

DOCTORAL DEGREE PROGRAMS IN COMPUTER INFORMATION SYSTEMS AND COMPUTER AND ENGINEERING MANAGEMENT

1. RATIONALE

It is generally agreed that Thailand is in the process of technological and industrial development. Such development needs large number of computer engineers and engineering managers who are capable of conducting deep research in the said areas. As of 1991, no governmental university is offering any Ph.D. program directly in the field of Computer Information Systems or Computer and Engineering Management. Ph.D. Program being offered are in the related-area of engineering but the number of graduates is not sufficient.

Assumption University does realize the importance and necessity of producing Ph.D. graduates in the mentioned fields. With the experience in offering the Master programs in Computer Information Systems (CIS), and Computer and Engineering Management (CEM), AU had decided to seek approval to offer Ph.D. programs in CIS and CEM. These programs will contribute to national and social development of Thailand by producing highly qualified personnel to help in training more computer and engineering managers and educators as well as researchers.

2. QUALIFICATIONS FOR ADMISSION

1. Graduated from accredited universities or colleges with a Master's Degree in Computer Information Systems or Computer and Engineering Management or related field with GPA of at least 3.5 (from the maximum of 4).
2. Graduated from accredited universities or colleges with a Master's Degree in Computer Information Systems or Computer and Engineering Management or related field with GPA of at least 3.0 (from the maximum of 4 but less than 3.5).

3. SELECTION PROCEDURE

Oral entrance examination

4. TYPES OF STUDENTS

There are 2 types of student:

1. ***Post-Master Students*** are those students who have already earned Master's degree with GPA of at least 3.5 as specified is 11.1.
2. ***Probationary Research Students*** are those students who have earned Master's degree but with GPA less than 3.5 as specified is 11.2.

5. GRADUATED STUDY SYSTEM

1. Semester System

Each academic year consists of two semesters:
Semester one January – April
Semester two September – December

2. Time Limit

Each student must complete all the requirements for the degree within 5 years from the date of first enrollment as a Post-Master student.

3. Study Plan

The Ph.D. curriculum may be classified into two plans according to the two types of students.

- Post-Master Student. A Post-Master Student must take four (12 credits) Ph.D. level courses, take a qualifying examination to become Ph.D. candidate, take a 30-credit Ph.D. dissertation, produce a proof that a full research paper resulting from the dissertation has been accepted for publication in a refereed Journal, and take the final examination (dissertation defense).
- Probationary Research Student. A Probationary Research Student must work on a research project under the supervision of a faculty member. The 9-credits research project is under the courses PH 7901-7903. Only after the student has produced a proof that his research has been accepted for publication in a refereed journal or proceedings of a conference which is refereed by external experts would he be reclassified as a Post-Master student. Otherwise after 2 years he would no longer be a student in the program.

4. Language of Instruction

English

6. GRADING SYSTEM

- Grading may be based in the final examination at the end of the semester, tests, reports, and or presentation.
- Grades given may be one of the following 10 grades :

Letter	Meaning	Value
A	Excellent	4.00
A-	Almost Excellent	3.75
B+	Very Good	3.25
B	Good	3.00
B-	Fairly Good	2.75
C+	Fair	2.25
C	Satisfactory	2.00
C-	Minimum Satisfactory	1.75
D	Poor	1.00
F	Failure	0.00

D or F in any required course means the student must re-take that course again.

- For those courses without credit as well as the research courses for Ph.D. dissertation the grade of S (Satisfactory) or U (Unsatisfactory) may be given.
- If and when undergraduate courses are required as remedial courses, the grade of C or better is equivalent to S.
- Grade of I (Incomplete) and W (Withdrawn with permission) may also be used.
- Grade for any and all classes must be recorded in the student's transcript.

7. AUDITING A COURSE

- With the approval of the Advisor, a student may audit a course. He has to pay the required fees for that course, attend at least 80% of the classes and gets a grade of "au" with no weight.
- The maximum number of credit hours allowed in any semester includes the audited classes but the minimum credit hours a student is required to take to maintain his status does not include the audited classes.
- Credit hours from audited classes are not counted in the accumulated credit earned.

8. LANGUAGE REQUIREMENTS

One major language (except English, Thai and the student's native language) is required. Normally the languages allowed are Chinese, French, German, Japanese, and Russian.

9. COMPREHENSIVE EXAMINATION

This examination is the same as in the MS (CIS) or MS (CEM) program at AU.

Graduates of MS (CIS) or MS (CEM) from Assumption University are exempted from this examination. Graduate of other universities and colleges must take this examination before being allowed to take the qualifying examination.

10. DISSERTATION COMMITTEE

Following admission into a Post-Master status, a dissertation committee will be established by the University. This committee will be responsible, with the student, for specifying an appropriate program of study to meet the required research objectives. This committee will detail all course requirements. Whenever possible, this committee will be chaired by that faculty member more likely to become the student's dissertation advisor. There must be at least two other members, one of whom must be an expert representing the Ministry of University Affairs.

11. QUALIFYING EXAMINATION

This examination will normally be taken in the first year of being Post-Master Student. The area of coverage will be substantially less broad than that of the general comprehensive examination. It will encompass a potential dissertation topic area plus related areas. The number of times a student can take his qualifying examination is not more than two.

12. FINAL EXAMINATION

A final examination or dissertation defense will be conducted in accordance with the rules of Assumption University based on the rules of the Ministry of University Affairs.

Eligibility

To be eligible a student must

- (1) Have been working on his research project under the supervision of the current advisor for at least one year.
- (2) have registered for 36 credits of research under PH 9001-9012.
- (3) Have a written document showing that his research paper has been accepted for publication by a referred journal.

Final Examination Committee

The final examination committee consists of the dissertation committee including the expert selected by the Ministry of Education and an outside expert.

Step to Follow

The student must

- (1) submit a draft of dissertation to the advisor for initial approval.
- (2) arrange to have the version of the dissertation, initially approved by the advisor, typewritten according to the format announced by the University and have it approved again by the advisor.
- (3) make enough copies of the document in 21.3 (2), without binding, for the final examination committee.
- (4) make enough copies of the paper in 21.1(3) for the final examination committee.
- (5) fill the form to request final examination and submit it to the Graduate Office.
- (6) after the final examination, modify the dissertation according to the resolution of the final examination committee and submit it to the advisor for final approval. Then have four copies bound for the University.

