KENTUCKY STATE UNIVERSITY
FACULTY SENATE
CURRICULUM COMMITTEE
FSCC# CC 12/13-20 Effective Date Fall 2013

GRADUATE CURRICULAR/PROGRAM CHANGE TRACKING DOCUMENT

ACADEMIC UNIT: Computer Science DATE SUBMITTED: 2-18-2013

1. BRIEF EXPLANATION OF PROPOSED CHANGE:
   a. Four new courses will be created:
      • COS 505 Computer Science Foundation III 3 credit hours
      • COS 506 Adv. Programming & Data Structures 3 credit hours
      • COS 570 Adv. Computer Architecture & Software 3 credit hours
      • COS 571 Software Assurance 3 credit hours
      The foundational courses will build the necessary background for progression to the Masters level by strengthening students' abilities in computer programming and related skills. These changes are recommended by the external Advisory Board and related to industry needs. The effect on enrollment should be positive.
   b. One revised course per catalog description
      • COS 588 Computer Network Security 3 credit hours
      This change is recommended by our external Advisory Board and related to industry needs. The effect on enrollment should be positive.

2. CHECK ITEM(s) BELOW FOR CHANGES DESIRED:
   □ New Degree Certification □ Deletion of Degree or Certification
   □ New or Revised Major □ Deletion of Course
   □ New or Revised Minor X Revised Degree or Certification
   X New Course(s) X Revised Course
   □ Course Level (number) Change □ Other (specify below):

Dean's Action:
Approved [Signature]
Date: 3/25/13

Kentucky State University is an equal educational and employment opportunity/affirmative action institution
II. Graduate Council Action:

☑ Approved  ☐ Disapproved  ☐ Returned for Recommended Change

Director of Graduate Studies: (signature): [Signature]  Date: 3/26/13

III. Curriculum Committee Action:

☒ Approved  ☐ Disapproved  ☐ Returned for Recommended Change

Chairperson: (signature): [Signature]  Date: 3/26/2013

IV. Faculty Senate Action:

☑ Approved  ☐ Disapproved  ☐ Returned for Recommended Changes

Senate President (signature): [Signature]  Date: 3/28/13

V. Provost/Vice President Academic Affairs (not required for courses):

☒ Approved  ☐ Disapproved  ☐ Returned for Recommended Change

Provost/VPAA (Signature): [Signature]  Date: 4/16/13

VI. President's Action (not required for courses):

☑ Approved  ☐ Disapproved  ☐ Returned for Recommended Change

President (Signature): [Signature]  Date: 5/18/13

Final Faculty Senate Approved form As Of 9/15/06
KENTUCKY STATE UNIVERSITY
FACULTY SENATE
CURRICULUM COMMITTEE

PROGRAM CHANGE PROPOSAL

ACADEMIC UNIT: Computer Science

DATE PREPARED: 2/18/2013

PRIMARY AUTHOR(S): Dr. Mike Unuakhulu

ACADEMIC DISCIPLINE

FACULTY APPROVED: [Signature]
(Date) 3/19/13

(Committee Chairperson's Signature)

CHAIRPERSON/DEAN

APPROVED: [Signature] 3/19/2013
(Date) (Chairperson's/Dean Signature)

1. DESCRIPTION OF CHANGE

Modify Program Requirements for Masters degree in Computer Science.

- Change required core courses
- Modify the program's two tracks: Cybersecurity and Information Engineering
- Increase the requirements for foundation courses

New Courses to be developed:
1. COS 505 Computer Science Foundation III
2. COS 506 Adv. Programming & Data Structures
3. COS 571 Software Assurance

Courses to be modified:
1. COS 588 Computer Network Security

See attached curriculum ladder

2. STARTING WITH:

_x_ Fall, ___ Spring, ___ Summer; 2013

3. EXPLANATION AND JUSTIFICATION FOR REQUESTED CHANGE

a. The foundational courses credit increase will build the necessary background for progression to the Masters level by strengthening students' abilities in computer programming and related skills. These changes are recommended by the external Advisory Board and related to industry needs.

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Additionally, it will make the graduate computer science program more attractive to prospective students and better meet the current demands of business and industry. The effect on enrollment should be positive.
KENTUCKY STATE UNIVERSITY  
Masters in  
Computer Science Technology  
Fall 2013

<table>
<thead>
<tr>
<th><strong>Foundation Courses</strong> (All 3 courses)</th>
</tr>
</thead>
<tbody>
<tr>
<td>COS 502: Computer Science Foundation I</td>
</tr>
<tr>
<td>COS 504: Computer Science Foundation II</td>
</tr>
<tr>
<td>COS 505: Computer Science Foundation III</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Core Courses All Tracks</strong> (5 Courses)</th>
</tr>
</thead>
<tbody>
<tr>
<td>COS 506: Advanced Programming &amp; Data Structures</td>
</tr>
<tr>
<td>COS 536: Software Engineering</td>
</tr>
<tr>
<td>COS 585: Information Security</td>
</tr>
<tr>
<td>COS 570: Advanced Computer Architecture and Software</td>
</tr>
<tr>
<td>COS 515: Advanced Database Management System</td>
</tr>
</tbody>
</table>

5 Electives

<table>
<thead>
<tr>
<th>Cybersecurity</th>
<th>Information Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>COS 586: Information System Assurance</td>
<td>COS 571: Software Assurance</td>
</tr>
<tr>
<td>COS 533: Cryptography Algorithm</td>
<td>COS 519: Managing Information Technology</td>
</tr>
<tr>
<td>COS 588: Computer Network Security</td>
<td>COS 514: Data Base and Data Mining</td>
</tr>
<tr>
<td>COS 583: Enterprise Security Management</td>
<td>COS 537: Artificial Intelligence</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Common Specialty Electives</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>COS 697 - Independent study</td>
</tr>
<tr>
<td>COS 599 - Special Topics</td>
</tr>
<tr>
<td>COS 698 – Computer Sc. Internship</td>
</tr>
<tr>
<td>COS 796 - Project course</td>
</tr>
</tbody>
</table>
### Core Courses All Tracks (4 Courses)
- COS 541 - Advanced Computer Architecture
- COS 544 - Advanced Operating Systems
- COS 536 - Software Engineering
- COS 515 - Advanced Database Management

### Elective Core Courses (1 Course only)
- COS 585 - Information Security
- COS 535 - Advanced Networking

### Foundation Courses
- COS 502 - Computer Science Foundation I
  or (COS 499 for AIT students)
- COS 504 - Computer Science Foundation II

### Security & Network (3 Courses) | Information Technology (3 Courses)
--- | ---
COS 533 - Cryptography Algorithms | COS 519 - Management Information Technology
COS 588 - Computer and Network Security | COS 517 - E-Commerce
COS 587 - Database Security | COS 521 - Web System Design

### Common Specialty Electives (2 Courses)

<table>
<thead>
<tr>
<th>Security &amp; Network</th>
<th>Information Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>COS 537 - Artificial Intelligence</td>
<td>COS 697 - Independent study</td>
</tr>
<tr>
<td>COS 599 - Special Topics</td>
<td>COS 698 - Internship in computer science</td>
</tr>
<tr>
<td>COS 514 - Database and Data Mining</td>
<td>COS 796 - Project course</td>
</tr>
<tr>
<td>COS 520 - Multimedia Design</td>
<td></td>
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</tbody>
</table>

### Thesis Option
- COS 799 Thesis
COS 797 Residence Credit for Thesis/Professional Project

<table>
<thead>
<tr>
<th>Security &amp; Network Electives</th>
<th>Information Technology Electives</th>
</tr>
</thead>
<tbody>
<tr>
<td>COS 519 - Management Information Technology</td>
<td>COS 533 - Cryptography Algorithms</td>
</tr>
<tr>
<td>COS 517 - E-Commerce</td>
<td>COS 588 - Computer and Network Security</td>
</tr>
<tr>
<td>COS 521 - Web System Design</td>
<td>COS 587 - Database Security</td>
</tr>
<tr>
<td>COS 535 - Advanced Networking</td>
<td>COS 585 - Information Security</td>
</tr>
</tbody>
</table>
ACADEMIC UNIT: Computer Science
DATE PREPARED: 02/18/2013
PRIMARY AUTHOR(S): Dr. Chi Shen

ACADEMIC DISCIPLINE FACULTY APPROVED: [Signature] 3/19/13
(Committee Chairperson’s Signature) (Date)

CHAIRPERSON/DEAN APPROVED: [Signature] 3/19/2013
(Chairperson’s/Dean Signature) (Date)

1. NEW COURSE NUMBER: COS 505

2. NEW COURSE TITLE: Computer Science Foundation III

3. CAPSULE STATEMENT OF COURSE CONTENT FOR CATALOG:
   This course teaches students the skills in computer systems, operating systems and basic components.

4. DESCRIPTION OF COURSE CONTENT FOR COURSE SYLLABUS:
   A general introduction to design of computer systems, operating systems and basic components. It covers the functions of each component, instruction set, I/O system, multiprocessor system and parallel architecture, the concepts and theories that underlie operating systems: process, memory management, file systems, scheduling algorithms, multi-programming. Prerequisite: Advisor’s consent is required.

