in Geometry, Mathematical Probability, Discrete Mathematics, Complex Analysis and Secondary School Mathematics. In addition, students must take Education 304, Legal, Ethical and Wesleyan Perspectives in Education. Education 402, Research-Based Learning Theory is also recommended.
Industry: Complex Analysis, Mathematical Probability, and Applied Mathematics.
Actuary: Mathematical Probability, Advanced Linear Algebra, and Discrete Mathematics.

New Math BS (continued)

RECOMMENDED ELECTIVES FOR MATHEMATICS TRACKS:

Graduate School: One semester of independent studying continuing Abstract Algebra or Real Analysis, Complex Analysis, Honors Project or Independent Research in Mathematics.
Teaching: The university's agreement with the State of California requires students seeking a Single Subject Teaching Credential in Mathematics to take Topics in Geometry, Mathematical Probability, Discrete Mathematics, Complex Analysis and Secondary School Mathematics. In addition, students must take Education 304, Legal, Ethical and Wesleyan Perspectives in Education. Education 402, Research-Based Learning Theory is also recommended.
Industry: Complex Analysis, Mathematical Probability, and Mathematical Modeling.
Actuary: Mathematical Probability, Discrete Mathematics, and Mathematical Modeling.

Mathematics BA (old)

LOWER-DIVISION REQUIREMENTS

COURSE	TITLE	UNITS
MTH 164	Calculus I	4
MTH 174	Calculus II	4
MTH 232	Linear Algebra	2
MTH 242	Number Theory with Proofs	2
MTH 274	Calculus III	4
CSC 142	Introduction to Computer Programming	2
CSC 154	Fundamentals of Computer Science	4
	TOTAL	**22**

UPPER-DIVISION REQUIREMENTS

COURSE	TITLE	UNITS
MTH 352	History of Mathematics	2
MTH 382	Mathematical Statistics	2
MTH 481	Senior Seminar in Mathematics	1
Choose one course from:		
MTH 424	Real Analysis I	4
MTH 444	Abstract Algebra I	4
Choose one course from:		
MTH 334	Applied Mathematics	4
MTH 344	Discrete Mathematics	4
Choose one sequence from:		
MTH 496 (2) *AND* MTH 497 (1) Service Learning in Mathematics I and II		3
MTH 498 (2) *AND* MTH 499 (1) Independent Research in Mathematics I and II		3
HON 498 (2) *AND* HON 499 (1) Honors Project I and II		3

Mathematics BA

LOWER-DIVISION REQUIREMENTS

COURSE	TITLE	UNITS
MTH 164	Calculus I	4
MTH 174	Calculus II	4
MTH 233	Linear Algebra	3
MTH 242	Number Theory with Proofs	2
MTH 274	Calculus III	4
CSC 143	Introduction to Computer Programming	3
CSC 153	Fundamentals of Computer Science	3
	TOTAL (4 units GE)	23

UPPER-DIVISION REQUIREMENTS

COURSE	TITLE	UNITS
MTH 352	History of Mathematics	2
MTH 382	Mathematical Statistics	2
MTH 481	Senior Seminar in Mathematics	1
	Choose one courses from:	
MTH 424	Real Analysis	4
MTH 444	Abstract Algebra	4
	Choose one courses from:	
MTH 343	Discrete Mathematics	3
MTH 373	Mathematical Modeling	3
MTH 413	Complex Analysis	3
	Choose one sequence from:	
MTH 496 & MTH 497	Service Learning in Mathematics I (2) and II (1)	3
MTH 498 & MTH 499	Independent Research in Mathematics I (2) and II (1)	3
HON 498 & HON 499	Honors Project I (2) and II (1)	3

Math BA (old) (continued)
Eight additional elective units from:

COURSE	TITLE	UNITS
MTH 312	Advanced Linear Algebra	2
MTH 334	Applied Mathematics	4
MTH 344	Discrete Mathematics	4
MTH 392	Mathematical Probability	2
MTH 402	Topics in Geometry	2
MTH 412	Complex Analysis	2
MTH 424	Real Analysis I	4
MTH 432	Real Analysis II	2
MTH 444	Abstract Algebra I	4
MTH 452	Abstract Algebra II	2
MTH 471	History of Mathematics Study Tour	1
MTH 491	Independent Study in Mathematics	1-4
MTH 492	Special Topics in Mathematics	2
MTH 496	Service Learning in Mathematics I	2
MTH 497	Service Learning in Mathematics II	1
MTH 498	Independent Research in Mathematics I	2
MTH 499	Independent Research in Mathematics II	1
HON 498	Honors Project I	2
HON 499	Honors Project II	1
	TOTAL	**24**

Note: An elective class may not count as both upper-division core and a required "additional elective."

New Math BA (continued)

8 additional units chosen from:

MTH 333	Differential Equations	3
MTH 343	Discrete Mathematics	3
MTH 373	Mathematical Modeling	3
MTH 392	Mathematical Probability	2
MTH 402	Topics in Geometry	2
MTH 413	Complex Analysis	3
MTH 463	Secondary School Mathematics	3
MTH 471	History of Mathematics Study Tour	1
MTH 491	Independent Studies in Mathematics	1-4
MTH 492	Special Topics in Mathematics	2
MTH 496 & MTH 497	Service Learning in Mathematics I (2) and II (1)	3
MTH 498 & MTH 499	Independent Research in Mathematics I (2) and II (1)	3
HON 498 & HON 499	Honors Project I (2) and II (1)	3
	TOTAL	**23**

Total units 46 (42 without GE)
Max units for BA is 48 without GE classes.

Proposal XXXIX: **To change the Minor in Computer Information Systems to align with the curricular changes**
Proposal XL: **To change the Minor in Computer Science to align with the curricular changes**
Proposal XLI: **To change the Minor in Mathematics to align with the curricular changes**

Unit change: The overall impact in terms of units can best be seen in the unit loading summary.

Rationale:
The curriculum needs to be adjusted to reflect small unit changes which were made to adjust to curricular changes. See the following pages for the new curriculum.

Computer Information Systems Minor (Old)
A minor in Computer Information Systems is offered to those who wish to complement study in another discipline. This minor is not available to students who earn a major in Computer Science.

REQUIRED COURSES

COURSE	TITLE	UNITS
ISS 232	Introduction to Computer Information Systems	2
ISS 242	Visual Programming for Business Applications	2
CSC 132	Introduction to Computer Science	2
CSC 142	Introduction to Computer Programming	2
CSC 154	Fundamentals of Computer Science	4
BUS 212	Principles of Management	4
Choose six additional units from:		
ISS 312	Operating Systems for Computer Information Systems	2
ISS 381	Telecommunications	1
ISS 414	Database Management Systems	4
ISS 472	Internship in Computer Information Systems	2
CSC 373	Computer Networking	3
	MINOR TOTAL	**22**

Computer Information Systems Minor

LOWER-DIVISION REQUIREMENTS

COURSE	TITLE	UNITS
ISS 242	Visual Programming for Business Applications	2
CSC 133	Introduction to Computer Science and Information Systems	3
CSC 143	Introduction to Computer Programming	3
CSC 153	Fundamentals of Computer Science	3
BUS 212	Principles of Management	4
	TOTAL	**15**

UPPER-DIVISION REQUIREMENTS

	Choose 8 additional units from:	
ISS 414	Database Management Systems	4
ISS 424	Internet Applications Development	4
ISS 472	Internship in Computer Information Systems	2
CSC 314	Operating Systems	4
CSC 374	Computer Networking and Security	4
CSC 412	Topics in Computer Science	2
CSC 493	Software Project	3
	TOTAL	**8**

Total units for minor 23

A minor in Computer Information Systems is offered to those who wish to complement study in another discipline. This minor is not available to students who earn a major in Computer Science.