13. COURES CODES

1. First Two letters

H stands for Ph.D. Program

2. Number

7900 - 7999 stand for probationary research project
 8000 - 8999 stand for PH.D. Courses
 9000 - stand for PH.D. dissertation

3. Letters and Number in the PH.D. Level

PH 7900 - 7999 stand for probationary research project
 PH 8000 - 8050 stand for Mathematics-related topics
 PH 8051 - 8099 stand for Hardware
 PH 8100 - 8150 stand for computer System Organization
 PH 8151 - 8199 stand for Software
 PH 8200 - 8050 stand for Data
 PH 8251 - 8259 stand for Theory of Computation
 PH 8300 - 8350 stand for Mathematics of Computing
 PH 8351 - 8399 stand for Information Systems
 PH 8409 - 8450 stand for Computing Methodology
 PH 8451 - 8499 stand for Computing Applications
 PH 8500 - 8599 stand for Computing Milieux
 PH 8600 - 8650 stand for Engineering and General Management
 PH 8650 - 8699 stand for Manufacturing Management
 PH 8700 - 8799 stand for System Management and Operation Research
 PH 8800 - 8899 stand for Technology Management
 PH 8900 - 8999 stand for Other Courses
 PH 9000 stand for Ph.D. Dissertation

4. PH.D. COURSES

A Ph.D. student who has been classified, as a Post- Master student must take at least four Ph.D. level courses, passed the qualifying exam, and the work on 36-credits of Ph.D. dissertation. The Ph.D. Level courses are given in a subsequent section.

14. STUDY PLAN

1. Probationary Research Student Study Plan

A student who earned a Master's Degree in computer-related or engineering-management-related areas with GPA of less than 3.5 may be admitted into the Ph.D. program as a probationary research student. A probationary research student must carry out a research project under the PH 7901-7903 courses with 9 credits. When his research paper is accepted for publication in a referred journal he is reclassified to be a Post-Master student and the he must follow the study plan for Post-Master student. If the student cannot get his papers accepted for publication within 2 years he would no longer be a student in the program.

2. Post-Master Student Study Plan

The minimum residency requirements are two and a half years or five semesters.

FIRST SEMESTER

Foreign Language	3
PH 8001	3
2 courses	6

SECOND SEMESTER

1 course
Qualifying Exam

THIRD SEMESTER

12-credits research toward dissertation 12

FOURTH SEMESTER

12-credit research toward dissertation 12

FIFTH SEMESTER

12-credit research toward dissertation 12
48

15. GRADUATION REQUIREMENTS

To earn a Ph.D. a student must have:

1. been admitted to the status of post –master student.
2. earned 12 credit of Ph.D. level course work with a minimum GPA of 3.0.
3. passed the qualifying examination to be reclassified to a Ph.D. candidate.
4. passed the foreign language requirement.
5. completed la 36-credit Ph.D. dissertation.
6. obtained a proof that a full paper from his dissertation ahs been accepted for publication by a refereed journal.
7. passed the final examination or dissertation defense.

If the student’s dissertation is in the field of Computer Information Systems, his Ph.D. is in Computer is in the field of Computer Information Systems.

If the student’s dissertation is in the field of Computer and Engineering Management, his Ph.D. is in the field of Computer and Engineering Management.

16. COURSES DESCRIPTION

PH	7901	Probational Research Project I Research project for probationary research students.	3 (0-0-9)
PH	7902	Probational Research Project II Research project for probationary research student.	3 (0-0-9)
PH	7903	Probational Research Project III Research project for probationary research student.	3 (0-0-9)
PH	8001	Mathematical Foundations for Researchers Prerequisite : Consent of Instructor	3 (3-0-0)

This course intends to provide sufficient background in mathematics applications to Ph.D. candidates to conduct his/her research. The topics include basic set theory, mathematical logic, methods of proof, sampling techniques, hypothesis testing, analysis of variance, goodness of fits test, factor analysis, queuing theory, simulation models, and Markov process.

PH	8011	Selected Topics in Mathematics Prerequisite : Consent of Instructor. Topics of current interest in the field of Mathematics	3 (3-0-0)
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PH 8012 Advanced Topics in Mathematics 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Mathematics which will contribute to the student's research.

PH 8021 Selected Topics in Statistics 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Statistics.

PH 8022 Advanced Topics in Statistics 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Statistics which will contribute to the student's research.

PH 8051 Selected Topics in Computer Hardware 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Computer Hardware.

PH 8052 Advanced Topics in Computer Hardware
Prerequisite : Consent of Instructor.

Advanced topics in the field of Computer Hardware which will contribute to the student's research

PH 8054 Selected Topics in HW Control Structure 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of HW Control Structure.

PH 8055 Advanced Topics in HW Control Structure 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of HW Control Structure which will contribute to the student's research.

PH 8057 Selected Topics in Arithmetic and Logic Structure 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Arithmetic and Logic Structure.

PH 8058 Advanced Topics in Arithmetic and Logic Structure 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Arithmetic and Logic Structure which will contribute to the student's research.

PH 8061 Selected Topics in Memory Structure 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Memory Structure.

PH 8062 Advanced Topics in Memory Structure 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Memory Structure which will contribute to the student's research.

PH 8064 Selected Topics in I/O Hardware 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of I/O Hardware

PH 8065 Advanced Topics in I/O Hardware 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of which I/O Hardware which will contribute to the student's research.

PH 8067 Selected Topics in Data Communication 3 (3-0-0)
Prerequisite : Consent of Instructor.

Topics of current interest in the field of Data Communication.

PH	8068	Advanced Topics in Data Communication Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Data Communication which will contribute to the student's research.

PH	8071	Selected Topics in Data Terminals Prerequisite : Consent of Instructor. Topics of current interest in the field of Data Terminals.	3 (3-0-0)
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PH	8072	Advanced Topics in Data Terminals Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Data Terminals which will contribute to the student's research.