5. PREREQUISITES:
   Instructor’s consent is required.

6. REQUIRED COURSE: X Yes  ____ No

7. CREDITS: (a) Number 3

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CURRICULUM CHANGE PROPOSAL
ACADEMIC UNIT: DIVISION OF COMPUTER SCIENCE
NUMBER: COS 505

(b) Variable credit Explanation: ________________________________

(c) Will course be repeatable for credit: Yes X No

(d) Grading systems permitted: X A-F ___ P/F ___ Credit/No Credit
   Exceptions: ____________________________________________

8. Course Level: ___ Elementary
   ___ Intermediate
   ___ Intermediate/Advanced
   ___ Advanced

9. CROSSLISTING DEPARTMENTS (attach supporting letters):

10. SCHEDULING PLAN: ___ Each semester
    X ___ Annually
    ___ Biennially
    ___ Occasionally

11. STARTING WITH:
    ___X___ Fall, ___ Spring, ___ Summer: 2013 Academic Year

12. IS THIS A “SPECIAL TOPICS” COURSE? ___ Yes X ___ No

13. EXPLANATION OF NEED FOR THE SPECIFIC COURSE:
    Required for the graduate degree

14. RELATIONSHIP TO OTHER LIKE COURSES IN THE DISCIPLINE/UNIVERSITY:
    Build on Basic Programming

15. COURSE WHICH MAY BE DROPPED AS A RESULT OF THIS PROPOSAL: None

16. INSTRUCTIONAL STAFF (if non-faculty, attach Vita): Chi Shen

17. COURSE SYLLABUS AND TEXT REFERENCE: See Attached
    Please attach. Include methods the instructor will use to evaluate student performance and a
    bibliography of available and needed references for Blazer Library.
CURRICULUM COMMITTEE
NEW COURSE PROPOSAL

ACADEMIC UNIT: Computer Science

DATE PREPARED: 02/18/2013

PRIMARY AUTHOR(S): Dr. Ashok Kumar

ACADEMIC DISCIPLINE FACULTY APPROVED: 3/7/13
(Committee Chairperson’s Signature)

CHAIRPERSON/DEAN APPROVED: 3/7/13
(Chairperson’s/Dean Signature)

1. NEW COURSE NUMBER: COS 506

2. NEW COURSE TITLE: Advanced Programming and Data Structures

3. CAPSULE STATEMENT OF COURSE CONTENT FOR CATALOG:
   This course teaches students the advanced skills in programming and Data Structures

4. DESCRIPTION OF COURSE CONTENT FOR COURSE SYLLABUS:
   This course introduces advanced programming concepts using Object-Oriented techniques. Some of the data structures mastered in this course are Link Lists, Stacks, Queues, Trees etc. Emphasis will also be on development of recursive, sorting and searching algorithms
   Prerequisite: Advisor’s consent is required.

5. PREREQUISITES:
   COS 502 or consent of instructor

6. REQUIRED COURSE: X Yes  No

7. CREDITS: (a) Number 3

   (b) Variable credit Explanation: 

   (c) Will course be repeatable for credit: Yes  X No

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(d) Grading systems permitted: X A-F ___ P/F ___ Credit/No Credit

Exceptions: ________________________________________________________

8. Course Level: ___ Elementary
   ___ Intermediate
   X Intermediate/Advanced
   ___ Advanced

9. CROSSTRAINING DEPARTMENTS (attach supporting letters):

10. SCHEDULING PLAN: ___ Each semester
    X Annually
    ___ Biennially
    ___ Occasionally

11. STARTING WITH:
    X Fall, ___ Spring, ___ Summer: 2013 Academic Year

12. IS THIS A "SPECIAL TOPICS" COURSE? ___ Yes X ___ No

13. EXPLANATION OF NEED FOR THE SPECIFIC COURSE:
    Required for the graduate degree

14. RELATIONSHIP TO OTHER LIKE COURSES IN THE DISCIPLINE/UNIVERSITY:
    Build on Basic Programming

15. COURSE WHICH MAY BE DROPPED AS A RESULT OF THIS PROPOSAL: None

16. INSTRUCTIONAL STAFF (if non-faculty, attach Vita): Dr. Ashok Kumar

17. COURSE SYLLABUS AND TEXT REFERENCE: See Attached
    Please attach. Include methods the instructor will use to evaluate student performance and a
    bibliography of available and needed references for Blazer Library.
KENTUCKY STATE UNIVERSITY
FACULTY SENATE
CURRICULUM COMMITTEE

CURRICULUM COMMITTEE
NEW COURSE PROPOSAL

ACADEMIC UNIT: Computer Science

DATE PREPARED: 02/18/2013

PRIMARY AUTHOR(S): Dr. Wasim Al-Hamdani

ACADEMIC DISCIPLINE
FACULTY APPROVED: 
(Committee Chairperson’s Signature) 

CHAIRPERSON/DEAN APPROVED: 
(Chairperson’s/Dean Signature) 

1. NEW COURSE NUMBER: COS 570


3. CAPSULE STATEMENT OF COURSE CONTENT FOR CATALOG:
   Advanced topics on computer software and hardware systems are covered which involves
   controlling complexity; virtual memory, threads and coordination of parallel activities. It
   also discusses quantitative and qualitative understanding of superscalar, pipelined
   architectures and different operating systems.

4. DESCRIPTION OF COURSE CONTENT FOR COURSE SYLLABUS:
   This course covers topics on computer software and hardware systems: techniques for
   controlling complexity; strong modularity using client-server design, virtual memory, and
   threads; networks; atomicity and coordination of parallel activities; recovery and reliability;
   privacy, security, and encryption; and impact of computer systems on society. Case studies of
   working systems and readings from the current literature provide comparisons and contrasts.
   Two design projects are required, and students engage in extensive written communication
   exercises. Quantitative and qualitative understanding of superscalar, super pipelined. Parallel
   processing systems, distributed systems, real time systems, network operating systems, and
   open source operating systems

Final Faculty Senate Approved Form as of 10/4/89
5. **PREREQUISITES:**

   Instructor's consent is required.

6. **REQUIRED COURSE:** X Yes  ___ No

7. **CREDITS:**
   (a) Number ____3____
   (b) Variable credit Explanation: ____________________________
   (c) Will course be repeatable for credit: Yes  X No
   (d) Grading systems permitted: X A-F  ___ P/F  ___ Credit/No Credit
      Exceptions: _______________________________________

8. **Course Level:** ___ Elementary
   X Intermediate
   ___ Intermediate/Advanced
   ___ Advanced

9. **CROSSLISTING DEPARTMENTS** (attach supporting letters):

10. **SCHEDULING PLAN:** ___ Each semester
   X Annually
   ___ Biennially
   ___ Occasionally

11. **STARTING WITH:**
    X Fall, ___ Spring, ___ Summer:   ___2013___ Academic Year

12. IS THIS A “SPECIAL TOPICS” COURSE? ___ Yes  X No

13. **EXPLANATION OF NEED FOR THE SPECIFIC COURSE:**
    Required for the graduate degree

14. **RELATIONSHIP TO OTHER LIKE COURSES IN THE DISCIPLINE/UNIVERSITY:**
    Build on Basic Programming
15. COURSE WHICH MAY BE DROPPED AS A RESULT OF THIS PROPOSAL: None

16. INSTRUCTIONAL STAFF (if non-faculty, attach Vita): Wasim Al-Hamdani

17. COURSE SYLLABUS AND TEXT REFERENCE: See Attached
   Please attach. Include methods the instructor will use to evaluate student performance and a
   bibliography of available and needed references for Blazer Library.
Curriculum Committee
New Course Proposal

Academic Unit: Computer Science

Date Prepared: 02/18/2013

Primary Author(s): Dr. S. Bhattacharyya

Academic Discipline: Faculty Approved: 3/7/13 (Date)
COMMITTEE CHAIRPERSON’S NAME

Chairperson/Dean Approved: 3/7/13 (Date)

Chairperson’s/Dean Signature

1. New Course Number: COS 571

2. New Course Title: Software Assurance

3. Capsule Statement of Course Content for Catalog:
   Students will learn advanced skills in software assurance. This course will prepare students in methods to assure a level of confidence in software systems and develop expertise to assess the security capabilities and resiliency of the software.

4. Description of Course Content for Course Syllabus:
   To learn the methods to assure the level of confidence in software systems that it will process as intended. Develop the expertise to be able to assess the security capabilities and resiliency of the software system to security breaches or faults. The course will cover topics on Testing, Quality assurance, Analysis, Product Metrics, Risk analysis, Security and Vulnerability assessment.