Computer Science Minor (Old)
A minor in Computer Science is offered to those who wish to complement study in another discipline. This minor is not available to students who earn a major in Computer Information Systems.

LOWER-DIVISION REQUIREMENTS

COURSE	TITLE	UNITS
CSC 132	Introduction to Computer Science	2
CSC 142	Introduction to Computer Programming	2
CSC 154	Fundamentals of Computer Science	4
CSC 254	Data Structures and Algorithms	4
	TOTAL	**12**

UPPER-DIVISION REQUIREMENTS

COURSE	TITLE	UNITS
Choose 10 units from:		
CSC 314	Operating Systems	4
CSC 324	Software Engineering	4
CSC 334	Artificial Intelligence	4
CSC 354	Design and Analysis of Algorithms	4
CSC 373	Computer Networking	3
CSC 394	Programming Languages	4
CSC 412	Topics in Computer Science	2
CSC 454	Computer Architecture and Assembly Language	4
ISS 414	Data Base Management Systems	4
ISS 424	Internet Applications Development	4
	TOTAL	**10**
	MINOR TOTAL	**22**

Computer Science Minor

LOWER-DIVISION REQUIREMENTS

COURSE	TITLE	UNITS
CSC 133	Introduction to Computer Science and Information Systems	3
CSC 143	Introduction to Computer Programming	3
CSC 153	Fundamentals of Computer Science	3
CSC 254	Data Structures and Algorithms	4
	TOTAL	13

UPPER-DIVISION REQUIREMENTS

Choose 10 additional units from:

COURSE	TITLE	UNITS
CSC 314	Operating Systems	4
CSC 324	Software Engineering	4
CSC 354	Design and Analysis or Algorithms	4
CSC 374	Computer Networking and Security	4
CSC 394	Programming Languages	4
CSC 412	Topics in Computer Science	2
CSC 454	Computer Architecture and Assembly Language	4
ISS 414	Database Management Systems	4
ISS 424	Internet Applications Development	4
	***** Only one of these may be taken	
	TOTAL	**10**

Total units for minor 23

A minor in Computer Science is offered to those who wish to complement study in another discipline. This minor is not available to students who earn a major in Computer Information Systems.

Mathematics Minor (Old)

REQUIRED COURSES

COURSE	TITLE	UNITS
MTH 164	Calculus I	4
MTH 174	Calculus II	4
MTH 232	Linear Algebra	2
Choose 12 additional units from:		
MTH 242	Number Theory with Proofs	2
MTH 274	Calculus III	4
MTH 312	Advanced Linear Algebra	2
MTH 334	Applied Mathematics	4
MTH 344	Discrete Mathematics	4
MTH 352	History of Mathematics	2
MTH 382	Mathematical Statistics	2
MTH 392	Mathematical Probability	2
MTH 402	Topics in Geometry	2
MTH 412	Complex Analysis	2
MTH 424	Real Analysis I	4
MTH 432	Real Analysis II	2
MTH 444	Abstract Algebra I	4
MTH 452	Abstract Algebra II	2
MTH 471	History of Mathematics Study Tour	1
MTH 492	Special Topics in Mathematics	2
	MINOR TOTAL	**22**