PH	8074	Selected Topics in Image Display Prerequisite : Consent of Instructor. Topics of current interest in the field of Image Display.	3 (3-0-0)
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PH	8075	Advanced Topics in Image Display Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Image Display which will contribute to the student's research.

PH	8077	Selected Topics in HW Interfaces Prerequisite : Consent of Instructor. Topics of current interest in the field of HW Interfaces.	3 (3-0-0)
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PH	8078	Advanced Topics in HW Interfaces Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of HW Interfaces which will contribute to the student's research.

PH	8081	Selected Topics in Logic Design Prerequisite : Consent of Instructor. Topics of current interest in the field of Logic Design.	3 (3-0-0)
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PH	8082	Advanced Topics in Logic Design Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Logic Design which will contribute to the student's research.

PH	8084	Selected Topics in Intergraded Circuits Prerequisite : Consent of Instructor. Topics of current interest in the field of Intergraded Circuits.	3 (3-0-0)
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PH	8085	Advanced Topics in Intergraded Circuits Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Intergraded Circuits which will contribute to the student's research.

PH	8100	Selected Topics in Computer Systems Organization Prerequisite : Consent of Instructor. Topics of current interest in the field of Computer Systems Organization.	3 (3-0-0)
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PH	8101	Advanced Topics in Computer Systems Organization Prerequisite : Consent of Instructor.	
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Advanced topics in the field of Computer Systems Organization which will contribute to the student's research.

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PH	8103	Selected Topics in System Architecture Prerequisite : Consent of Instructor. Topics of current interest in the field of System Architecture	3 (3-0-0)
PH	8104	Advanced Topics in System Architecture Prerequisite : Consent of Instructor.	3 (3-0-0)
Advanced topics in the field of System Architecture which will contribute to the student's research.			
PH	8106	Selected Topics in System Specification Methodology Prerequisite : Consent of Instructor. Topics of current interest in the field of System Specification Methodology	3 (3-0-0)
PH	8107	Advanced Topics in System Specification Methodology Prerequisite : Consent of Instructor.	3 (3-0-0)
Advanced topics in the field of System Specification Methodology which will contribute to the student's research .			
PH	8109	Selected Topics in Array and Vector Processor Prerequisite : Consent of Instructor. Topics of current interest in the field of Array and Vector Processor	3 (3-0-0)
PH	8110	Advanced Topics in Array and Vector Processor Prerequisite : Consent of Instructor.	3 (3-0-0)
Advanced topics in the field of Array and Vector Processor which will contribute to the student's research.			
PH	8112	Selected Topics in Security of Computer Network Prerequisite : Consent of Instructor. Topics of current interest in the field of Security of Computer Network.	3 (3-0-0)
PH	8113	Advanced Topics in Security of Computer Network Prerequisite : Consent of Instructor.	3 (3-0-0)
Advanced topics in the field of Security of Computer Network which will contribute to the student's research.			
PH	8115	Selected Topics in Network Architecture and Design Prerequisite : Consent of Instructor. Topics of current interest in the field of Network Architecture and Design.	3 (3-0-0)
PH	8116	Advanced Topics in Network Architecture and Design Prerequisite : Consent of Instructor.	3 (3-0-0)
Advanced topics in the field of Network Architecture and Design which will contribute to the student's research.			
PH	8118	Selected Topics in Network Protocols Prerequisite : Consent of Instructor. Topics of current interest in the field of Network Protocols.	3 (3-0-0)
PH	8119	Advanced Topics in Network Protocols Prerequisite : Consent of Instructor.	3 (3-0-0)
Advanced topics in the field of Network Protocols which will contribute to the student's research.			
PH	8121	Selected Topics in Network Operation Prerequisite : Consent of Instructor. Topics of current interest in the field of Network Operation.	3 (3-0-0)

PH 8122 Advanced Topics in Network Operation 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Network Operation which will contribute to the student's research.

PH 8124 Selected Topics in Distributed Systems 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Distributed Systems.

PH 8125 Advanced Topics in Distributed Systems 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Distributed Systems which will contribute to the student's research.

PH 8127 Selected Topics in Local Area Network 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Local Area Network.

PH 8128 Advanced Topics in Local Area Network 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Local Area Network which will contribute to the student's research.

PH 8130 Selected Topics in Microprocessor 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Microprocessor.

PH 8131 Advanced Topics in Microprocessor 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Microprocessor which will contribute to the student's research.

PH 8133 Selected Topics in Process Control System 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Process Control System.

PH 8134 Advanced Topics in Process Control System 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Process Control System which will contribute to the student's research.

PH 8136 Selected Topics in Real Time System 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Real Time System.

PH 8137 Advanced Topics in Real Time System 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Real Time System which will contribute to the student's research.

PH 8139 Selected Topics in Signal Processing System 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Signal Processing System.

PH 8140 Advanced Topics in Signal Processing System 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Signal Processing System which will contribute to the student's research.

PH 8142 Selected Topics in Performance of System 3 (3-0-0)
Prerequisite : Consent of Instructor.

Topics of current interest in the field of Performance of System.

PH	8143	Advanced Topics in Performance of System Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Performance of System which will contribute to the student's research.

PH	8145	Selected Topics in VLSI System Prerequisite : Consent of Instructor. Topics of current interest in the field of VLSI System.	3 (3-0-0)
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PH	8146	Advanced Topics in VLSI System Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of VLSI System which will contribute to the student's research.

PH	8148	Selected Topics in System Implementation Prerequisite : Consent of Instructor. Topics of current interest in the field of System Implementation.	3 (3-0-0)
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PH	8149	Advanced Topics in System Implementation Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of System Implementation which will contribute to the student's research.

PH	8151	Selected Topics in Computer Software Prerequisite : Consent of Instructor. Topics of current interest in the field of Computer Software.	3 (3-0-0)
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PH	8152	Advanced Topics in Computer Software Prerequisite: Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Computer Software which will contribute to the student's research.

PH	8154	Selected Topics in Programming Technique Prerequisite: Consent of Instructor. Topics of current interest in the field of Programming Technique.	3 (3-0-0)
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PH	8155	Advanced Topics in Programming Technique Prerequisite: Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Programming Technique which will contribute to the student's research.