5. Prerequisites:
   Consent of instructor required

6. Required Course: X Yes    ____ No

7. Credits: (a) Number 3

   (b) Variable credit Explanation:

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CURRICULUM CHANGE PROPOSAL
ACADEMIC UNIT: ________________________
COURSE NUMBER: ___COS 571
PAGE 2

(c) Will course be repeatable for credit: ___Yes  X No
(d) Grading systems permitted: ___X A-F  ___P/F  ___Credit/No Credit
   Exceptions: ________________________________

8. Course Level: ___ Elementary
   ___ Intermediate
   ___ Intermediate/Advanced
   ___X Advanced

9. CROSSLISTING DEPARTMENTS (attach supporting letters):

10. SCHEDULING PLAN: ___ Each semester
     X annually
     ___ Biennially
     ___ Occasionally

11. STARTING WITH:
    ___X Fall, ___ Spring, ___ Summer: ___ 2013 ___ Academic Year

12. IS THIS A "SPECIAL TOPICS" COURSE? ___ Yes  X No

13. EXPLANATION OF NEED FOR THE SPECIFIC COURSE:
    Required for the new gaming degree

14. RELATIONSHIP TO OTHER LIKE COURSES IN THE DISCIPLINE/UNIVERSITY:
    Builds on the concepts for Software Engineering for Game development

15. COURSE WHICH MAY BE DROPPED AS A RESULT OF THIS PROPOSAL:

16. INSTRUCTIONAL STAFF (if non-faculty, attach Vita): S. Bhattacharyya

17. COURSE SYLLABUS AND TEXT REFERENCE: See Attached
    Please attach. Include methods the instructor will use to evaluate student performance and a
    bibliography of available and needed references for Blazer Library.
COURSE DESCRIPTION
for the New Courses

COS 505 Computer Science Foundation III
Prerequisite: Consent of the instructor. A general introduction to design of computer systems, operating systems and basic components. It covers the functions of each component, instruction set, I/O system, multiprocessor system and parallel architecture, the concepts and theories that underlie operating systems: process, memory management, file systems, scheduling algorithms, multiprocessing.

COS 506: Advanced Programming & Data Structures
Prerequisite: COS 502 or consent of the instructor. This course introduces advanced programming concepts using Object-Oriented techniques. Some of the data structures mastered in this course are Link Lists, Stacks, Queues, Trees etc. Emphasis will also be on development of recursive, sorting and searching algorithms.

COS 570: Computer Architecture & Software
Course discusses advanced topics and research issues in operating systems and computer Architecture. Topics will be drawn from a variety of operating systems areas and different architecture design such as distributed systems and languages, networking, security, and protection, real-time systems, modeling and analysis, CHDL, HLD, cluster machine, Z-system architecture design, etc.

COS 571: Software Assurance
Prerequisite: Consent of the instructor. To learn the methods to assure the level of confidence in software systems that it will process as intended. Develop the expertise to be able to assess the security capabilities and resiliency of the software system to security breaches or faults. The course will cover topics on Testing, Quality assurance, Analysis, Product Metrics, Risk analysis, Security and Vulnerability assessment.

COS 588: Computer Network and Security
Prerequisite: Consent of the instructor. The course covers two major topics, computer network protocols layers and service models, the OSI model, network architecture, and networked systems. The second part involves an examination of network security defense techniques and countermeasures. Topics include: firewall systems and IDS, VPNs, Security threats, mechanisms, and services.
Kentucky State University
DIVISION OF COMPUTER AND TECHNICAL SCIENCES

Course: COS-50690
Course Title: Data Structures (3 credit hours)

Syllabus

PROFESSOR: Dr. Chi Shen
OFFICE: 314 F Hathaway Hall
OFFICE PHONE: 502-597-6211
FAX: 502-597-6179
E-MAIL: ashok.kumar@kys.edu

SEMESTER: Spring 2013
CLASS TIME: Wednesday: 5:00-7:30 pm
CLASSROOM:
OFFICE HOURS: MWF: 12:30 to 3:00 pm

I. MISSION STATEMENTS:
The Objectives and Learning Outcomes of this course directly support the Mission of the University, College, and Division, and may be found at: www.kysu.edu/about; www.kysu.edu/academics/collegesAndSchools/default.htm; www.kysu.edu/academics/collegesAndSchools/collegeofartssocialsciencesandinterdisciplinarystudies/default.htm.

II. NOTICE TO STUDENTS WITH DISABILITIES:
Any student who requires an accommodation due to a documented disability may contact the Disability Resource Center (DRC) at (502) 597-5076, or visit Hill Student Center, Suite 220C, to arrange for reasonable accommodations. The student is required to obtain verification from the DRC and deliver the signed DRC document to the instructor specifying the accommodations. The student is encouraged to complete this process at the beginning of the semester since an approval for accommodations is not retroactive. The accommodations become effective upon receipt of the DRC approval by the faculty member from the student. Additional information concerning the DRC and accommodations can be found at http://www.kysu.edu/about/divisions/studentAffairsAndEnrollment/disabilityRecourseCenter.htm.

III. COURSE DESCRIPTION – COURSE RATIONALE:
This course introduces advanced programming concepts. Some of the data structures mastered in this course are Link Lists, Stacks, Queues, Trees etc. We will use Object Oriented approach. Emphasis will also be on development of recursive, sorting and searching algorithms and for stacks, queues, sorting using linked list, priority queues, Heaps, Graphs and Sets.
Prerequisite: Advisor’s consent is required.

IV. COURSE OBJECTIVES:
The objective of this course is to
- Extend programming ability using an object oriented language. Build and manipulate linear and non-linear data structures, including stacks, queues, linked lists, tree, graphs and recursion.
- Learn algorithms for sorting, and search data.
V. STUDENT LEARNING OBJECTIVES/OUTCOMES:

Upon completing the course, you should be able to:

- Understand the role of Software Engineering principles as used in the creation of quality software;
- Create objects, and utilize object oriented techniques for the creation of quality software;
- Use ADT, pointers and indirect addressing techniques;
- Utilize the various data structures covered in class (linked lists, queues, stacks, recursion, sorting and searching algorithms) and learn how to effectively use them to solve typical programming problems;
- Learn more about the Visual C++ programming environment.

VI. REQUIRED TEXTS:


VII. BLACKBOARD:

Blackboard is a learning environment you will use for most of your course functions.

You can access course information, announcements, messages, assignments, quizzes, and the Discussion Board inside the Blackboard site. You will also submit and retrieve your coursework using Blackboard, so take some time, if you have not used it before, to learn how to use the site effectively and efficiently. Your failure to familiarize yourself with the site will not be a suitable excuse for late work or lack of progress.

You need to check Blackboard REGULARLY to find assignments, course materials and class announcements.

VIII. COURSE SPECIFIC REQUIREMENTS, EXPECTATIONS, POLICIES:

ASSIGNMENTS:

All assignments are due on the due date at the beginning of the class. A penalty of 10% is assessed for the first day assignment is late. An assignment that is more than a week late will not get credit. A due date will be given in class or online for each weekly assignment. To earn full credit for an assignment, you should:

- Make sure it is turned in on time
- Present it neatly and well organized
- Test it for the proper output and resolve all errors
Students are required to take the examinations on the dates and at the times they are scheduled. No makeup examinations will be given without an official excuse or the equivalent.

ATTENDANCE:

- Students are expected to attend class regularly. In the event that a student must miss a class, the student is responsible for finding out what assignments were made, what due dates were announced, what material was covered.
- Any individual student with poor class attendance should not expect the instructor to provide out of class assistance.
- Tardiness to class is discouraged.
- Excused absences require documented proof.
- Electronic devices, such as cell phone, iPad, and iPod etc are not allowed to use during the class. If you must use them, you will be asked to leave the classroom and come back after you finish.

IX. EVALUATION PROCEDURES:

EVALUATION:

Your score will be based on the following:

- Participation and Attendance 5%
- Weekly Assignments, Projects 30%
- Quizzes and exams 45%
- Final Exam 20%

GRADING:

Your total points will be compared to the total points available to all class members to determine a percentage. Grades will be assigned by the following scale:

<table>
<thead>
<tr>
<th>Points</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>90-100</td>
<td>A</td>
</tr>
<tr>
<td>80-89</td>
<td>B</td>
</tr>
<tr>
<td>70-79</td>
<td>C</td>
</tr>
<tr>
<td>0-59</td>
<td>F</td>
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</tbody>
</table>

X. COURSE CALENDAR/SCHEDULE:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Software Engineering Principles Classes</td>
<td>Chapter 1</td>
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<tr>
<td>2</td>
<td>Data Design and Implementation</td>
<td>Chapter 2</td>
</tr>
<tr>
<td>3</td>
<td>Data Design and Implementation</td>
<td>Chapter 2</td>
</tr>
<tr>
<td>4</td>
<td>Unsorted lists</td>
<td>Chapter 3</td>
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<tr>
<td>5</td>
<td>Unsorted lists</td>
<td>Chapter 3</td>
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<tr>
<td>6</td>
<td>ADT Sorted Lists/ Midterm 1</td>
<td>Chapter 4</td>
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<td>7</td>
<td>ADT Stacks and Queues</td>
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<td>Chapter 5</td>
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<td>9</td>
<td>Spring Break</td>
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<td>10</td>
<td>List PLUS</td>
<td>Chapter 6</td>
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<tr>
<td>Week</td>
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<tr>
<td>11</td>
<td>List PLUS</td>
<td>Chapter 6</td>
</tr>
<tr>
<td>12</td>
<td>Programming with Recursion/Midterm 2</td>
<td>Chapter 7</td>
</tr>
<tr>
<td>13</td>
<td>Programming with Recursion</td>
<td>Chapter 7</td>
</tr>
<tr>
<td>14</td>
<td>Binary Search Tree</td>
<td>Chapter 8</td>
</tr>
<tr>
<td>15</td>
<td>Priority Queues, Heaps, Graphs</td>
<td>Chapter 9</td>
</tr>
<tr>
<td>16</td>
<td>Sorting and Searching/Review</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td><strong>Final exam</strong></td>
<td></td>
</tr>
</tbody>
</table>

