**Undergraduate Program** **Subject Outline**

**Faculty of Engineering and Information Sciences**

**<http://my.uowdubai.ac.ae>**

## Subject Name: Comtemporary topics in security

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| --- | --- | --- | --- |
| Course code: | CSCI301 | Section: |  |
| Credit Points: | 06 | Year | 2021 |
| Session | Spring | Duration: | 10 weeks |
| Pre-requisite(s) | CSCI 251, CSIT 115 | Co-requisite(s) |  |
| Mode of Delivery: | Distance/ |
| Final Exam Passing Requirement: | \_\_40\_\_% |

**\*** *This subject has been adjusted for* ***distance*** *delivery in 2021 due to the COVID-19 Pandemic*

## Lecture Information

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| --- | --- | --- |
| **Day:** | Wednesday | Thursday |
| **Time:** | 8:30am-10:30am | 9:30am-10:30am |
| **Location:** | Online Webex | Online Webex |

## Computer Lab Information: labs will occur on a fortnight basis. labs will occur on: week2, week 4, week 6, week 8, week 9, and week 10. week 9 labs will de assigned for project presentations.

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|  | **Computer Lab 1** | **Computer Lab 2** |
| **Day:** | Sunday | Thursday |
| **Time:** | 12:30pm-14:30pm | 10:30am-12:30pm |
| **Location:** | online | online |

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| **Educator’s Name:** | **Halim Khelalfa** | | |
| **Building & Office No:** | 3.15 | | |
| **E-mail Address:** | **halimkhelalfa@uowdubai.ac.a.e** | | |
| **Consultation:** | Monday | 14:30pm | 16:30pm |
| Thursday | 14:30pm | 16:30pm |

## Subject Description

This subject will expose students to several contemporary topics in cyber and computer security. There are many diverse topics in the security domain that affect everyday computing technology. In this subject, students will learn about the principles underlying these topics along with their associated issues and challenges, from a theoretical and practical point of view. Among others, the subject will include topics such as blockchain, cryptocurrency, multimedia security, Internet of Things (IoT) security, obfuscation and reverse engineering.

**2 Contribution to Program learning outcomes (PLO)**

The activities in this course contribute to achieving the following program learning outcomes

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| **Bachelor of Computer Science** | |
| PLO1 | Apply theoretical basis of computer science to solve a range of practical problems. |
| PLO2 | Design and develop state of the art software solutions for a variety of applications |
| PLO3 | Design, develop and employ effective and efficient approaches and algorithms in solving practical problems |
| PLO4 | Analyze the requirement of projects, design solutions, select appropriate tools for implementation, integration or management of the project. |
| PLO5 | Acquire the ability to function effectively as part of a team to accomplish a set of common goals and objectives and efficiently communicate with project stakeholders |
| PLO6 | Adopt a professional and ethical approach to decision making and related social responsibilities. |

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|  | Upon successful completion of this subject, a student should be able to: | **PLO** | |
| LO1 | Describe and explain principles underlying the various topics in cyber and computer security. | 1,2,3,4 | |
| LO2 | Demonstrate an understanding of concepts and techniques underpinning cybersecurity topics. | 1,2,3,4 | |
| LO3 | Devise and analyse solutions in cyber and computer security areas. | 1,2,3,4 | |
| LO4 | Use appropriate programming interfaces to implement techniques related to cyber and computer security topics. | 2,3 | |
| LO5 | Describe issues and challenges associated with topics in cyber and computer security. | 5,6 | |