PH	8157	Selected Topics in Software Engineering Prerequisite: Consent of Instructor. Topics of current interest in the field of Software Engineering.	3 (3-0-0)
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PH	8158	Advanced Topics in Software Engineering Prerequisite: Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Software Engineering which will contribute to the student's research.

PH	8159	Selected Topics in Programming Languages Prerequisite: Consent of Instructor. Topics of current interest in the field of Programming Languages.	3 (3-0-0)
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PH	8160	Advanced Topics in Programming Languages Prerequisite: Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Programming Languages which will contribute to the student's research.

PH	8161	Selected Topics in Operating System	3 (3-0-0)
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Prerequisite: Consent of Instructor.
Topics of current interest in the field of Operating System.

PH	8162	Advanced Topics in Operating System Prerequisite: Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Operating System which will contribute to the student's research.

PH	8163	Selected Topics in SW Standards and Specifications Prerequisite: Consent of Instructor. Topics of current interest in the field of SW Standards and Specifications.	3 (3-0-0)
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PH	8164	Advanced Topics in SW Standards and Specifications Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of SW Standards and Specifications which will contribute to the student's research.

PH	8165	Selected Topics in SW Tools and Techniques Prerequisite : Consent of Instructor. Topics of current interest in the field of SW Tools and Techniques.	3 (3-0-0)
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PH	8166	Advanced Topics in SW Tools and Techniques Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of SW Tools and Techniques which will contribute to the student's research.

PH	8167	Selected Topics in Program Verification Prerequisite : Consent of Instructor. Topics of current interest in the field of Program Verification.	3 (3-0-0)
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PH	8168	Advanced Topics in Program Verification Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Program Verification which will contribute to the student's research.

PH	8169	Selected Topics in SW Testing and Bebugging Prerequisite : Consent of Instructor. Topics of current interest in the field of SW Testing and Bebugging.	3 (3-0-0)
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PH	8170	Advanced Topics in SW Testing and Bebugging Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of SW Testing and Bebugging which will contribute to the student's research.

PH	8171	Selected Topics in SW Distribution and Maintenance Prerequisite : Consent of Instructor. Topics of current interest in the field of SW Distribution and Maintenance.	3 (3-0-0)
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PH	8172	Selected Topics in SW Cost Estimation Prerequisite : Consent of Instructor. Topics of current interest in the field of SW Cost Estimation.	3 (3-0-0)
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PH	8173	Selected Topics in SW Productivity Prerequisite : Consent of Instructor. Topics of current interest in the field of SW Productivity.	3 (3-0-0)
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PH	8174	Selected Topics in SW Configuration Management Prerequisite : Consent of Instructor. Topics of current interest in the field of SW Configuration Management.	3 (3-0-0)
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PH	8175	Selected Topics in SW Quality Assurance Prerequisite : Consent of Instructor. Topics of current interest in the field of SW Quality Assurance.	3 (3-0-0)
PH	8176	Selected Topics in SW Design Methodology Prerequisite : Consent of Instructor. Topics of current interest in the field of SW Design Methodology.	3 (3-0-0)
PH	8177	Selected Topics in SW Formal Specification Prerequisite : Consent of Instructor. Topics of current interest in the field of SW Formal Specification.	3 (3-0-0)
PH	8178	Selected Topics in Theory of Programming Languages Prerequisite : Consent of Instructor. Topics of current interest in the field of Theory of Programming Languages.	3 (3-0-0)
PH	8179	Advanced Topics in Theory of Programming Languages Prerequisite : Consent of Instructor.	3 (3-0-0)

Advanced topics in the field of Theory of Programming Languages which will contribute to the student's research.

PH	8181	Selected Topics in Languages Classifications Prerequisite : Consent of Instructor. Topics of current interest in the field of Languages Classifications.	3 (3-0-0)
PH	8182	Selected Topics in Languages Constructs Prerequisite : Consent of Instructor. Topics of current interest in the field of Languages Constructs.	3 (3-0-0)
PH	8183	Selected Topics in Languages Processor Prerequisite : Consent of Instructor. Topics of current interest in the field of Languages Processor.	3 (3-0-0)
PH	8184	Advanced Topics in Languages Processor Prerequisite : Consent of Instructor.	3 (3-0-0)

Advanced topics in the field of Languages Processor which will contribute to the student's research.

PH	8185	Selected Topics in OS Management Prerequisite : Consent of Instructor. Topics of current interest in the field of OS Management.	3 (3-0-0)
PH	8186	Selected Topics in Storage Management Prerequisite : Consent of Instructor. Topics of current interest in the field of Storage Management.	3 (3-0-0)
PH	8187	Selected Topics in System Management Prerequisite : Consent of Instructor. Topics of current interest in the field of System Management.	3 (3-0-0)
PH	8188	Selected Topics in SW Communication Management Prerequisite : Consent of Instructor. Topics of current interest in the field of SW Communication Management.	3 (3-0-0)
PH	8189	Selected Topics in SW Backup Management Prerequisite : Consent of Instructor. Topics of current interest in the field of SW Backup Management.	3 (3-0-0)
PH	8190	Selected Topics in SW Security and Protection Prerequisite : Consent of Instructor. Topics of current interest in the field of SW Security and Protection.	3 (3-0-0)

PH	8191	Selected Topics in Organization and Design OS Prerequisite : Consent of Instructor. Topics of current interest in the field of Organization and Design OS.	3 (3-0-0)
PH	8192	Selected Topics in OS Performance Evaluation Prerequisite : Consent of Instructor. Topics of current interest in the field of OS Performance Evaluation.	3 (3-0-0)
PH	8193	Selected Topics in System Programs and Utilities Prerequisite : Consent of Instructor. Topics of current interest in the field of System Programs and Utilities.	3 (3-0-0)
PH	8194	Selected Topics in Software Psychology Prerequisite : Consent of Instructor. Topics of current interest in the field of Software Psychology.	3 (3-0-0)
PH	8200	Selected Topics in Computer Data Technology Prerequisite : Consent of Instructor. Topics of current interest in the field of Computer Data Technology.	3 (3-0-0)
PH	8201	Advanced Topics in Computer Data Technology Prerequisite : Consent of Instructor.	3 (3-0-0)

Advanced topics in the field of Computer Data Technology which will contribute to the student's research.

