

ICT 550 Section 001 [FALL 2021] Security Informatics

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Office Phone:	859-218-2299
Lectures:	<u>MWF</u> : 3 PM to 3:50 PM, Room 312
Virtual office hours:	<u>Mondays, Wednesdays, Fridays</u> : 1.55 PM to 2:55 PM <u>Wednesdays</u> : 11 AM to 12.05 PM or at other times by appointment [Office hours will be via Zoom only]
Preferred method of contact:	Email I usually respond as soon as possible. Maximum: 12 hours any day of the week including weekends/holidays

Course Description

This course introduces students to policy concerns relating to security informatics, and highlights theoretical and practical approaches to designing secure Information and Communication Technology (ICT) systems. It addresses key issues such as authentication, risk analysis, access control, database and network security, and information assurance.

Prerequisites

Preferably Technology Security (ICT 351-001)

Student Learning Outcomes

By the end of this course, you will:

- Understand the basic terminologies and definitions used in information security.
- Be able to deploy and implement access control and authentication techniques.
- Be able to design and implement different types of security policies.
- Be able to apply security management (identity management, change management, etc.) principles, security audit principles and practices, and procedures involved in handling security incidents.
- Have a strong understanding of industrial control systems security.
- Perform risk assessment and apply risk mitigation techniques.
- Understand operating system security and know how to secure operating systems.
- Be able to maintain security control of the networks and systems
- Have strong hands-on practical skills and experience through various projects undertaken throughout the course.

Required Materials

Lecture notes and peer-reviewed publications. Lecture materials will be provided to all students on a weekly basis throughout the semester.

Reference Textbooks

- M. Ciampa, Security + Security Guide to Network Security Fundamentals, 5th edition, ISBN-13: 978-1305093911, 2014.
- T. Howlett, Open Source Security Tools, ISBN 0-321-19443-8, Pearson Education Ltd.
- M. Solomon and M. Chapple, Information Security Illuminated, ISBN-13: 9780763726775, Jones and Bartlett Learning.
- ACM/IEEE/Springer peer-reviewed conference and journal publications.

Grading Parameters for Graduate Students

- 4 projects: 80%
- Midterm exam (20%) [covers the first half of the course]

Grading Parameters for Undergraduate Students

- 2 projects (includes hands-on labs): 60 %
- Midterm exam (20%) [covers the first half of the course]
- 2 quizzes (20%) [covers second half of the course]

Course Grading for Graduate Students

[90% – 100%] = **A (Exceptional Achievement)**

[80% – 89%] = **B (High Achievement)**

[70% – 79%] = **C (Average Achievement)**

[0% – 69%] = **E (Failing)**

Course Grading for Undergraduate Students

[90% – 100%] = **A (Exceptional Achievement)**

[80% – 89%] = **B (High Achievement)**

[70% – 79%] = **C (Average Achievement)**

[60% – 69%] = **D (Below Average Achievement)**

[0% – 59%] = **E (Failing)**

Tentative Course Topics

Information security terminologies, attackers and types of attacks, malware types
Common security principles
Access control models and authentication services
Industrial Control Systems Security
Risk assessment methods and risk mitigation techniques
Business Continuity (BC) planning, disaster recovery
Security management, security audit principles and practices, security incident handling
Network Security
Wireless security
Operating system security
Vulnerability assessment: policies, procedures, tools

Lecture notes cover important materials that need a thorough understanding by the students. Homework assignments are intended to reinforce the material in the text and will often require external materials outside the book to be consulted. Quizzes will help ensure students stay up with the materials being taught. Midterm and final exams may be preceded by short reviews of the materials to be tested.

Mid-term Grade (for 100-400 level courses, and for undergrads in 500-level courses)

Mid-term grades will be posted in myUK by the deadline established in the Academic Calendar (<http://www.uky.edu/registrar/calendar>).

Submission of Assignments

1. All assignments, homeworks, and project reports must be uploaded to Canvas.
2. All times specified for submission deadlines are Eastern Standard Time (EST).
3. All submitted work must be typed [12 point, Time Roman, single line spacing, 1 inch margins] and be thoroughly spellchecked and free of grammatical mistakes.
4. All sources used during the preparation of all submitted works must be clearly identified in a separate list of ordered [e.g., [1], [2], [3], etc.] references (in a **Reference** section placed after the main document). These references must be cited within the text of the submission where appropriate. Please avoid using Wikipedia, blogs, white papers as direct sources for cited references in your submitted papers or reports.
5. Late assignments are only acceptable under exceptional circumstances or if the instructor has been notified ahead of time. For all other cases, submissions handed in after the submission deadline will be assessed with a penalty of 5% per day.