## Subject Schedule

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| --- | --- | --- | --- | --- | --- | --- |
| **Week** | **Lecture Topic(s)** | **Learning Outcomes** | **Session Type** | **Delivery format** | **Related supporting materials** | **Assessment**  **Formative (F) Summative (S)** |
| **1** | **Secure Socket Layer (1):** Basic cryptographic theory for Networks | 1,2,3,4,5 | lecture | Distance | Lecture Notes, Videos, Articles | Quiz (F) |
| **2** | **Secure Socket Layer (2):** Secure Network Protocols, crypto libraries | 1,2,3,4,5 | lecture | Distance | Lecture Notes, Videos, Articles | Test 1 (S) |
| **Lab** | 1,2,3,4,5 |  | Distance |  |  |
| **3** | **Secure Socket Layer (3):** Secure Implementation of SSL | 1,2,3,4,5 | lecture | Distance | Lecture Notes, Videos, Articles |  |
| **4** | **Malware (1):** Types of Malware, Common Attack Vectors, Defense against Malware | 1,2,3,4,5 | lecture | Distance | Lecture Notes, Videos, Articles |  |
| **Lab** | 1,2,3,4,5 |  | Distance |  |  |
| **5** | **Malware (2):** Detecting and Analysing Malware, Malware Analysis Technique | 1,2,3,4,5 | lecture | Distance | Lecture Notes, Videos, Articles |  |
| **6** | **Malware (3):** Malware Analysis in Practice | 1,2,3,4,5 | lecture | Distance | Lecture Notes, Videos, Articles |  |
| **Lab** | 1,2,3,4,5 |  | Distance |  |  |
| **7** | **Blockchain (1):** Introduction to Blockchains | 1,2,3,4,5 | lecture | Distance | Lecture Notes, Videos, Articles |  |
| **8** | **Blockchain (2):** Applications of Blockchains: Smart Contracts, Cryptocurrency, etc.  Blockchain in Practice | 1,2,3,4,5 | lecture | Distance | Lecture Notes, Videos, Articles |  |
| **Lab** | 1,2,3,4,5 |  | Distance |  |  |
| **9** | **IoT Security (1)**: IoT Basics, IoT Protocols | 1,2,3,4,5 | lecture | Distance | Lecture Notes, Videos, Articles |  |
|  | **Lab project presentations** |  |  |  |  |  |
| **10** | **IoT Security (2)**: Threat Models, Security Requirement for IoT, Privacy Issues, Secure Architecture for IoT | 1,2,3,4,5 | lecture | Distance | Lecture Notes, Videos, Articles |  |
| **Lab** | 1,2,3,4,5 |  | Distance |  |  |

## Supporting Materials

Books, Articles, Videos, Podcasts, etc. will be available on our Learning Management System (LMS)

The class textbooks are:

1. Wenliang Du, 2nd Edition, 2019, Computer & Internet Security: A Hands-on Approach, ISBN 978-1-7330039-3-3
2. Andreas M. Antonopoulos, Mastering Bitcoin: Programming the Open Blockchain, ISBN 9781449374044, O'Reilly, 2014
3. Joshua Dennis Davies, Implementing SSL/TLS using cryptography and PKI, ISBN 9781118038758, Wiley Pub., Inc, 2011
4. Christopher C. Elisan, Advanced malware analysis, ISBN 9780071819749, McGraw-Hill Education, 2015
5. Alasdair Gilchrist, IoT Security Issues, ISBN 9781501505775, Walter de Gruyter, Inc., 2017

**The following is a list of recommended text books:**

1. Pethuru Raj , Blockchain Technology and Applications, CRC press 2021
2. Banafa, Ahmed. *Blockchain Technology and Applications*. River Publishers, 2020.
3. Richard, Richard, et al. "Smart Contract Development Model and the Future of Blockchain Technology." *2020 the 3rd International Conference on Blockchain Technology and Applications*. 2020.
4. Subha, T. "Assessing Security Features of Blockchain Technology." *Blockchain Technology and Applications* (2020).
5. Indrakumari, R., et al. "Consensus Algorithms–A Survey." *Blockchain Technology and Applications* (2020): 4.
6. Picone, Marco, Simone Cirani, and Luca Veltri. "Blockchain Security and Privacy for the Internet of Things." (2021): 892.
7. Nabben, Kelsie. "Blockchain Security as “People Security”: Applying Sociotechnical Security to Blockchain Technology." *Frontiers in Computer Science* 2 (2021): 62.
8. Putz, Benedikt, Fabian Böhm, and Günther Pernul. "HyperSec: Visual Analytics for blockchain security monitoring." *arXiv preprint arXiv:2103.14414* (2021)
9. Honar Pajooh, Houshyar, et al. "Multi-layer blockchain-based security architecture for internet of things." *Sensors* 21.3 (2021): 772.
10. Rai, Shishir, et al. "Blockguard: Adaptive Blockchain Security (Short Paper)." *2nd International Conference on Blockchain Economics, Security and Protocols (Tokenomics 2020)*. Schloss Dagstuhl-Leibniz-Zentrum für Informatik, 2021.
11. Wen, Yujuan, et al. "Attacks and countermeasures on blockchains: A survey from layering perspective." *Computer Networks* 191 (2021): 107978.
12. Singh, Saurabh, ASM Sanwar Hosen, and Byungun Yoon. "Blockchain Security Attacks, Challenges, and Solutions for the Future Distributed IoT Network." *IEEE Access* 9 (2021): 13938-13959.
13. Amiet, Nils. "Blockchain Vulnerabilities in Practice." *Digital Threats: Research and Practice* 2.2 (2021): 1-7.
14. Ahmadi, Mohsen, et al. "Mimosa: Reducing malware analysis overhead with coverings." *arXiv preprint arXiv:2101.07328* (2021).
15. Naik, Nitin, et al. "Embedded YARA rules: strengthening YARA rules utilising fuzzy hashing and fuzzy rules for malware analysis." *Complex & Intelligent Systems* 7.2 (2021): 687-702.
16. Naik, Nitin, et al. "Fuzzy-import hashing: A static analysis technique for malware detection." *Forensic Science International: Digital Investigation* 37 (2021): 301139.
17. Serpanos, Dimitrios, et al. "Sisyfos: A Modular and Extendable Open Malware Analysis Platform." *Applied Sciences* 11.7 (2021): 2980.
18. Tan, Haoxi, et al. "ColdPress: An Extensible Malware Analysis Platform for Threat Intelligence." *arXiv preprint arXiv:2103.07012* (2021).
19. Ahmad, Rasheed, and Izzat Alsmadi. "Machine learning approaches to IoT security: A systematic literature review." *Internet of Things* (2021): 100365.
20. Liang, Xingwei, and Yoohwan Kim. "A Survey on Security Attacks and Solutions in the IoT Network." *2021 IEEE 11th Annual Computing and Communication Workshop and Conference (CCWC)*. IEEE, 2021.