PH	8203	Selected Topics in Data Structures Prerequisite : Consent of Instructor. Topics of current interest in the field of Data Structures.	3 (3-0-0)
PH	8204	Advanced Topics in Data Structures Prerequisite : Consent of Instructor.	3 (3-0-0)

Advanced topics in the field of Data Structures which will contribute to the student's research.

PH	8206	Selected Topics in Data Storage Representation Prerequisite : Consent of Instructor. Topics of current interest in the field of Data Storage Representation.	3 (3-0-0)
PH	8207	Advanced Topics in Data Storage Representation Prerequisite : Consent of Instructor.	3 (3-0-0)

Advanced topics in the field of Data Storage Representation which will contribute to the student's research.

PH	8209	Selected Topics in Data Encryption Prerequisite : Consent of Instructor. Topics of current interest in the field of Data Encryption.	3 (3-0-0)
PH	8210	Advanced Topics in Data Encryption Prerequisite : Consent of Instructor.	3 (3-0-0)

Advanced topics in the field of Data Encryption which will contribute to the student's research.

PH	8212	Selected Topics in Data Compaction and Compression Prerequisite : Consent of Instructor. Topics of current interest in the field of Data Compaction and Compression.	3 (3-0-0)
PH	8213	Advanced Topics in Data Compaction and Compression Prerequisite : Consent of Instructor.	3 (3-0-0)

Advanced topics in the field of Data Compaction and Compression which will contribute to the student's research.

PH 8215 Selected Topics in Data Backup and Recovery 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Data Backup and Recovery.

PH 8216 Advanced Topics in Data Backup and Recovery 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Data Backup and Recovery which will contribute to the student's research.

PH 8218 Selected Topics in Information Theory 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Information Theory.

PH 8219 Advanced Topics in Information Theory 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Information Theory which will contribute to the student's research.

PH 8221 Selected Topics in Data Files 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Data Files.

PH 8222 Advanced Topics in Data Files 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Data Files which will contribute to the student's research.

PH 8224 Selected Topics in Database 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Database.

PH 8225 Advanced Topics in Database 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Database which will contribute to the student's research.

PH 8227 Selected Topics in Searching and Sorting 3 (3-0-0)
 Prerequisite : Consent of Instructor Searching and Sorting
 Topics of current interest in the field of Searching and Sorting.

PH 8228 Advanced Topics in 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Searching and Sorting which will contribute to the student's research.

PH 8251 Selected Topics in Theory of Computations 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Theory of Computations.

PH 8252 Advanced Topics in Theory of Computations 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Theory of Computations which will contribute to the student's research.

PH 8254 Selected Topics in Computations by Abstract Devices 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Computations by Abstract Devices.

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PH 8255 Advanced Topics in Computations by Abstract Devices 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Computations by Abstract Devices which will contribute to the student's research.

PH 8257 Selected Topics in Analysis of Algorithms 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Analysis of Algorithms.

PH 8258 Advanced Topics in Analysis of Algorithms 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Analysis of Algorithms which will contribute to the student's research.

PH 8260 Selected Topics in Problem Complexity 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Problem Complexity.

PH 8261 Advanced Topics in Problem Complexity 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Problem Complexity which will contribute to the student's research.

PH 8263 Selected Topics in Logic and Meaning of Programs 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Logic and Meaning of Programs.

PH 8264 Advanced Topics in Logic and Meaning of Programs 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Logic and Meaning of Programs which will contribute to the student's research.

PH 8266 Selected Topics in Mathematical Logic 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Mathematical Logic.

PH 8267 Advanced Topics in Mathematical Logic 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Mathematical Logic which will contribute to the student's research.

PH 8269 Selected Topics in Formal Languages 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Formal Languages.

PH 8270 Advanced Topics in Formal Languages 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Formal Languages which will contribute to the student's research.

PH 8301 Selected Topics in Mathematics of Computing 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Mathematics of Computing.

PH 8302 Advanced Topics in Mathematics of Computing 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Mathematics of Computing which will contribute to the student's research.

PH 8304 Selected Topics in Computer Arithmetic's 3 (3-0-0)

Prerequisite : Consent of Instructor.
Topics of current interest in the field of Computer Arithmetic's.

PH 8305 Advanced Topics in Computer Arithmetic's 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Computer Arithmetic's which will contribute to the student's research.

PH 8307 Selected Topics in Numerical Analysis 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Numerical Analysis.

PH 8308 Advanced Topics in Numerical Analysis 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Numerical Analysis which will contribute to the student's research.

PH 8310 Selected Topics in Error Analysis 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Error Analysis.

PH 8311 Advanced Topics in Error Analysis 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Error Analysis which will contribute to the student's research.

PH 8313 Selected Topics in Interpolation 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Interpolation.

PH 8314 Advanced Topics in Interpolation 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Interpolation which will contribute to the student's research.

PH 8316 Selected Topics in Approximation 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Approximation.

PH 8317 Advanced Topics in Approximation 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Approximation which will contribute to the student's research.

PH 8319 Selected Topics in Numerical Linear Algebra 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Numerical Linear Algebra.

PH 8320 Advanced Topics in Numerical Linear Algebra 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Numerical Linear Algebra which will contribute to the student's research.

PH 8322 Selected Topics in Nonlinear Equations 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Nonlinear Equations.

PH 8323 Advanced Topics in Nonlinear Equations 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Nonlinear Equations which will contribute to the student's research.

PH 8325 Selected Topics in Optimization 3 (3-0-0)

Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Optimization.

PH 8326 Advanced Topics in Optimization 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Optimization which will contribute to the student's research.

PH 8328 Selected Topics in Differential Equations 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Differential Equations.

PH 8329 Advanced Topics in Differential Equations 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Differential Equations which will contribute to the student's research.

PH 8331 Selected Topics in Graph Theory 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Graph Theory.

PH 8332 Advanced Topics in Graph Theory 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Graph Theory which will contribute to the student's research

PH 8334 Selected Topics in Probability and Statistics 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Probability and Statistics.