Group Work and Collaboration

All assignments should be undertaken individually. For projects requiring group work, detailed instructions will be outlined in the project description. When group work is performed, each member of the group must state his/her contributions very clearly and all

members of the group must agree on each member's contributions before the start of the project and inform the instructor (in writing) about the expected efforts of each member of the group.

Face Covering/Distancing Policy

- In accordance with University guidelines, students **must wear UK-approved face coverings in the classroom** and academic buildings (e.g., faculty offices, laboratories, libraries, performance/design studios, and common study areas where students might congregate). If UK-approved face coverings are not worn over the nose and mouth, students will be asked to leave the classroom.
- Students should leave enough space when entering and exiting a room. Students should not crowd doorways at the beginning or end of class.

Class Recording Notification

The University of Kentucky Student Code of Conduct defines Invasion of Privacy as using electronic or other devices to make a photographic, audio, or video record of any person without their prior knowledge or consent when such a recording is likely to cause injury or distress.

Video and audio recordings by students are **not permitted during the class unless the student has received prior permission from the instructor**. Any sharing, distribution, and or uploading of these recordings outside of the parameters of the class is prohibited. Students with specific recording accommodations approved by the Disability Resource Center should present their official documentation to the instructor.

Academic Policy Statements

The Academic Policy Statements web page can be accessed at: <https://www.uky.edu/universitysenate/acadpolicy>

Excused Absences and Acceptable Excuses

Excused Absences: *Senate Rules 5.2.5.2.1* defines the following as acceptable reasons for excused absences: (a) significant illness, (b) death of a family member, (c) trips for members of student organizations sponsored by an educational unit, trips for University classes, and trips for participation in intercollegiate athletic events, (d) major religious holidays, (e) interviews for graduate/professional school or full-time employment post-graduation, and (f) other circumstances found to fit "reasonable cause for nonattendance" by the instructor of record. Students should notify the professor of absences prior to class when possible.

If a course syllabus requires specific interactions (e.g., with the instructor or other students), in situations where a student's total EXCUSED absences exceed 1/5 (or 20%) of the required interactions for the course, the student shall have the right to request and receive a "W," or

the Instructor of Record may award an “I” for the course if the student declines a “W.” (*Senate Rules 5.2.5.2.3.1*)

Religious Observances

Religious Observances: Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays. *Senate Rules 5.2.5.2.1(4)* requires faculty to include any notification requirements within the syllabus. If no requirement is specified, two weeks prior to the absence is reasonable and should not be given any later. Information regarding major religious holidays may be obtained through [the Ombud's website](#) or calling 859-257-3737.

Verification of Absences

Verification of Absences: Students may be asked to verify their absences in order for them to be considered excused. *Senate Rule 5.2.5.2.1* states that faculty have the right to request appropriate verification when students claim an excused absence due to: significant illness; death in the household, trips for classes, trips sponsored by an educational unit and trips for participation related to intercollegiate athletic events; and interviews for full-time job opportunities after graduation and interviews for graduate and professional school. (Appropriate notification of absences due to University-related trips is required prior to the absence when feasible and in no case more than one week after the absence.)

Make-Up Work

Make-Up Work: Students missing any graded work due to an excused absence are responsible: for informing the Instructor of Record about their excused absence within one week following the period of the excused absence (except where prior notification is required); and for making up the missed work. The instructor must give the student an opportunity to make up the work and/or the exams missed due to the excused absence, and shall do so, if feasible, during the semester in which the absence occurred. The instructor shall provide the student with an opportunity to make up the graded work and may not simply calculate the student's grade on the basis of the other course requirements, unless the student agrees in writing. According to *SR 5.2.5.2.2*, if a student adds a class after the first day of classes and misses graded work, the instructor must provide the student with an opportunity to make up any graded work.

Excused Absences for Military Duties

Excused Absences for Military Duties: If a student is required to be absent for one-fifth or less of the required course interactions (e.g., class meetings) due to military duties, the following procedure (per *SR 5.2.5.2.3.2*) shall apply:

1. Once a student is aware of a call to duty, the student shall provide a copy of the military orders to the Director of the Veterans Resource Center. The student shall also provide the Director with a list of his/her courses and instructors.
2. The Director will verify the orders with the appropriate military authority, and on behalf of the military student, notify each Instructor of Record via Department Letterhead as to the known extent of the absence.
3. The Instructor of Record shall not penalize the student's absence in any way and shall provide accommodations and timeframes so that the student can make up missed assignments, quizzes, and tests in a mutually agreed upon manner.