*The instructor reserves the right to make changes to (delete, add, or modify) this Syllabus as the semester progresses.*
Student Acknowledgment of Receipt of Course Information

My signature below indicates that I have received a course syllabus for the following course, ____________, and I have been notified that the "Common Policies for all Courses at KSU" can be found throughout the University Catalogue at:

http://www.kysu.edu/about/divisions/studentAffairsAndEnrollment/enrollmentManagement/registrar/Kentucky+State+University+Catalogue.htm

I agree to read these documents, and I agree to sign and deliver this copy of the "Student Acknowledgment" form within two (2) weeks of the start of the semester. I understand that the policies contained within these documents apply directly to me and to all students in the class. I agree to abide by these policies, and recognize that not abiding by these policies could result in dismissal from this class and/or affect my standing as a student at KSU as per Section 2.C. of the Student Handbook and Section XIX.G.1. of the University Catalogue.

Name (please print): ____________________________________________

CVID: _________________________________________________________

Signature: ____________________________________________________

Date: _________________________________________________________

Contact information (please PRINT clearly):

Local Address: ________________________________________________

Local Phone: _________________________________________________

E-Mail: _______________________________________________________

[Or, the instructor may choose the electronic option:]

Student Acknowledgment of Receipt of Course Information

Read the syllabus and the "Common Policies for all Courses at KSU" found throughout the University Catalogue at:

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Then, type exactly what is written below in Statements (1) and (2), and deliver this statement as instructed: make sure "Student Acknowledgment of Receipt of Course Information" is on the subject line. Adding your name and student ID at the end of the statement will stand as your signature. I also agree to deliver this copy of the "Student Acknowledgment" form within two (2) weeks of the start of the semester. I understand that the policies contained within these documents apply directly to me and to all students in the class. I agree to abide by these policies, and recognize that not abiding by these policies could result in dismissal from this class and/or affect my standing as a student at KSU as per Section 2.C. of the Student Handbook and Section XIX.G.1. of the University Catalogue.

1) This statement acknowledges that: (A) I have received the course syllabus for ____________, and (B) I have read the "Common Policies for all Courses at KSU." I understand this statement will be printed and kept in my permanent file or be placed in my electronic Blackboard file for future reference.

2) I agree that I have read these documents before sending this email to my Instructor. I understand that the policies contained within these documents apply directly to me and to all students in the class. By sending this email I agree to abide by these policies, and recognize that not abiding by these policies could result in dismissal from this class and/or affect my standing as a student at KSU.

Student Name and ID number
I. MISSION STATEMENTS:
The Objectives and Learning Outcomes of this course directly support the Mission of the University, College, and Division, and may be found at: www.kysu.edu/about; www.kysu.edu/academics/collegesAndSchools/default.htm; www.kysu.edu/academics/collegesAndSchools/collegeofartssocialsciencesandinterdisciplinarystudies/default.htm.

II. NOTICE TO STUDENTS WITH DISABILITIES:
Any student who requires an accommodation due to a documented disability may contact the Disability Resource Center (DRC) at (502) 597-5076, or visit Hill Student Center, Suite 220C, to arrange for reasonable accommodations. The student is required to obtain verification from the DRC and deliver the signed DRC document to the instructor specifying the accommodations. The student is encouraged to complete this process at the beginning of the semester since an approval for accommodations is not retroactive. The accommodations become effective upon receipt of the DRC approval by the faculty member from the student. Additional information concerning the DRC and accommodations can be found at http://www.kysu.edu/about/divisions/studentAffairsAndEnrollment/disabilityResourceCenter.htm.

III. COURSE DESCRIPTION – COURSE RATIONALE:
The course is designed for the graduate students who do not have computer science background. The course provides students with an understanding of two fundamental parts in computer science: Computer Organization and Operating system.

Part 1: Computer organization

The first part of the course provides the basic knowledge necessary to understand the hardware operation of digital computers and covers some main subjects associated with computer hardware. It gives students a clear understanding of the architecture and organization of modern computers, and the cost and performance tradeoffs involved in their design. It shows you how to understand modern computer architecture in its rapidly changing form by discussing fundamental ideas, plus real world examples. Students would learn how to develop an elementary computer by leading you through the process on challenging problems. Make the class informative and enjoyable.

Part 2: Operating system
Operating systems are an essential part of any computer system. Similarly, a course on operating systems is an essential part of any computer-science education. This part of course provides an introduction of operating system design, internals, and administration. Topics include process management, scheduling, memory management, concurrency, synchronization, inter process communication. In this course, we do not concentrate on any particular operating system or hardware. Instead, we discuss fundamental concepts that are applicable to a variety of systems. Our aim is to present basic concepts and algorithms in a general setting that is not tied to one particular operating system.

IV. COURSE OBJECTIVES/LEARNING OUTCOMES:

This course is intended to provide graduate students with a broad understanding of computer architecture and operating systems. Upon completion of this course, the student will be able to:

Knowledge:
- Define computer architecture
- Recall the basic concept of computer architecture and operating system.
- Identify computer hardware and system software

Comprehension:
- Understand the various digital components used in the organization and design of digital computers
- Understand the detailed steps that a designer must go through in order to design an elementary basic computer
- Explain the architecture and organization of modern computers, and the cost and performance tradeoffs involved in their design.
- Depict the methods for process scheduling, inter process communication, process synchronization and deadlock handling
- Understand interfaces provided by the memory management component of the operating system

Application:
- Apply the technical knowledge to the other applications.
- Apply the process management techniques and be able to write applications using the interfaces provided by the operating system.
- Apply the process synchronization mechanisms for writing concurrent applications
- Be able to use management schemes to improve both the utilization of the CPU and the speed of its users.

V. REQUIRED TEXTS:

- THE ESSENTIALS OF COMPUTER ORGANIZATION AND ARCHITECTURE
  Jones and Bartlett Publisher

- OPERATING SYSTEM CONCEPTS 7th edition
  by Avi Silberschatz, Peter Galvin and Greg Gagne

VI. BLACKBOARD:

Blackboard is a learning environment you will use for most of your course functions.
You can access course information, announcements, messages, assignments, quizzes, and the Discussion Board inside the Blackboard site. You will also submit and retrieve your coursework using Blackboard, so take some time to learn how to use the site effectively and efficiently. Your failure to familiarize yourself with the site will not be a suitable excuse for late work or lack of progress.

You need to check Blackboard **REGULARLY** to find assignments, course materials and class announcements.

---

**VII. COURSE SPECIFIC REQUIREMENTS, EXPECTATIONS, POLICIES:**

**ASSIGNMENTS:**

All assignments are due on the due date at the beginning of the class. A penalty of **10%** is assessed for the first day assignment is late. **An assignment that is more than a week late will not get credit.** A due date will be given in class or online for each weekly homework assignment. To earn full credit for an assignment, you should:

- Make sure it is turned in on time
- Present it neatly and well organized
- Test it for the proper output and resolve all errors

Students are required to take the examinations on the dates and at the times they are scheduled. No makeup examinations will be given without an official excuse or the equivalent.

**ATTENDANCE:**

- Students are expected to attend class **regularly.** In the event that a student must miss a class, the student is responsible for finding out what assignments were made, what due dates were announced, what material was covered.
- Any individual student with poor class attendance should not expect the instructor to provide out of class assistance.
- Tardiness to class is discouraged.
- Excused absences require documented proof.