PH 8335 Advanced Topics in Probability and Statistics 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Probability and Statistics which will contribute to the student's research.

PH 8337 Selected Topics in Discrete Mathematics 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Discrete Mathematics.

PH 8338 Advanced Topics in Discrete Mathematics 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Discrete Mathematics which will contribute to the student's research.

PH 8340 Selected Topics in Mathematical Software 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Mathematical Software.

PH 8341 Advanced Topics in Mathematical Software 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Mathematical Software which will contribute to the student's research.

PH 8351 Selected Topics in Information Systems 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Information Systems.

PH 8352 Advanced Topics in Information Systems 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Information Systems which will contribute to the student's research.

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PH 8354 Selected Topics in Information Systems Modeling 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Information Systems Modeling.

PH 8355 Advanced Topics in Information Systems Modeling 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Information Systems Modeling which will contribute to the student's research.

PH 8357 Selected Topics in System Theory 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of System Theory.

PH 8358 Advanced Topics in System Theory 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of System Theory which will contribute to the student's research.

PH 8360 Selected Topics in Database Management 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Database Management.

PH 8361 Advanced Topics in Database Management 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Database Management which will contribute to the student's research.

PH 8363 Selected Topics in Information Storage and Retrieval 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Information Storage and Retrieval.

PH 8364 Advanced Topics in Information Storage and Retrieval 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Information Storage and Retrieval which will contribute to the student's research

PH 8366 Selected Topics in Office Automation 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Office Automation.

PH 8367 Advanced Topics in Office Automation 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Office Automation which will contribute to the student's research.

PH 8369 Selected Topics in Decision Support Systems 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Decision Support Systems.

PH 8370 Advanced Topics in Decision Support Systems 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Decision Support Systems which will contribute to the student's research.

PH 8372 Selected Topics in Communication Applications 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Communication Applications.

PH 8373 Advanced Topics in Communication Applications 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Communication Applications which will contribute to the student's research.

PH 8401 Selected Topics in Computing Methodologies 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Computing Methodologies

PH 8402 Advanced Topics in Computing Methodologies 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Computing Methodologies which will contribute to the student's research.

PH 8404 Selected Topics in Algebraic Manipulation 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Algebraic Manipulation.

PH 8405 Advanced Topics in Algebraic Manipulation 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Algebraic Manipulation which will contribute to the student's research.

PH 8407 Selected Topics in Artificial Intelligence 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Artificial Intelligence.

PH 8408 Advanced Topics in Artificial Intelligence 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Artificial Intelligence which will contribute to the student's research.

PH 8410 Selected Topics in Machine Translation 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Machine Translation.

PH 8411 Advanced Topics in Machine Translation 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Machine Translation which will contribute to the student's research.

PH 8413 Selected Topics in Robotics 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Robotics.

PH 8414 Advanced Topics in Robotics 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Robotics which will contribute to the student's research.

PH 8416 Selected Topics in Expert System 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Expert System.

PH 8417 Advanced Topics in Expert System 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Expert System which will contribute to the student's research.

PH 8419 Selected Topics in Knowledge-Based System 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Knowledge-Based System.

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PH 8420 Advanced Topics in Knowledge-Based System 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Knowledge-Based System which will contribute to the student's research.

PH 8422 Selected Topics in Computer Graphics 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Computer Graphics.

PH 8423 Advanced Topics in Computer Graphics 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Computer Graphics which will contribute to the student's research.

PH 8425 Selected Topics in Image Processing 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Image Processing.

PH 8426 Advanced Topics in Image Processing 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Image Processing which will contribute to the student's research.

PH 8428 Selected Topics in Pattern Recognition 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Pattern Recognition.

PH 8429 Advanced Topics in Pattern Recognition 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Pattern Recognition which will contribute to the student's research.

PH 8431 Selected Topics in Simulation and Modeling 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Simulation and Modeling.

PH 8432 Advanced Topics in Simulation and Modeling 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Simulation and Modeling which will contribute to the student's research.

PH 8434 Selected Topics in Text Processing 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Text Processing.

PH 8435 Advanced Topics in Text Processing 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Text Processing which will contribute to the student's research.

PH 8437 Selected Topics in Computer Vision 3 (3-0-0)
Prerequisite : Consent of Instructor.
Topics of current interest in the field of Computer Vision.

PH 8438 Advanced Topics in Computer Vision 3 (3-0-0)
Prerequisite : Consent of Instructor.

Advanced topics in the field of Computer Vision which will contribute to the student's research.

PH 8440 Selected Topics in Voice Technology 3 (3-0-0)
Prerequisite : Consent of Instructor.

Topics of current interest in the field of Voice Technology.

PH	8441	Advanced Topics in Voice Technology Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Voice Technology which will contribute to the student's research.

PH	8451	Selected Topics in Computer Applications Prerequisite : Consent of Instructor. Topics of current interest in the field of Computer Applications.	3 (3-0-0)
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PH	8452	Advanced Topics in Computer Applications Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Computer Applications which will contribute to the student's research.

PH	8454	Selected Topics in Administrative Data Processing Prerequisite : Consent of Instructor. Topics of current interest in the field of Administrative Data Processing.	3 (3-0-0)
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PH	8455	Advanced Topics in Administrative Data Processing Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Administrative Data Processing which will contribute to the student's research.

PH	8457	Selected Topics in Computer Applications in Physical Science Prerequisite : Consent of Instructor. Topics of current interest in the field of Computer Applications in Physical Science.	3 (3-0-0)
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PH	8458	Advanced Topics in Computer Applications in Physical Science Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Computer Applications in Physical Science which will contribute to the student's research.

PH	8461	Selected Topics in Engineering Computations Prerequisite : Consent of Instructor. Topics of current interest in the field of Engineering Computations.	3 (3-0-0)
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PH	8462	Advanced Topics in Engineering Computations Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Engineering Computations which will contribute to the student's research.

PH	8464	Selected Topics in Life Science Computations Prerequisite : Consent of Instructor. Topics of current interest in the field of Life Science Computations.	3 (3-0-0)
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PH	8465	Advanced Topics in Life Science Computations Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Life Science Computations which will contribute to the student's research.