Mathematics Minor

LOWER-DIVISION REQUIREMENTS

COURSE	TITLE	UNITS
MTH 164	Calculus I	4
MTH 174	Calculus II (pre-req MTH164)	4
MTH 233	Linear Algebra (pre-req MTH 164)	3
	TOTAL	11
	UPPER-DIVISION REQUIREMENTS	
	Choose 12 additional units from:	
MTH 242	Number Theory with Proofs (pre-req MTH164)	2
MTH 274	Calculus III (pre-req MTH174)	4
MTH 333	Differential Equations (pre-req MTH274)	3
MTH 343	Discrete Mathematics (pre-req MTH164)	3
MTH 352	History of Mathematics (pre-req MTH164)	2
MTH362	Calculus Based Statistics (pre-req MTH164)	2
MTH 373	Mathematical Modeling (pre-req MTH164 & MTH382 or MTH362)	3
MTH 382	Mathematical Statistics (pre-req MTH274)	2
MTH 392	Mathematical Probability (pre-req MTH382)	2
MTH 402	Topics in Geometry (pre-req MTH164)	2
MTH 413	Complex Analysis (pre-req MTH274)	3
MTH 424	Real Analysis (pre-req MTH242)	4
MTH 444	Abstract Algebra (pre-req MTH242)	4
MTH 471	History of Mathematics Study Tour (pre-req MTH164)	1
MTH 492	Special Topics in Mathematics (pre-req depends on topic)	2
	TOTAL	**13**

Total units 23

MATHEMATICAL, INFORMATION AND COMPUTER SCIENCES
APC SUBMISSION
FALL OF 2010 FOR 2011-12 ACADEMIC YEAR

NON ACTION OR PROCEDURAL CHANGES:

Proposal I:	To rename MTH424 (4) Real Analysis I to Real Analysis
Proposal II:	To rename MTH444 (4) Abstract Algebra I to Abstract Algebra
Proposal III:	To change the catalog description of MTH113 (3) Intermediate Algebra to more accurately reflect the content of the course.

Proposal I: **To rename MTH424 (4) Real Analysis I to Real Analysis**

Unit change: 0

Rationale:
We have removed Real Analysis II from the curriculum.

Catalog Copy and Learning Outcomes:
N/A

Proposal II: **To rename MTH444 (4) Abstract Algebra I to Abstract Algebra**

Unit change: 0

Rationale:
We have removed Abstract Algebra II from the curriculum.

Catalog Copy and Learning Outcomes:
N/A

Proposal III: **To change the catalog description of MTH113 (3) Intermediate Algebra to more accurately reflect the content of the course.**

Unit change: 0

Rationale:
One of our external reviewers pointed out that the course descriptions for MTH113 and MTH123 were not sufficiently distinct. We have made an editorial change in the course description for MTH113 to increase clarity.

MTH 113 (3) INTERMEDIATE ALGEBRA A review and extension of elementary algebra, solutions of linear and quadratic equations, radicals, inequalities, linear and quadratic functions, polynomial functions, exponential and logarithmic functions, and graphing. Offered every fall semester. *Prerequisite: Mathematics 099 (or equivalent).*	**MTH 113 (3) INTERMEDIATE ALGEBRA** A review and extension of elementary algebra, solutions of linear and quadratic equations, radicals, inequalities, linear and quadratic functions, polynomial functions, and graphing. Offered every fall semester. *Prerequisite: Mathematics 099 (or equivalent).*

Courses for 11-12

means may or may not need to teach it based on student demand
cancelled to help PLNU save money
alternating year course

Course	Sec.		Units		Course	Sec.	Course Description	Units	
CSC 131	1	Intro to Information Systems	0	cross list	CSC 153	1	Fundamentals of CS	3	
CSC 133	1	Intro to Computer Science and Information Systems	3		CSC 181	1	Excel	1	
CSC 143	1	Intro to Computer Programming	3		CSC 181	2	Excel	1	
CSC 143	2	Intro to Computer Programming	3		CSC 191	1	Data Mining/Databases	1	
CSC 181	1	Excel	1		CSC 314	1	Operating Systems	4	
CSC 181	2	Excel	1		CSC 354	1	Algorithm Analysis and Theory of Computation	4	
CSC 181	3	Excel	1		CSC 394	1	Programming Languages	4	
CSC 252	1	Data Structures with Programming	0	cancelled	CSC 481	1	Senior Seminar in Computer Science	1	
CSC 254	1	Data Structures	4		CSC 497		Service Learning in Computer Science II	1	
CSC 374	1	Computer Networking and Security	4						
CSC 412	1	Special Topics in CS	2						
CSC 496	1	Service Learning in Computer Science I	2						