---

**VIII. EVALUATION PROCEDURES:**

**EVALUATION:**

<table>
<thead>
<tr>
<th>Part I: Homework /Project</th>
<th>30%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes/Exams</td>
<td>20%</td>
</tr>
<tr>
<td>Part II: Homework /Project</td>
<td>30%</td>
</tr>
<tr>
<td>Quizzes/Exams</td>
<td>20%</td>
</tr>
</tbody>
</table>

**GRADING:**

Your total points will be compared to the total points available to all class members to determine a percentage. Grades will be assigned by the following scale:

<p>| 90-100      | A |
| 80-89       | B |</p>
<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction/ Data Representing</td>
<td><strong>Book1:</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chapter 1,2</td>
</tr>
<tr>
<td>2</td>
<td>Boolean Algebra and Digital Logic</td>
<td>Chapter 3</td>
</tr>
<tr>
<td>3</td>
<td>Simple Computer /Instruction Set</td>
<td>Chapter 4,5</td>
</tr>
<tr>
<td>4</td>
<td>Memory</td>
<td>Chapter 6</td>
</tr>
<tr>
<td>5</td>
<td>Input/output/Storage System</td>
<td>Chapter 7</td>
</tr>
<tr>
<td>6</td>
<td>Parallel and Multiprocessor Architectures</td>
<td>Chapter 9, 11</td>
</tr>
<tr>
<td></td>
<td>Performance Analysis</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Review</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Midterm</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td><strong>Spring Break</strong></td>
<td><strong>Book2:</strong></td>
</tr>
<tr>
<td></td>
<td>Introduction</td>
<td>Chapter 1,2</td>
</tr>
<tr>
<td></td>
<td>Operating-System Structures</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Processes</td>
<td>Chapter 3, 4</td>
</tr>
<tr>
<td></td>
<td>Threads</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>CPU Scheduling</td>
<td>Chapter 5</td>
</tr>
<tr>
<td>12</td>
<td>Process Synchronization</td>
<td>Chapter 6, 7</td>
</tr>
<tr>
<td></td>
<td>Deadlock</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Memory Management</td>
<td>Chapter 8</td>
</tr>
<tr>
<td>14</td>
<td>Virtual Memory</td>
<td>Chapter 9</td>
</tr>
<tr>
<td>15</td>
<td>Review</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Final Exam</td>
<td></td>
</tr>
</tbody>
</table>

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I agree to read these documents, and I agree to sign and deliver this copy of the “Student Acknowledgment” form within two (2) weeks of the start of the semester. I understand that the policies contained within these documents apply directly to me and to all students in the class. I agree to abide by these policies, and recognize that not abiding by these policies could result in dismissal from this class and/or affect my standing as a student at KSU as per Section 2.C. of the Student Handbook and Section XIX.G.1. of the University Catalogue.

Name (please print): ________________________________

CWID: ________________________________

Signature: ______________________________________

Date: ______________________________________

Contact information (please PRINT clearly):

Local Address: ________________________________

Local Phone: ________________________________

E-Mail: ________________________________

[Or, the instructor may choose the electronic option:]

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Student Name and ID number
Kentucky State University
Division Computer Sciences
Course: COS 570

Course Title: Adv. Computer Architecture & Software (3 credit hours)

Syllabus

PROFESSOR: Wasim A Al-Hamdani
OFFICE: HH314A
OFFICE PHONE: 6728
FAX: 502-597-6179
E-MAIL: Wasim.al-hamdani@kysu.edu

SEMESTER: Fall
CLASS TIME: R5-7:30
CLASSROOM: HH313
OFFICE HOURS:

I. MISSION STATEMENTS:
The Objectives and Learning Outcomes of this course directly support the Mission of the University, College, and Division, and may be found at: www.kysu.edu/about; www.kysu.edu/academics/collegesAndSchools/default.htm; www.kysu.edu/academics/collegesAndSchools/collegeofartssocialsciencesandinterdisciplinarystudies/default.htm.

II. NOTICE TO STUDENTS WITH DISABILITIES:
Any student who feels he or she may need an accommodation based on the impact of a disability may contact the Disability Resource Center (DRC) at (502) 597-5076, or visit Hill Student Center, Suite 220C, to arrange reasonable accommodations for documented disabilities. The student is required to obtain verification from the DRC and deliver the signed DRC document to the instructor at the beginning of the semester for reasonable accommodations.

III. COURSE DESCRIPTION – COURSE RATIONALE:
Course discusses advanced topics and research issues in operating systems and computer Architecture. Topics will be drawn from a variety of operating systems areas and different architecture design such as distributed systems and languages, networking, security, and protection, real-time systems, modeling and analysis, CHDL, HLD, cluster machine, Z-system architecture design, etc.

IV. COURS OVERVIEW:
Course Overview

The operating system part will introduce advanced concepts in operating system theory and implementation; identify software design issues for advanced computer systems, such as multiprocessors or distributed systems; provide exposure to current topics in operating system research by reading and analysis of journal papers; and review and expand on complex concepts from the introductory operating systems course, such as synchronization, virtual memory, and file systems.
A quantitative and qualitative understanding of superscalar, superpipelined, dataflow and VLIW processors; Available parallelism in programs; Out of order instruction execution; Reservation stations; Reorder buffers; Exception handling in out of order processors; Branch prediction techniques; Memory systems for superscalar processors; Trace caches; Memory disambiguation and load/store reordering; Performance evaluation of superscalar processors; Multicore processors; Composable distributed processors
V. STUDENT LEARNING OBJECTIVES/OUTCOMES:

- The basic concepts of building operating system
- Different function of operating system
- Students will learn to read and critique research papers
- Students will summarize and lead a discussion of research papers
- Students will be familiar with classic operating systems literature
- Students will know where to look for and where to publish operating system papers
- Experience in state of the art computer architecture tools
- Some exposure to computer architecture research
- Some experience in technical writing
- Some experience in project presentations

VI. REQUIRED TEXTS:

Readings:
Principles of Computer System Design: An Introduction
Jerome H. Saltzer
M. Frans Kaashoek
Publisher: Morgan Kaufmann; 1 edition (July 7, 2009)
Language: English
ISBN-10: 0123749573

Understanding Operating Systems
Publisher: Course Technology; 006 edition (February 17, 2010)
Language: English
ISBN-10: 9781439079201

Operating Systems In Depth: Design and Programming
Thomas W. Doeppner
by Thomas W. Doeppner
November 2010, ©2011

Guide to Parallel Operating Systems with Windows® 7 and Linux, 2nd Edition
Ron Carswell - San Antonio College
Shen Jiang - San Antonio College
Terrill Freese - San Antonio College

Optional supplementary reference texts include the following:
Distributed Systems, Sape Mullender, Addison-Wesley.
Distributed Operating Systems, Andrew S. Tanenbaum, Prentice Hall.
An Introduction to Programming with Threads, Andrew Burrell.
Multithreaded Programming with Pthreads, Chapter 4, Bil Lewis, Daniel J. Berg.
VII. BLACKBOARD: all papers are located in Blackboard course site

VIII. COURSE SPECIFIC REQUIREMENTS, EXPECTATIONS, POLICIES:

Student required to read papers before attending the lecture; the student evaluation will depends on student class discussion, presenting and involvement in class work

Student need to submit deep research paper according to ACM specifications

Our policy is simple, based on professional standards: On quizzes and tests you should not collaborate. On all other assignments you are welcome to work with anyone else on ideas and understanding, but you should complete all assignments on your own, and you should carefully acknowledge all contributions of ideas by others, whether from classmates or from sources you have read

IX. EVALUATION PROCEDURES:

Student homework 20% (1.5/home work)
Student papers 20% Nov 26\textsuperscript{th}, 2012
Midterm 20% Oct 8\textsuperscript{th}, 2012
Final 40% Dec 10\textsuperscript{th}, 2012

X. COURSE CALENDAR/SCHEDULE:

<table>
<thead>
<tr>
<th>Topics</th>
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<tbody>
<tr>
<td>1 Operating Systems</td>
</tr>
<tr>
<td>2 PC Hardware and x86 Programming</td>
</tr>
<tr>
<td>3 OS Organization</td>
</tr>
<tr>
<td>4 Address Spaces using Segmentation (Handout)</td>
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<tr>
<td>5 Address Spaces using Page Tables (Handout)</td>
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<tr>
<td>6 Interrupt and Exception Handling</td>
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<td>7 Multiprocessors and Locking</td>
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<td>8 Processes and Context Switching</td>
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<td>9 Processes and Coordination</td>
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</tbody>
</table>

**Paper**

You need to submit an idea for a paper; the paper is on “operating system security”

The paper need to be in ACM temples you find it on black board
Student Acknowledgment of Receipt of Course Information

My signature below indicates that I have received a course syllabus and have read the "Common Policies for all Courses at KSU" at www.kysu and for the following course: ___________.

I agree to read these documents before the next class period. I understand that the policies contained within these two documents apply to me and to all other students in the class, and by my signature I agree to abide by these policies.

Name (please print): ____________________________

CWID: ______________________________________

Signature: ___________________________________

Date: ________________________________________

Contact information (please PRINT clearly):

Local Address: __________________________________

________________________________________________________________________

Local Phone: ____________________________

E-Mail: __________________________

--------------------------

Or, the instructor may choose the electronic option:

Student Acknowledgment of Receipt of Course Information

Once you have read the syllabus and all applicable readings suggested by the syllabus, type exactly what is written below in Statements 1) and 2) send me an email (through Outlook) or a Message (through Blackboard) with the following two statements, and make sure "Student Acknowledgment of Receipt of Course Information" is on the subject line and make sure you put your name at the end:

1) This statement acknowledges that A) I have received the course syllabus for: ___________; and B) I have read the "Common Policies for all Courses at KSU" found at www.kysu.edu and I understand this statement will be printed and kept in my permanent file or be placed in my electronic Blackboard file for future reference.