PH	8467	Selected Topics in Medical Science Computations Prerequisite : Consent of Instructor. Topics of current interest in the field of Medical Science Computations.	3 (3-0-0)
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PH	8468	Advanced Topics in Medical Science Computations Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Medical Science Computations which will contribute to the student's research.

PH 8471 Selected Topics in Social Science Computations 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Social Science Computations.

PH 8472 Advanced Topics in Social Science Computations 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Social Science Computations which will contribute to the student's research.

PH 8474 Selected Topics in Behavioral Science Computations 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Behavioral Science Computations.

PH 8475 Advanced Topics in Behavioral Science Computations 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Behavioral Science Computations which will contribute to the student's research.

PH 8477 Selected Topics in Computations and Arts 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Computations and Arts.

PH 8478 Advanced Topics in Computations and Arts 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Computations and Arts which will contribute to the student's research.

PH 8480 Selected Topics in Computations and Humanities 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Computations and Humanities.

PH 8481 Advanced Topics in Computations and Humanities 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Computations and Humanities which will contribute to the student's research

PH 8501 Selected Topics in Computer Industry 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Computer Industry.

PH 8502 Advanced Topics in Computer Industry 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Computer Industry which will contribute to the student's research.

PH 8504 Selected Topics in History of Computing 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of History of Computing.

PH 8505 Selected Topics in Computers and Education 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Computers and Education.

PH 8506 Advanced Topics in Computers and Education 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Computers and Education which will contribute to the student's research.

PH 8508 Selected Topics in Computers and Society 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Computers and Society.

PH 8509 Advanced Topics in Computers and Society 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Computers and Society which will contribute to the student's research.

PH 8511 Selected Topics in Legal Aspects of Computing 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field Legal Aspects of Computing.

PH 8512 Advanced Topics in Legal Aspects of Computing 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Legal Aspects of Computing which will contribute to the student's research.

PH 8514 Selected Topics in Computing Profession 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Selected Topics in the field of Computing Profession which will contribute to the student's research.

PH 8515 Selected Topics in Personal Computing 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Personal Computing.

PH 8516 Advanced Topics in Personal Computing 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Personal Computing which will contribute to the student's research.

PH 8601 Selected Topics in Accounting for Engineering Management 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Accounting for Engineering Management.

PH 8602 Advanced Topics in Accounting for Engineering Management 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Accounting for Engineering Management which will contribute to the student's Research.

PH 8604 Selected Topics in Engineering Economy 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Engineering Economy.

PH 8605 Advanced Topics in Engineering Economy 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Engineering Economy which will contribute to the student's research.

PH 8607 Selected Topics in of Human Relation in Technical Management 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Human Relation in Technical Management.

PH 8608 Advanced Topics in Human Relation in Technical Management 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Human Relation in Technical Management which will contribute to the student's research.

PH 8611 Selected Topics in Engineering Personnel Management 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Engineering Personnel Management.

PH 8612 Advanced Topics in Engineering Personnel Management 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Engineering Personnel Management which will contribute to the student's research.

PH 8614 Selected Topics in Industrial Marketing System 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Industrial Marketing System.

PH 8615 Advanced Topics in Industrial Marketing System 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Industrial Marketing System which will contribute to the student's research.

PH 8617 Selected Topics in Operation in Service Industries 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Operation in Service Industries.

PH 8618 Advanced Topics in Operation in Service Industries 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Operation in Service Industries which will contribute to the student's research.

PH 8701 Selected Topics in Manufacturing Management 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Manufacturing Management.

PH 8702 Advanced Topics in Manufacturing Management 3 (3-0-0)
 Prerequisite : Consent of Instructor

Advanced topics in the field of Manufacturing Management which will contribute to the student's research.

PH 8704 Selected Topics in Computer Integrated Manufacturing 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Computer Integrated Manufacturing.

PH 8705 Advanced Topics in Computer Integrated Manufacturing 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Computer Integrated Manufacturing which will contribute to the student's research.

PH 8707 Selected Topics in Computer- Aided Design 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Computer- Aided Design.

PH 8708 Advanced Topics in Computer-Aided Design 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Computer-Aided Design which will contribute to the student's research.

PH 8710 Selected Topics in Industrial Automation 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Topics of current interest in the field of Industrial Automation.

PH	8711	Advanced Topics in Industrial Automation Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Industrial Automation which will contribute to the student's research.

PH	8713	Selected Topics in Packaging Management Prerequisite : Consent of Instructor. Topics of current interest in the field of Packaging Management.	3 (3-0-0)
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PH	8714	Advanced Topics in Packaging Management Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Packaging Management which will contribute to the student's research.

PH	8716	Selected Topics in Project Management Prerequisite : Consent of Instructor. Topics of current interest in the field of Project Management.	3 (3-0-0)
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PH	8717	Advanced Topics in Project Management Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Project Management which will contribute to the student's research.

PH	8719	Selected Topics in Business Logistics Prerequisite : Consent of Instructor. Topics of current interest in the field of Business Logistics.	3 (3-0-0)
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PH	8720	Advanced Topics in Business Logistics Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Business Logistics which will contribute to the student's research.

PH	8722	Selected Topics in Work Analysis and Design Prerequisite : Consent of Instructor. Topics of current interest in the field of Work Analysis and Design.	3 (3-0-0)
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PH	8723	Advanced Topics in Work Analysis and Design Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Work Analysis and Design which will contribute to the student's research.

PH	8725	Selected Topics in Industrial Engineering Prerequisite : Consent of Instructor. Topics of current interest in the field of Industrial Engineering.	3 (3-0-0)
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PH	8726	Advanced Topics in Industrial Engineering Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Industrial Engineering which will contribute to the student's research.

PH	8728	Selected Topics in Production Management Prerequisite : Consent of Instructor. Topics of current interest in the field of Production Management.	3 (3-0-0)
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PH	8729	Advanced Topics in Production Management Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Production Management which will contribute to the student's research.

Assumption University Graduate Studies

PH 8731 Selected Topics in Inventory Strategies 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Inventory Strategies.