Unexcused Absences

Unexcused Absences: If an attendance/interaction policy is not stated in the course syllabus or the policy does not include a penalty to the student, the instructor cannot penalize a student for any unexcused absences. (SR 5.2.5.2.3.3)

Prep Week and Reading Days

Prep Week and Reading Days: Per *Senate Rules 5.2.5.6*, the last week of instruction of a regular semester is termed "Prep Week." This phrase also refers to the last three days of instruction of the summer session and winter intersession. The Prep Week rule applies to ALL courses taught in the fall semester, spring semester, and summer session, including those taught by distance learning or in a format that has been compressed into less than one semester or session. This rule does not apply to courses in professional programs in colleges that have University Senate approval to have their own calendar.

Make-up exams and quizzes are allowed during Prep Week. In cases of "Take Home" final examinations, students shall not be required to return the completed examination before the regularly scheduled examination period for that course. No written examinations, including final examinations, may be scheduled during the Prep Week. No quizzes may be given during Prep Week. No project/lab practicals/paper/presentation deadlines or oral/listening examinations may fall during the Prep Week unless it was scheduled in the syllabus AND the course has no final examination (or assignment that acts as a final examination) scheduled during finals week. (A course with a lab component may schedule the lab practical of the course during Prep Week if the lab portion does not also require a Final Examination during finals week.) Class participation and attendance grades are permitted during Prep Week. The *Senate Rules* permit continuing into Prep Week regularly assigned graded homework that was announced in the class syllabus.

For fall and spring semester, the Thursday and Friday of Prep Week are study days (i.e. "Reading Days"). There cannot be any required "interactions" on a Reading Day. "Interactions" include participation in an in-class or online discussion, attendance at a guest lecture, or uploading an assignment. See *Senate Rules 9.1* for a more complete description of required interactions.

Accommodations Due to Disability

Accommodations Due to Disability: In accordance with federal law, if you have a documented disability that requires academic accommodations, please inform your instructor as soon as possible during scheduled office hours. In order to receive accommodations in a course, you must provide your instructor with a Letter of Accommodation from the Disability Resource Center (DRC). The DRC coordinates campus disability services available to students with disabilities. It is located on the corner of Rose Street and Huguelet Drive in the Multidisciplinary Science Building, Suite 407. You can reach them via phone at (859) 257-2754, [via email \(drc@uky.edu\)](mailto:drc@uky.edu) or visit their [website \(uky.edu/DisabilityResourceCenter\)](http://uky.edu/DisabilityResourceCenter). DRC accommodations are not retroactive and should therefore be established with the DRC as early in the semester as is feasible.

Non-Discrimination Statement and Title IX Information

Non-discrimination and Title IX policy: In accordance with federal law, UK is committed to providing a safe learning, living, and working environment for all members of the University community. The University maintains a comprehensive program which protects all members from discrimination, harassment, and sexual misconduct. For complete information about UK's prohibition on discrimination and harassment on aspects such as race, color, ethnic origin, national origin, creed, religion, political belief, sex, and sexual orientation, please see [the electronic version of UK's Administrative Regulation 6:1 \("Policy on Discrimination and Harassment"\) \(https://www.uky.edu/regs/ar6-1\)](https://www.uky.edu/regs/ar6-1). In accordance with Title IX of the Education Amendments of 1972, the University prohibits discrimination and harassment on the basis of sex in academics, employment, and all of its programs and activities. Sexual misconduct is a form of sexual harassment in which one act is severe enough to create a hostile environment based on sex and is prohibited between members of the University community and shall not be tolerated. For more details, please see [the electronic version of Administrative Regulations 6:2 \("Policy and Procedures for Addressing and Resolving Allegations of Sexual Assault, Stalking, Dating Violence, Domestic Violence, and Sexual Exploitation"\) \(https://www.uky.edu/regs/ar6-2\)](https://www.uky.edu/regs/ar6-2). Complaints regarding violations of University policies on discrimination, harassment, and sexual misconduct are handled by the Office of Institutional Equity and Equal Opportunity (Institutional Equity), which is located in 13 Main Building and can be reached by phone at (859) 257-8927. You can also visit [Institutional Equity's website \(https://www.uky.edu/eoo\)](https://www.uky.edu/eoo).