ISS 472	1	Internship	1		ISS 414	1	Data Base Management Systems	4	
ISS 496		Service Learning in Computer Information Sys I	0	cross lst	ISS 472	1	Internship	0	
					ISS 481	1	Senior Semiar in Computer Information Systems	0	(cross listed)
					ISS 497		Service Learning in Computer Information Sys II	0	(cross listed)
			25						24

MTH 099	1	Elementary Algebra	3		MTH 099	1	Elementary Algebra	3	
MTH 113	1	Intermediate Algebra	3		MTH 123	1	Elementary Functions	3	
MTH 121	1	Calculus and Modeling	1		MTH131	1	Computer Aided Calculus	0	cross list
MTH 123	1	Elementary Functions	3		MTH 144	1	Calculus	4	
MTH 133	1	Precalculus	3		MTH 144	2	Calculus	4	
MTH 164	1	Calculus I	4		MTH 174	1	Calculus II	4	
MTH 203	1	Statistics - SPSS	3.5		MTH 203	1	Statistics - SPSS	3.5	
MTH 203	2	Statistics - Excel	3.5		MTH 203	2	Statistics - Excel	3.5	
MTH 203	3	Statistics - Excel	3.5		MTH 203	3	Statistics - Excel	3.5	
MTH 213	1	Math for Elem. Teachers	3		MTH 223	1	Math for Elem Teachers	3	
MTH 274	1	Calculus III	4		MTH 233	1	Intro to Linear Algebra	3	
MTH 303	1	Problem Solving	3		MTH 242	1	Number Theory w Proofs	2	
MTH 303	2	Problem Solving	3		MTH 303	1	Problem Solving	3	
MTH 303	3	Problem Solving	3		MTH 303	2	Problem Solving	3	
MTH 303	4	Problem Solving	3		MTH 303	3	Problem Solving	3	
MTH 303	5	Problem Solving	3		MTH 303	4	Problem Solving	3	
MTH 303	6	Problem Solving	-	cancelled	MTH 303	5	Problem Solving	3	
MTH 343	1	Discrete Mathematics	3		MTH 303	6	Problem Solving	3	
MTH 362	1	Calculus Based Statistics for the Sciences	2		MTH 333	1	Differential Equations	3	
MTH 413	1	Complex Analysis	3		MTH 382	1	Mathematical Statistics	2	
MTH 424	1	Real Analysis	4		MTH 392	1	Probability	2	
MTH 492	1	Special Topics	2		MTH 471	1	History of Mathematics Study Trip	1	
MTH 496	1	Service Learning in Mathematics II	0	cross lst	MTH 481	1	Senior Seminar in Mathematics	0	(cross listed)
					MTH 497	1	Service Learning in Mathematics II	0	(cross listed)
			64						63

		Chair	3				Chair	3	
		Vice Chair	1				Vice Chair	1	
		Crow - Institutional research	2				Crow - Institutional research	2	
		Zack - IR and Planning	3				Zack - IR and Planning	3	
			97.5					**95.5**	
Total People			**8.13**					**7.95833333**	**8.04**

Annual total **193.0**

Courses for 2012-13

means may or may not need to teach it based on student demand
cancelled to help PLNU save money
alternating year course