PH 8731 Advanced Topics in Inventory Strategies 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Inventory Strategies which will contribute to the student's research.

PH 8734 Selected Topics in Facility Layout Planning 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Facility Layout Planning.

PH 8735 Advanced Topics in Facility Layout Planning 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Facility Layout Planning which will contribute to the student's research.

PH 8737 Selected Topics in Productivity Engineering 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Productivity Engineering.

PH 8738 Advanced Topics in Productivity Engineering 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Productivity Engineering which will contribute to the student's research.

PH 8801 Selected Topics in Systems Management 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Systems Management.

PH 8802 Advanced Topics in Systems Management 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Systems Management which will contribute to the student's research.

PH 8804 Selected Topics in Statistical Process Control 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Statistical Process Control.

PH 8805 Advanced Topics in Statistical Process Control 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Statistical Process Control which will contribute to the student's research.

PH 8807 Selected Topics in Management of Quality Assurance 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Management of Quality Assurance.

PH 8808 Advanced Topics in Management of Quality Assurance 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of which Management of Quality Assurance will contribute to the student's research.

PH 8810 Selected Topics in Experimental Design 3 (3-0-0)
 Prerequisite : Consent of Instructor.
 Topics of current interest in the field of Experimental Design.

PH 8811 Advanced Topics in Experimental Design 3 (3-0-0)
 Prerequisite : Consent of Instructor.

Advanced topics in the field of Experimental Design which will contribute to the student's research.

PH	8813	Selected Topics in Maintenance Management Prerequisite : Consent of Instructor. Topics of current interest in the field of Maintenance Management	3 (3-0-0)
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PH	8814	Advanced Topics in Maintenance Management Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Maintenance Management which will contribute to the student's research.

PH	8816	Selected Topics in Operations Research Prerequisite : Consent of Instructor. Topics of current interest in the field of Operations Research	3 (3-0-0)
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PH	8817	Advanced Topics in Operations Research Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Operations Research which will contribute to the student's research.

PH	8819	Selected Topics in System Simulation Prerequisite : Consent of Instructor. Topics of current interest in the field of System Simulation.	3 (3-0-0)
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PH	8820	Advanced Topics in System Simulation Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of System Simulation which will contribute to the student's research.

PH	8822	Selected Topics in Sociotechnical Systems Prerequisite : Consent of Instructor. Topics of current interest in the field of Sociotechnical Systems.	3 (3-0-0)
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PH	8823	Advanced Topics in Sociotechnical Systems Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Sociotechnical Systems which will contribute to the student's research.

PH	8825	Selected Topics in Systems Theory Prerequisite : Consent of Instructor. Topics of current interest in the field of Systems Theory.	3 (3-0-0)
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PH	8826	Advanced Topics in Systems Theory Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Systems Theory which will contribute to the student's research.

PH	8828	Selected Topics in Cybernetics Prerequisite : Consent of Instructor. Topics of current interest in the field of Cybernetics.	3 (3-0-0)
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PH	8829	Advanced Topics in Cybernetics Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Cybernetics which will contribute to the student's research.

PH	8901	Selected Topics in Technology Management Prerequisite : Consent of Instructor. Topics of current interest in the field of Technology Management.	3 (3-0-0)
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PH	8902	Advanced Topics in Technology Management	3 (3-0-0)
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Prerequisite: Consent of Instructor.

Advanced topics in the field of Technology Management which will contribute to the student's research.

PH	8911	Selected Topics in Technology Policy and Society Prerequisite : Consent of Instructor. Topics of current interest in the field of Technology Policy and Society.	3 (3-0-0)
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PH	8912	Advanced Topics in Technology Policy and Society Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Technology Policy and Society which will contribute to the student's research.

PH	8921	Selected Topics in Energy Management Prerequisite : Consent of Instructor. Topics of current interest in the field of Energy Management.	3 (3-0-0)
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PH	8922	Advanced Topics in Energy Management Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Energy Management which will contribute to the student's research.

PH	8931	Selected Topics in Environment Management Prerequisite : Consent of Instructor. Topics of current interest in the field of Environment Management.	3 (3-0-0)
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PH	8932	Advanced Topics in Environment Management Prerequisite : Consent of Instructor.	3 (3-0-0)
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Advanced topics in the field of Environment Management which will contribute to the student's research.

PH	9001	Doctoral Research I Prerequisite : Qualifying Examination This is worth three credits toward the Ph.D. dissertation.	3 (0-0-9)
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PH	9002	Doctoral Research II Prerequisite : Qualifying Examination This is worth three credits toward the Ph.D. dissertation.	3 (0-0-9)
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PH	9003	Doctoral Research III Prerequisite : Qualifying Examination This is worth three credits toward the Ph.D. dissertation.	3 (0-0-9)
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PH	9004	Doctoral Research IV Prerequisite : Qualifying Examination This is worth three credits toward the Ph.D. dissertation.	3 (0-0-9)
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PH	9005	Doctoral Research V Prerequisite : Qualifying Examination This is worth three credits toward the Ph.D. dissertation.	3 (0-0-9)
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PH	9006	Doctoral Research VI Prerequisite : Qualifying Examination This is worth three credits toward the Ph.D. dissertation.	3 (0-0-9)
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PH	9007	Doctoral Research VII Prerequisite : Qualifying Examination This is worth three credits toward the Ph.D. dissertation.	3 (0-0-9)
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PH	9008	Doctoral Research VIII Prerequisite : Qualifying Examination	3 (0-0-9)
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		This is worth three credits toward the Ph.D. dissertation.	
PH	9009	Doctoral Research IX Prerequisite : Qualifying Examination This is worth three credits toward the Ph.D. dissertation.	3 (0-0-9)
PH	9010	Doctoral Research X Prerequisite : Qualifying Examination This is worth three credits toward the Ph.D. dissertation.	3 (0-0-9)
PH	9011	Doctoral Research XI Prerequisite : Qualifying Examination This is worth three credits toward the Ph.D. dissertation.	3 (0-0-9)
PH	9012	Doctoral Research XII Prerequisite : Qualifying Examination This is worth three credits toward the Ph.D. dissertation.	3 (0-0-9)