Faculty members are obligated to forward any report made by a student related to discrimination, harassment, and sexual misconduct to the Office of Institutional Equity. Students can confidentially report alleged incidences through the [Violence Intervention and Prevention Center \(https://www.uky.edu/vipcenter\)](https://www.uky.edu/vipcenter), [Counseling Center \(https://www.uky.edu/counselingcenter\)](https://www.uky.edu/counselingcenter), or [University Health Service \(https://ukhealthcare.uky.edu/university-health-service/student-health\)](https://ukhealthcare.uky.edu/university-health-service/student-health).

Reports of discrimination, harassment, or sexual misconduct may be made to Institutional Equity [here](#).

Classroom Policy

All electronic equipment must be either **switched off** or in **silent mode** before the start of each lecture. Please kindly avoid sleeping, eating, talking (unless permission is granted by the instructor) etc. once the lecture has started. Students should refrain from disruptive behavior such as entering the classroom late or departing before the end of the lecture without the instructor's permission. For more information on prohibited student conduct, students are advised to consult the UKY's Code of Student Conduct (<http://www.uky.edu/studentconduct/code-student-conduct>).

Attendance Policy

This class is a community whose success depends on everyone's participation, and it is vital for you to attend class in order to be successful. Attendance will be taken at the beginning of class. If you miss this, it is your responsibility to let me know you arrived late. If you are absent on a day when an assignment is due, you will be allowed to hand in or make up that work **only** if the absence is **officially excused**. You will be asked to provide official written documentation for excused absences the next time you are in class in order for your absence to be excused. If you know ahead of time that you will be absent from class with an excused absence, please discuss this with your instructor and turn in any assignments ahead of time. Excuses for university-sponsored activities must be made *prior* to such absences. For any emergency situation that arises, **email your instructor** as soon as you know about the situation when possible. **No make-up work is available for in-class exercises or quizzes unless approved in advance by your instructor.** Students have one week to complete a missed assignment or quiz due to an excused absence upon their return without penalty.

Course Withdrawal

Students are expected to withdraw from the class **if more than 20% of the classes scheduled for the semester are missed (excused)** per University policy. Please reference the definition of excused absences in the current edition of *Student Rights and Responsibilities* or on the web at <http://www.uky.edu/ombud/excused-absences>

Per *Senate Rule 5.2.4.2*, students missing any graded work due to an excused absence are responsible: for informing the Instructor of Record about their excused absence within one week following the period of the excused absence (except where prior notification is required); and for making up the missed work. The professor must give the student an opportunity to make up the work and/or the exams missed due to an excused absence, and shall do so, if feasible, during the semester in which the absence occurred.

Academic Offenses Rules for Undergraduate and Graduate Students

Below are descriptions of official policies established in the *University Senate Rules*, available [HERE](#) in their entirety.

Procedural information regarding cases of plagiarism, cheating, and falsification and misuse of academic records is available on the [University Ombud's website](#).

Students shall not plagiarize, cheat, or falsify or misuse academic records.

- [Plagiarism](#)
- [Cheating](#)
- [Misuse of Academic Records](#)

Senate Rules 6.3.1 ("Plagiarism")

Plagiarism: Per University policy, students shall not plagiarize, cheat, or falsify or misuse academic records. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the University may be imposed. A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty.

Senate Rule 6.3.1 states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about a question of plagiarism involving their work, they are obliged to consult their instructors on the matter before submission.

When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording, or content from another source without appropriate acknowledgment of the fact, the students are guilty of plagiarism.

Plagiarism includes reproducing someone else's work (including, but not limited to a published article, a book, a website, computer code, or a paper from a friend) without clear attribution. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work which a student submits as his/her own, whoever that other person may be, except under specific circumstances (e.g. Writing Center review, peer review) allowed by the Instructor of Record or that person's designee. Plagiarism may also include double submission, self-plagiarism, or unauthorized resubmission of one's own work, as defined by the instructor.

Students may discuss assignments among themselves or with an instructor or tutor, except where prohibited by the Instructor of Record (e.g. individual take-home exams). However,

the actual work must be done by the student, and the student alone, unless collaboration is allowed by the Instructor of Record (e.g. group projects).

When a student's assignment involves research in outside sources or information, the student must carefully acknowledge exactly what, where and how he/she has employed them. If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas which are so generally and freely circulated as to be a part of the public domain.

Please note: Any assignment you turn in may be submitted to an electronic database to check for plagiarism.

Senate Rules 6.3.2 ("Cheating")

Cheating is defined by its general usage. It includes, but is not limited to, the wrongfully giving, taking, or presenting any information or material by a student with the intent of aiding himself/herself or another on any academic work which is considered in any way in the determination of the final grade. The fact that a student could not have benefited from an action is not by itself proof that the action does not constitute cheating. Any question of definition shall be referred to the University Appeals Board.