2) I agree to read these documents before sending in this email. I understand that the policies contained within these documents apply directly to me and to all students in the class. By sending this email I agree to abide by these policies, and recognize that not abiding by these policies could adversely affect my grade in this class and/or my standing as a student at KSU.
Kentucky State University
Division of Computer Sciences
Course: COS 571-90
Course Title: Software Assurance (3 credit hours)
Syllabus

PROFESSOR: Siddhartha Bhattacharyya
OFFICE: HH 314C
OFFICE PHONE: 502-597-6386
FAX: 502-597-6179

SEASON: Fall 2011
CLASS TIME: T 5:00-7:30PM
CLASSROOM: HH 300
OFFICE HOURS: T-R 9:00AM-12:00PM;
M-W 10:00-12:00PM or by appointment

E-MAIL: s.bhattacharyya@kysu.edu

I. MISSION STATEMENTS:
The Objectives and Learning Outcomes of this course directly support the Mission of the University, College, and Division, and may be found at: www.kysu.edu/about;

II. NOTICE TO STUDENTS WITH DISABILITIES:
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III. COURSE DESCRIPTION – COURSE RATIONALE:
Students will learn advanced skills in software assurance. This course will prepare students in methods to assure a level of confidence in software systems and develop expertise to assess the security capabilities and resiliency of the software.

IV. COURSE OBJECTIVES:
To learn the methods to assure the level of confidence in software systems that it will process as intended. Develop the expertise to be able to assess the security capabilities and resiliency of the software system to security breaches or faults. The course will cover topics on Testing, Quality assurance, Analysis, Product Metrics, Risk analysis, Security and Vulnerability assessment.

V. STUDENT LEARNING OBJECTIVES/OUTCOMES:
Software Assurance is to acquaint students with the use of methodologies applied to the development of secure and more reliable software. At the conclusion of the course, the successful student will be competent at all of the following tasks, and proficient at most of them:

- Understand assessment of software
- Understand building secure software
- Evaluate software security capabilities
- Understanding and implementation of testing and quality assurance methods
• Understanding software management.
• Applying the principles to the development of software.

Most of the learning in this course will be accomplished when you attend the class and do the homework. Therefore it is important that you put some personal effort into it.

VI. REQUIRED TEXTS:


VII. BLACKBOARD:
Lecture slides and assignments will be uploaded on the Blackboard at http://www.blakcboard.ksu.edu

VIII. COURSE SPECIFIC REQUIREMENTS, EXPECTATIONS, POLICIES:

ASSIGNMENTS:
All assignments are due on the due date at the beginning of the class. A penalty of 20% is assessed for the first day on an assignment. An assignment that is more than five days late will not get credit. A due date will be given online or in class for each weekly homework assignment. To earn full credit for an assignment, you should:
• Make sure it is turned in on time
• Present it neatly and well organized

Students are required to take the examinations on the dates and at the times they are scheduled. No makeup examinations will be given without a doctor’s excuse or the equivalent

ATTENDANCE:

• Students are strongly encouraged to attend class regularly. Some projects may be assigned and due in the same class. In the event that a student must miss a class, the student is responsible for finding out what assignments were made, what due dates were announced, what material was covered. Excused absences require documented proof.
• Any individual student with poor class attendance should not expect the instructor to provide out of class assistance.
• Tardiness to class is discouraged.

CHEATING AND PLAGIARISM:

While you are encouraged to seek help and to learn teamwork, copying of any significant part of another’s work may result in a zero grade for all parties for the work in question, and may result in a failing grade for the course. Cheating on exams will be handled in compliance with KSU policy.

IX. EVALUATION PROCEDURES:

| EVALUATION | 90 | + | = | A |
| 80 | - | 89 | = | B |
| 70 | - | 79 | = | C |
| 60 | - | 69 | = | D |
| 0 | - | 59 | = | F |
Assignments: 25%
Quizzes & In class activities: 10%
Mid Term Exam (2): 25%
Final Examination: 25%
Project: 15%

**X. COURSE CALENDAR/SCHEDULE:**

**TENTATIVE WEEK BY WEEK SCHEDULE OF TOPICS:**

<table>
<thead>
<tr>
<th>Week</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction and Theory of Program testing</td>
</tr>
<tr>
<td>2</td>
<td>Unit testing, Control flow testing, Data flow testing</td>
</tr>
<tr>
<td>3</td>
<td>Domain and System Integration testing</td>
</tr>
<tr>
<td>4</td>
<td>Functional testing, System Testing and Planning</td>
</tr>
<tr>
<td>5</td>
<td>Software reliability and Quality Assurance</td>
</tr>
<tr>
<td>6</td>
<td>Software Security and assurance</td>
</tr>
<tr>
<td>7</td>
<td>A risk Management framework, Code review with a tool</td>
</tr>
<tr>
<td>8</td>
<td>Midterm</td>
</tr>
<tr>
<td>10</td>
<td>Architecture risk analysis</td>
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<tr>
<td>11</td>
<td>Software penetration testing</td>
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<td>12</td>
<td>Risk Based Security testing</td>
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<tr>
<td>13</td>
<td>Mid Term</td>
</tr>
<tr>
<td>14</td>
<td>An enterprise Software Security Program</td>
</tr>
<tr>
<td>15</td>
<td>Knowledge of Software Security</td>
</tr>
<tr>
<td>16</td>
<td>Taxonomy of Coding Errors</td>
</tr>
<tr>
<td>17</td>
<td>Final exams/Project</td>
</tr>
</tbody>
</table>

*Note: This course schedule is subject to change at the discretion of the instructor due to time constraints or other extenuating circumstances.*

*The instructor reserves the right to make changes to (delete, add, or modify) this Syllabus as the semester progresses.*
Student Acknowledgment of Receipt of Course Information

My signature below indicates that I have received a course syllabus for the following course, _____________, and I have been notified that the “Common Policies for all Courses at KSU” can be found throughout the University Catalogue at:

http://www.ksu.edu/about/divisions/studentAffairsAndEnrollment/enrollmentManagement/registrar/Kentucky+State+University+Catalogue.htm

I agree to read these documents, and I agree to sign and deliver this copy of the “Student Acknowledgment” form within two (2) weeks of the start of the semester. I understand that the policies contained within these documents apply directly to me and to all students in the class. I agree to abide by these policies, and recognize that not abiding by these policies could result in dismissal from this class and/or affect my standing as a student at KSU as per Section 2.C. of the Student Handbook and Section XIX.G.1. of the University Catalogue.

Name (please print): ________________________________________

CWID: ________________________________________________________

Signature: ____________________________________________________

Date: _________________________________________________________

Contact information (please PRINT clearly):

Local Address: ________________________________________________

Local Phone: _________________________________________________

E-Mail: _______________________________________________________

[Or, the instructor may choose the electronic option:]

Student Acknowledgment of Receipt of Course Information

Read the syllabus and the “Common Policies for all Courses at KSU” found throughout the University Catalogue at:

http://www.ksu.edu/about/divisions/studentAffairsAndEnrollment/enrollmentManagement/registrar/Kentucky+State+University+Catalogue.htm

Then, type exactly what is written below in Statements (1) and (2), and deliver this statement as instructed: make sure “Student Acknowledgment of Receipt of Course Information” is on the subject line. Adding your name and student ID at the end of the statement will stand as your signature. I also agree to deliver this copy of the “Student Acknowledgment” form within two (2) weeks of the start of the semester. I understand that the policies contained within these documents apply directly to me and to all students in the class. I agree to abide by these policies, and recognize that not abiding by these policies could result in dismissal from this class and/or affect my standing as a student at KSU as per Section 2.C. of the Student Handbook and Section XIX.G.1. of the University Catalogue.

1) This statement acknowledges that: (A) I have received the course syllabus for ___________, and (B) I have read the "Common Policies for all Courses at KSU." I understand this statement will be printed and kept in my permanent file or be placed in my electronic Blackboard file for future reference.

2) I agree that I have read these documents before sending this email to my Instructor. I understand that the policies contained within these documents apply directly to me and to all students in the class. By sending this email I agree to abide by these policies, and recognize that not abiding by these policies could result in dismissal from this class and/or affect my standing as a student at KSU.

Student Name and ID number
KENTUCKY STATE UNIVERSITY
FACULTY SENATE
CURRICULUM COMMITTEE

COURSE CHANGE PROPOSAL

ACADEMIC UNIT: Computer Science Dept.