FALL					SPRING				
Course	Sec.		Units		Course	Sec.	Course Description	Units	
CSC 131	1	Intro to Information Systems	0	cross list	CSC 153	1	Fundamentals of CS	3	
CSC 133	1	Intro to Computer Science and Information Systems	3		CSC 181	1	Excel	1	
CSC 143	1	Intro to Computer Programming	3		CSC 181	2	Excel	1	
CSC 143	2	Intro to Computer Programming	3		CSC 191	1	Data Mining/Databases	1	
CSC 181	1	Excel	1		CSC 314	1	Operating Systems	4	cross lst
CSC 181	2	Excel	1		CSC422	1	Theory of Computation	2	
CSC 181	3	Excel	1		CSC 412	1	Special Topics in CS	2	
CSC 252	1	Data Structures with Programming	0	cancelled	CSC 481	1	Senior Seminar in Computer Science	1	
CSC 254	1	Data Structures	4		CSC 493	1	Software Project	3	
CSC 324	1	Software Engineering	4	cross list	CSC 497	1	Service Learning in Computer Science II	1	cross lst
CSC 454	1	Computer Architecture	4						
CSC 496	1	Service Learning in Computer Science I	2	cross list					
ISS 324	1	Software Engineering	0		ISS 242	1	Visual Programming for Business Applications	2	
ISS 472	1	Internship	1		ISS 424	1	Internet Applications Development	4	
ISS 496	1	Service Learning in Computer Information Sys I	0	cross list	ISS 472	1	Internship	0	
					ISS 481	1	Senior Semiar in Information Systems	0	
					ISS 497		Service Learning in Computer Information Sys II	0	cross lst
				27					25
MTH 099	1	Elementary Algebra	3		MTH 099	1	Elementary Algebra	3	
MTH 113	1	Intermediate Algebra	3		MTH 113	1	Intermediate Algebra	3	
MTH 121	1	Calculus and Modeling	0	cross list	MTH 123	1	Elementary Functions	3	
MTH 123	1	Elementary Functions	3		MTH131	1	Computer Aided Calculus	0	cross list
MTH 133	1	Precalculus	3		MTH 144	1	Calculus	4	
MTH 164	1	Calculus I	4		MTH 144	2	Calculus	4	
MTH 203	1	Statistics - SPSS	3.5		MTH 174	1	Calculus II	4	
MTH 203	2	Statistics - Excel	3.5		MTH 203	1	Statistics - SPSS	3.5	
MTH 203	3	Statistics - Excel	3.5		MTH 203	2	Statistics - Excel	3.5	
MTH 213	1	Math for Elem. Teachers	3		MTH 203	3	Statistics - Excel	3.5	
MTH 274	1	Calculus III	4		MTH 223	1	Math for Elem Teachers	3	
MTH 303	1	Problem Solving	3		MTH 233	1	Intro to Linear Algebra	2	
MTH 303	2	Problem Solving	3		MTH 242	1	Number Theory w Proofs	2	
MTH 303	3	Problem Solving	3		MTH 303	1	Problem Solving	3	
MTH 303	4	Problem Solving	3		MTH 303	2	Problem Solving	3	
MTH 303	5	Problem Solving	3		MTH 303	3	Problem Solving	3	
MTH 303	6	Problem Solving	3		MTH 303	4	Problem Solving	3	
MTH 362	1	Calculus Based Statistics for the Sciences	2		MTH 303	5	Problem Solving	3	
MTH 373	1	Mathematical Modeling	3		MTH 303	6	Problem Solving	0	cancelled
MTH 444	1	Abstract Algebra	4		MTH 333	1	Differential Equations	3	
MTH 463	1	Secondary School Mathematics	3		MTH 352	1	Math History	2	
MTH 492	1	Special Topics	2		MTH 382	1	Mathematical Statistics	2	
MTH 496	1	Service Learning in Mathematics I	0	cross list	MTH 402	1	Topics in Geometry	2	
					MTH 481	1	Senior Seminar in Mathematics	0	
					MTH 497	1	Service Learning in Mathematics II	0	cross lst
				66					63
		Chair	3				Chair	3	
		Vice Chair	1				Vice Chair	1	
		Crow - Institutional research	2				Crow - Institutional research	2	
		Zack - IR and Planning	3				Zack - IR and Planning	3.0	
			101.50					**96.50**	

Annual Hours	**198.00**
Full Time Faculty Equivalents	**8.25**
Old two year teaching load	**404**
Two year teaching totals	**391.0**
Faculty	**8.145833**
Difference for Computational Science	**13.0**