Senate Rules 6.3.3 ("Misuse of Academic Records")

Misuse of academic records: Maintaining the integrity, accuracy, and appropriate privacy of student academic records is an essential administrative function of the University and a basic protection of all students. Accordingly, the actual or attempted falsification, theft, misrepresentation or other alteration or misuse of any official academic record of the University, specifically including knowingly having unauthorized access to such records or the unauthorized disclosure of information contained in such records, is a serious academic offense. As used in this context, "academic record" includes all paper and electronic versions of the partial or complete permanent academic record, all official and unofficial academic transcripts, application documents and admission credentials, and all academic record transaction documents. The minimum sanction for falsification, including the omission of information, or attempted falsification or other misuse of academic records as described in this section is suspension for one semester.

Statement on Diversity, Equity, and Inclusion (DEI)

The University of Kentucky is committed to our core values of diversity and inclusion, mutual respect and human dignity, and a sense of community ([Governing Regulations XIV](#)). We acknowledge and respect the seen and unseen diverse identities and experiences of all members of the university community (<https://www.uky.edu/regs/gr14>). These identities include but are not limited to those based on race, ethnicity, gender identity and expressions,

ideas and perspectives, religious and cultural beliefs, sexual orientation, national origin, age, ability, and socioeconomic status. We are committed to equity and justice and providing a learning and engaging community in which every member is engaged, heard, and valued.

We strive to rectify and change behavior that is inconsistent with our principles and commitment to creating a safe, equitable, and anti-racist environment. If students encounter such behavior in a course, they are encouraged to speak with the instructor of record or the [college's diversity officer](#), who is charged with addressing concerns about diversity, equity, and inclusiveness (uky.edu/inclusiveexcellence/college-diversity-inclusion-officers). Students may also contact a faculty member within the department, program director, the director of undergraduate or graduate studies, the department chair, or the dean. To submit an official report of bias, hatred, racism, or identity-based violence, visit the Bias Incident Support Services [website](https://www.uky.edu/biss/report-bias-incident) (<https://www.uky.edu/biss/report-bias-incident>)

TECHNOLOGY INFORMATION & RESOURCES

Resources available to students

The University of Kentucky is proud to offer myriad resources to its students. A list of available resources can be found at: <https://www.uky.edu/universitysenate/student-resources>

As your instructor, I am your first go-to person for technology problems. If you need more immediate assistance, please contact UKIT.

Information Technology Customer Service Center (UKIT)

<https://www.uky.edu/its/>; 859-218-4357

Library Services & Distance Learning Services

<http://www.uky.edu/Libraries/DLLS>

For more resources about online classes and student resources, visit <http://www.uky.edu/ukonline/>

The School of Information Science has a page with a comprehensive list of technology resources here: <http://ci.uky.edu/sis/students/techtips>

Veterans Resource Center

We recognize the complexities of being a member of the military community and also a student. If you are a member of the military or a military veteran or dependent, please inform your instructor if you are in need of special accommodations. Drill schedules, calls to active duty, mandatory training exercises, complications with GI Bill disbursement, and other

unforeseen military and veteran related developments can complicate your academic life. If you are aware of a complication, we will work with you and put you in contact with university staff members who are trained to assist you. Please contact the Coordinator of the University of Kentucky Veterans Resource Center at (859) 257-1148 for additional assistance. Visit <http://www.uky.edu/veterans> for more available resources.

Course Calendar

Graduate Students

Lecture Material, Projects, Exam	
Lecture Material	Posted <i>weekly</i> on canvas
Project 1	Due 4 PM (EST) on September 13, 2021
Mid-term exam	October 13, 2021, 3 PM EST
Project 2	Due 4 PM (EST) on October 4, 2021
Project 3	Due 4 PM (EST) on November 1, 2021
Project 4	Due 4 PM (EST) on November 29, 2021

Undergraduate Students

Lecture Material, Projects, Exam	
Lecture notes	Posted <i>weekly</i> on canvas
Project 1	Due 4 PM (EST) on September 29, 2021
Mid-term exam	October 13, 2021, 3 PM EST
Quiz 1	November 8, 2021
Project 2	Due 3 PM (EST) on November 19, 2021
Quiz 2	December 8, 2021

NOTE: Please contact me as early as possible to make the appropriate arrangements in case you cannot take the exams on the dates specified above.

NOTE: This syllabus may be changed at any time at the discretion of the instructor.