DATE PREPARED: 2/5/2013

PRIMARY AUTHOR(S): Mike Unuakhulu

ACADEMIC DISCIPLINE FACULTY APPROVED:
(Committee Chairperson’s Signature) Mike Unuakhulu 3/7/13

CHAIRPERSON/DEAN APPROVED:
(Chairperson’s/Dean Signature) 3/7/13

1. CURRENT COURSE NUMBER: C_O_M_P_U_T_E_R_NETWORK_SECURITY

2. CURRENT COURSE TITLE (Limited to 32 Spaces Including Blanks):

3. STARTING WITH:
   _X_ Fall, ___ Spring, ___ Summer: 2013 Academic Year

4. CROSSLISTING DEPARTMENTS (attach supporting letters):
   
   1) ____________________________  (c)
   2) ____________________________  (d)

5. CHECK ITEM(S) BELOW FOR CHANGES DESIRED:
   
   ___ Course Number  ___ Course Title  ___ Crosslist Status
   ___ Credits  ___ Grading System  ___ Prerequisites
   ___ Planned Offering  ___ Catalogue Description  ___ Delete Course
   ___ Course Level  ___ Required Status  ___ Other

6. EXPLANATION/JUSTIFICATION FOR REQUESTED CHANGE(S). ENTER BOTH CURRENT AND PROPOSED DATA FOR EACH CHANGE (use additional pages as necessary):

See Next Sheet

Final Faculty Senate Approved Form as of 10/4/89
New Description

COS 588 : Computer Network and Security
Prerequisite: Consent of the instructor. The course covers two major topics. Computer network protocols layers and service models, the OSI model, network architecture, and networked systems. The second part involves an examination of network security defense techniques and countermeasures. Topics include: firewall systems and IDS, VPNs, Security threats, mechanisms, and services.

Old Description

COS 588 : Computer Network Security
Major principles and tools for network and web security are presented to highlight the programming and design concepts involved in network and web security. Topics like network security architecture, technology, policy, security assessment, and incident handling are discussed.
Kentucky State University  
Division Computer Sciences  
Course: COS 58890  
Course Title: COMPUTER NETWORK SECURITY (3 credit hours)  
Syllabus

PROFESSOR: Wasim A Al-Hamdani  
OFFICE: HH314A  
OFFICE PHONE: 6728  
FAX: 502-597-6179  
E-MAIL: Wasim.al-hamdani@kysu.edu

SEASON: F2011  
CLASS TIME: W5-7:30  
CLASSROOM: HH313  
OFFICE HOURS: WR:2-5PM, MT:11-1PM

I. MISSION STATEMENTS:
The Objectives and Learning Outcomes of this course directly support the Mission of the University, College, and Division, and may be found at: www.kysu.edu/about; www.kysu.edu/academics/collegesAndSchools/default.htm; www.kysu.edu/academics/collegesAndSchools/collegeofartssocialsciencesandinterdisciplinarystudies/default.htm.

II. NOTICE TO STUDENTS WITH DISABILITIES:
Any student who feels he or she may need an accommodation based on the impact of a disability may contact the Disability Resource Center (DRC) at (502) 597-5076, or visit Hill Student Center, Suite 220C, to arrange reasonable accommodations for documented disabilities. The student is required to obtain verification from the DRC and deliver the signed DRC document to the instructor at the beginning of the semester for reasonable accommodations.

III. COURSE DESCRIPTION – COURSE RATIONALE:
This course provides an essential study of computer security issues and methods in networking systems. Topics to be covered include review of networking, advanced cryptography, access control, distributed authentication, TCP/IP security, firewalls, IPsec, Virtual Private Networks, intrusion detection systems, and advanced topics such as wireless security, identity management, etc.

Class Format: Lectures are combined with discussions and, if applicable, student presentations and discussions of advanced topics. Students are expected to be active participants, by studying the relevant chapters and/or research papers, and participating at in-class discussions.

IV. COURSE OBJECTIVES:
- Basic security principles
- Basic cryptography: symmetric primitives (block ciphers, stream ciphers, hash functions), asymmetric primitives (public-key encryption and signature algorithms)
- Computer security: process isolation, trusted computing group’s (TCG) trusted platform module (TPM)
- Network security: SSL/TLS, IPsec, SSH

V. STUDENT LEARNING OBJECTIVES/OUTCOMES:
- Students will summarize and lead a discussion of research papers
- Students will be familiar with classic network security literature

VI. REQUIRED TEXTS:

Supplemental Texts:
Introduction to Network Security (Chapman & Hall/CRC Computer & Information Science Series)  
publisher: Chapman and Hall/CRC; 1 edition (November 18, 2008)
COS58890 Computer and Network Sec

Network Security: Current Status and Future Directions
Christos Douligeris, Dimitrios N. Serpanos
Publisher: Wiley-IEEE Press (June 15, 2007)
Language: English
ISBN-10: 9780471703556
ASIN: 0471703559

Cryptography and Network Security
Publisher: Prentice Hall; 4 edition (November 26, 2005)
Language: English
ISBN-10: 0131873164

Additional Readings:
VII. BLACKBOARD: all papers are located in Blackboard course site

VIII. COURSE SPECIFIC REQUIREMENTS, EXPECTATIONS, POLICIES:
Student required to read before attending the lecture; the student evaluation will depends on student class discussion, presenting and involvement in class work
Student need to submit deep research papers according to ACM specifications

IX. EVALUATION PROCEDURES:
Student papers and projects 50%
Midterm 20%
Final 30%

X. COURSE CALENDAR/SCHEDULE:

<table>
<thead>
<tr>
<th>Weeks</th>
<th>Homework</th>
<th>Homework Reading</th>
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<tbody>
<tr>
<td>1</td>
<td>Network architecture</td>
<td>Chapter 1</td>
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<tr>
<td></td>
<td>Network Protocols</td>
<td>Chapter 2</td>
</tr>
</tbody>
</table>

Homework outcome: week 5 first draft (Paper1)
- What is current problem with TCP/IP and SSL/TLS
- How to improve the security? Current suggestion and your suggestion
- Should be written as ACM Template

| 2     | The Internet Taxonomy of network based vulnerabilities and attacks | Chapter 3 | Securing BGP Next-generation secure Internet introduction, project ideas | Secure Border Gateway Protocol (S-BGP) Beware of BGP Attacks A Clean-Slate Design for the Next-Generation Secure Internet SCI-FI: Domain-based Isolation, Scalability and Control for the Future Internet |
|       |                     | Chapter 4 |   |   |

Homework outcome: week 6 first draft (Paper2)
- State the current state of secure Internet
- Specified and prove your ideas for next generation secure internet
- Should be written as ACM Template

<p>| 3     | Physical Network | Chapter 5 | VANET | Towards Characterizing and Classifying |</p>
<table>
<thead>
<tr>
<th>Layer</th>
<th>Location privacy</th>
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<tbody>
<tr>
<td>Network Protocols</td>
<td>Securing Vehicular Communications Assumptions, Requirements, and Principles</td>
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<tr>
<td>Transport Protocols</td>
<td>Securing Vehicular Communications</td>
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<td></td>
<td>Survey of Computational Location Privacy</td>
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</tbody>
</table>

Homework outcome: week 7 first draft (Paper 3)
- State the current state of location privacy
- Specified and prove your ideas for colocation privacy
- Should be written as ACM Template

<table>
<thead>
<tr>
<th>4</th>
<th>Application Layer Overview</th>
<th>Chapter 8</th>
<th>Trustworthy computing Application Layer Email security</th>
<th>Secure Group Communications Using Key Graphs Open reading</th>
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</thead>
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<tr>
<td></td>
<td>Email</td>
<td>Chapter 9</td>
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</table>

Homework outcome: week 8 first draft
- State the current Trustworthy computing, specifies new ideas and your prove for these ideas to improve trustworthy computing (Paper 4.1)
- State the current Application Layer security, specifies new ideas and your prove for these ideas to improve Application Layer Security (Paper 4.2)
- State the current Email security, specifies new ideas and your prove for these ideas to improve Email security (Paper 4.3)
- Should be written as ACM Template

<table>
<thead>
<tr>
<th>5</th>
<th>Open discussion for all papers</th>
<th>Chapter 10</th>
<th>Open reading</th>
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<tr>
<td></td>
<td>Web</td>
<td>Chapter 11</td>
<td>Paper 2 Guide to Enterprise Telework and Remote Access Security</td>
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<td>6</td>
<td>9/28</td>
<td>Paper 3</td>
<td>Port scanning (practices after midterm)</td>
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<td>Remote Access Security</td>
<td>Appendix 1</td>
<td>Install nmap (or nmapfe) (<a href="http://nmap.org">http://nmap.org</a>) port scanner onto your laptop or home computer and perform a TCP port scan and a UDP port scan of another computer. Submit reports generated by nmap (or Zenmap) containing list of open TCP &amp; UDP ports. Also submit output of “netstat –na” command on computer that was scanned. Be sure to temporarily turn off any host-based firewall software if needed so that outputs of nmap and “netstat –na” indicate the same number of open ports.</td>
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<thead>
<tr>
<th>7</th>
<th>Common Network Security Devices Cryptology</th>
<th>Chapter 12</th>
<th>Report Paper 3</th>
<th>Penetration and Vulnerability testing (practices after midterm)</th>
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</thead>
<tbody>
<tr>
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<td>Appendix 1</td>
<td>Paper 4</td>
<td>Install a network-based vulnerability scanner Nessus (<a href="http://www.nessus.org">www.nessus.org</a>) onto your computer and perform a vulnerability scan of another. Submit vulnerability report of services that pose medium or high security risk. Be sure to temporarily turn off any host-based firewall software if needed to get meaningful output.</td>
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<td>8</td>
<td>Midterm Wed October 12</td>
<td>Chapter 2</td>
<td>Paper 4</td>
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<td>Chapter 3</td>
<td>Paper 5</td>
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<td>Chapter 4</td>
<td>Paper 6</td>
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<td>Chapter 5</td>
<td>Paper 7</td>
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<tr>
<td>9</td>
<td>Papers discussions Building Security into the Network Defining Security Zones Device Security Secure Routing Secure LAN Switching Network Address Translation and Security</td>
<td>Chapter 6</td>
<td>Network Security Principles and</td>
<td></td>
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</table>

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Page 4
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Chapters</th>
<th>Assignments</th>
<th>Notes</th>
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<tbody>
<tr>
<td>10</td>
<td>Device Security Features on Switches Cisco IOS Firewall</td>
<td>Chapter 3, 4, 5</td>
<td>Report</td>
<td>(practices after midterm)</td>
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<td>CCIE Professional Development Series</td>
<td>- Analyzing Log Files with Microsoft Log Parser and Splunk</td>
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<td>Network Security Technologies and Solutions</td>
<td>- Packet Sniffing with Wireshark and Tcpdump</td>
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<td></td>
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<td>by Yusuf Bhaiji</td>
<td>- Using Snort on Windows</td>
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<td>- Survivability Analysis Framework</td>
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<td>- Windows Server Baseline Hardening Steps</td>
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<td>- Network Time Protocol (NTP) Client Setup</td>
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<td>- Securing the Domain with Security Templates and Group Policy</td>
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<td>- Applying Windows Domain Security</td>
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<td>- Applying a Security Template to Windows Workstations</td>
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<td>- Applying Security Templates to Domain Controllers</td>
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<td>- Open Source Security (OSSEC) Agent</td>
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<td>Homework outcome: week 12 first draft (Paper5)</td>
<td></td>
<td>- what is trust model</td>
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<td>- discuss the current state of trust model</td>
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<td>- design new trusted model based on elliptic curve</td>
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<td>- Should be written as ACM Template</td>
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<td>Your start point is chapter 21 and 22</td>
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<td>11</td>
<td>Secure Routing</td>
<td>Chapter 2</td>
<td>Report</td>
<td>Exploit code generation (practices after midterm)</td>
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<td>Designing Firewalls</td>
<td>Chapter 3</td>
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<td>Security in Virtual Private Networks</td>
<td>Chapter 4</td>
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<td>IP Security (IPSec)</td>
<td>Chapter 5</td>
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<td>Create an exploit using Metasploit that can be successfully used against</td>
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<td>a vulnerable application if needed on your computer using tools provided at</td>
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<td><a href="http://www.metasploit.com/framework/">http://www.metasploit.com/framework/</a> . Which vulnerability was exploited?</td>
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<td>Which server port number was vulnerable?</td>
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<td>Provide evidence that this exploit was successful via screenshots, packet</td>
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<td>captures, and output of “netstat –a”</td>
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<td>12</td>
<td>IDS for Networks</td>
<td>Chapter 6, 7, 8, 9</td>
<td>Report</td>
<td>WLAN TRAFFIC GRAPHING APPLICATION USING</td>
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<td>Denial-of-Service Attacks</td>
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<td>SIMPLE</td>
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<td>Secure Architectures</td>
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<td>SCENARIO BASED PERFORMANCE EVALUATION OF</td>
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<td>SECURE ROUTING IN MANETs</td>
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<td>Tutorial for Simulation-based Performance</td>
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<td>Analysis of MANET Routing Protocols in ns</td>
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<td>Certification</td>
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<td>The Security of Vehicular Ad Hoc Networks</td>
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<td>Cryptography for network security: failures.</td>
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Page 5
<table>
<thead>
<tr>
<th>Homework outcome: week 15 first draft (Paper 6)</th>
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<tbody>
<tr>
<td>• what is Web security</td>
<td>• discuss the current state of web security model</td>
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<tr>
<td>• discuss the current state of web security model</td>
<td>• use your ideas from SSL paper to develop new web secure model</td>
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<tr>
<td>• use your ideas from SSL paper to develop new web secure model</td>
<td>• Should be written as ACM Template</td>
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• What is Secure Routing? (Paper 6) |
• Discuss the current state of secure routing? Methods and techniques |
• Develop new model for secure routing |
• Should be written as ACM Template |

<table>
<thead>
<tr>
<th>14</th>
<th>Voice Over IP Security Grid Security</th>
<th>13</th>
<th>Report</th>
<th>Internet Key Exchange (IKE)</th>
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<tbody>
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<td>This covers the following topics:</td>
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<td>• Internet Key Exchange (IKE)</td>
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<td>• IKE History</td>
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<td>• IKE Phases</td>
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<td>• IKE Main Mode</td>
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<td>• IKE Aggressive Mode</td>
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<td>• IKE Authentication Methods</td>
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<td>• Authentication Methods: Comparison</td>
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<td>• Proof of Identity</td>
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<td>• IKE Phase 1 Cookies</td>
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<td>• Diffie-Hellman Parameters</td>
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<td>• Well-Known Group 1</td>
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<td>• Negotiating Cryptographic Parameters</td>
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<td>• IKE Session Keys</td>
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<td>• IKE Message IDs</td>
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<td>• IKE Phase 2</td>
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<td>• ISAKMP/IKE Encoding</td>
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<td>• ISAKMP Payload Types</td>
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<td>• IKE Version 2</td>
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<td>This covers the following topics:</td>
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<tr>
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<td>• What is a VPN?</td>
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Homework outcome: **week 18 first draft (Paper 7)**
- what is network management
- Discuss the current state of network management techniques?
- Specifies your ideas for next generation of network management
- Should be written as ACM Template

This covers the following topics:
- Overview
- Wi-Fi Operation
- MAC Address Filtering
- Wired Equivalent Privacy (WEP)
- WEP Keys
- WEP Details
- WEP Encapsulation
- WEP Decapsulation
- Ron's Cipher 4 (RC4)
- WEP Authentication
- WEP Review
- Problems with WEP Authentication
- Problem with Stream Cipher
- Problems with WEP ICV
- More WEP Problems
- Attack Tools
- Wardriving
- Wardriving Tools
- Network Stumbler
- Kismet
- Wireless Sniffing Tools
- Packet Analyzers |

| 16 |  |
| 17 | Thanks given |
| 18 | Papers discussion |
| 19 | Papers discussions |
| 20 | Review |
| 21 | final |

Others
You can skip one paper and select one from the following list

The case for ubiquitous transport-level encryption
Protecting Browsers from DNS Rebinding Attacks
The Design and Implementation of Protocol-based Hidden Key Recovery
XCS: Cross Channel Scripting and its Impact on Web Applications
Stanford Javascript Crypto Library
Transaction Generators: Root Kits for Web
Spyware Resistant Web Authentication Using Virtual Machines
Private Web Search
Analysis of security protocols
Internet Inter-Domain Traffic
Using Encryption for authentication in large networks
Network insecurity through packet filtering
Timing attack: What can be achieved by a powerful adversary? Timing Attacks on Implementations of DH, RSA, DSS and other Systems by Paul Kocher
IP Covert Timing Channels: An Initial Exploration
Space-efficient Block Storage Integrity

General
Report means your finding in details 3-5 pages  Font size 11, single space
Paper means 4-7 pages with your new finding and proves

Student Acknowledgment of Receipt of Course Information
My signature below indicates that I have received a course syllabus and have read the "Common Policies for all Courses at KSU" at www.ksu and for the following course: _________.

I agree to read these documents before the next class period. I understand that the policies contained within these two documents apply to me and to all other students in the class, and by my signature I agree to abide by these policies.

Name (please print): ________________________________

CWID: ___________________________________________

Signature: _________________________________________

Date: ____________________________________________

Contact information (please PRINT clearly):

Local Address: ______________________________________

________________________________________________

Local Phone: ________________________________________

E-Mail: ____________________________________________

Or, the instructor may choose the electronic option:

Student Acknowledgment of Receipt of Course Information

Once you have read the syllabus and all applicable readings suggested by the syllabus, type exactly what is written below in statements 1) and 2) send me an email (through Outlook) or a Message (through Blackboard) with the following two statements, and make sure “Student Acknowledgment of Receipt of Course Information” is on the subject line and make sure you put your name at the end:

1) This statement acknowledges that A) I have received the course syllabus for: __________; and B) I have read the "Common Policies for all Courses at KSU" found at www.ksu.edu and I understand this statement will be printed and kept in my permanent file or be placed in my electronic Blackboard file for future reference.

2) I agree to read these documents before sending in this email. I understand that the policies contained within these documents apply directly to me and to all students in the class. By sending this email I agree to abide by these policies, and recognize that not abiding by these policies could adversely affect my grade in this class and/or my standing as a student at KSU.