## Access to Supporting Materials

The University uses MOODLE as a Learning Management System (LMS) to support all coursework subjects. The subject site and supporting materials can be accessed via: <https://moodle.uowplatform.edu.au> And via UOWD Library

## Assessment

## Assessment Of Learning Outcomes

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| **Learning Outcome** | | **Measures (Elements of Assessment)** |
| LO1 | Describe and explain principles underlying the various topics in cyber and computer security. | Asessment1, assessment 2, final |
| LO2 | Demonstrate an understanding of concepts and techniques underpinning cybersecurity topics. | Asessment1, assessment 2, final |
| LO3 | Devise and analyse solutions in cyber and computer security areas. | Asessment1, assessment 2, final |
| LO4 | Use appropriate programming interfaces to implement techniques related to cyber and computer security topics. | Asessment1, |
| LO5 | Describe issues and challenges associated with topics in cyber and computer security. | assessment 2, final |

## Assessment Tasks

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| **Learning Outcome** | Assessment1  **Programming**  **20%** | Assessment 2  **Project :Written report and presentation**  **20%** | Assessment 3  **Labs 10%** | ~**Final Exam**  **50%** |
| LO 1 | x | x | X | x |
| LO 2 | x | x | X | x |
| LO 3 | x | x | X | x |
| LO 4 | x |  | X |  |
| LO 5 |  | x |  | x |
| Group (G)/ Individual (I) | I | Group of 3 | I | I |
| Total Marks | 20 | 20 | 10 | 50 |
| Due Date | Week 6 | Week 9 | Week2-week10 |  |

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| **Assessment Task:** | Assignment 1 |
| **Type:** | Individual |
| **Description:** | Programming assignment |
| **Learning Outcome Measured:** | LO1, LO2, LO3, LO4 |
| **Total Marks:** | 100 |
| **Weighting:** | 20% |
| **Due Date:** | Week 6, 23/05/21 at 8:00PM. |
| **Word Length (if applicable):** |  |
| **Hand in to:** | Via box [csci301.2p9tapbpk9cj2shl@u.box.com](mailto:csci301.2p9tapbpk9cj2shl@u.box.com) |
| **TurnItIn submission required by:** | [insert date] |

## Outline and Requirements

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| The programming assignment introduces students to a practical view of the security of TLS. This is a individual type of assignment. The members must be part of the same lab . Students will implement TLS client server programs, HTTPS proxy programs in order to assess the security risk of trusted Certificate Authorities being compromised.  The programming assignment will be released by week 3. It will be due by the beginning of week 6, 23/05/21 at 8:00PM.  The submission details will be posted on the assignment handout. |

## Marking Criteria

Students will be assessed based on the following criteria:

* The quality of solution,
* The submission of a detailed lab report, with screenshots, that describes:
  + what you have accomplished
  + what you have observed.
  + More importantly, you MUST provide explanations to the observations that are interesting or surprising.
  + You must list and insert the important code snippets followed by explanation. If you do not provide any explanation to the code or to the observations you made, you will not receive any credits

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| **Assessment Task:** | Project |
| **Type:** | Group of 3 |
| **Learning Outcome Measured:** | LO1, LO2, LO3, LO5 |
| **Total Marks:** | 100 |
| **Weighting:** | 20% |
| **Due Date:** | 11/06/2021 11:58 pm |
| **Word Length (if applicable):** |  |
| **Hand in to:** | Lecturer |
| **TurnItIn submission required by:** | [insert date] |

## Outline and Requirements

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| * The aim of this project is explore the vulnerabilities of IoT systems, and Blockchain systems. I will be posting by week 5 a series of articles related to Attacks on IOT Systems and /or attacks on Blockchains. * This is a group assignment. * Students should form **into groups of three**, and submit by email to the lecturer the group member names at the **beginning of the tutorials of week2.** * **The members of a group must be part of the same lab**. Passed that delay, groups will be formed randomly by the lecturer. By week 3, each group will be assigned a topic by the lecturer. * The format of the email should be as below. If you use a different format , I will ignore the email.  |  |  |  |  | | --- | --- | --- | --- | | Student ID | First Name | Last Name | Lab group: Sunday/ Thursday | |  |  |  |  | |  |  |  |  | |  |  |  |  |  * My email address is : [halimkhelalfa@uowdubai.ac.ae](mailto:halimkhelalfa@uowdubai.ac.ae) * I will be posting a contribution sheet, that must be filled and signed by all members of the group. * Each group :   + will be assigned a particular topic that may consists of one or more articles.   + will produce a report and a power point presentation. * Topics of the presentations will be posted on the Course Web page along with the corresponding groups * Topics covered during the presentations are part of the curriculum. * Each group will work independently from other groups; there should be no collaborations between groups. * All groups must submit their reports and presentation to Turnitin by 11/06/2021 at 11:59pm. * UoWD penalties will apply for late submission or not being present for presentations when called in. * The order of presentations will be posted on Moodle by the beginning of week 8. * Each (team) group will have to produce:  1. A report of 12 pages (not including the cover and title pages. 2. A power presentation summarizing the findings of the report.  * Each group will be allocated 15 minutes for the presentation and 5 minutes for questions. Due to time restriction, groups must be ready to present when called on. The clock starts running from the time you are called on. After 20 minutes, another group will be called on.   **The Report:** must be double-spaced (spacing is set at 1.5 in Word), Times New Roman 12 point. You must include a table of content with main divisions of Introduction, Body, Conclusion and References. You must also use appropriate headings and subheadings for proper division of report content.  You should hand out the following documents: (group# is your group number) |

## Marking Criteria

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| The overall mark for this assignment is the weighted average of the report and the presentation. The weighting is as follows:   * ***The report has a weight of 40%*** * ***The presentation has a weight of 60%***   The report mark is a global mark for all members of the group.  The presentation mark is an individual mark, according to how each individual answers questions. During question time all group members must have their camera on. |

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| **Assessment Task:** | Labs |
| **Type:** | Individual |
| **Description:** | Report |
| **Learning Outcome Measured:** | LO1, LO2, LO3, LO5 |
| **Total Marks:** | 100 |
| **Weighting:** | 10% |
| **Due Date:** | Specified on the lab handout |
| **Word Length (if applicable):** |  |
| **Hand in to:** | Electronic submission via box. [csc301\_.vf2i6h44m8z1n3af@u.box.com](mailto:csc301_.vf2i6h44m8z1n3af@u.box.com) |
| **TurnItIn submission required by:** | [insert date] |

## Outline and Requirements

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| This subject includes fortnightly Lab sessions.  Labs will occur on: week2, week 4, week 6, week 8, week 9, and week 10.  **Week 9 labs will be assigned for project presentations.** Some of the labs will require you to submit your work. The lab handout will inform you if a submission is required. The submission can be either at the end of the lab session, at a later date. |

## Marking Criteria

* .
* The quality of solution,
* The submission of a detailed lab report that answers all the questions asked.
* The format and style of the report

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| **Assessment Task:** | Final Exam |
| **Learning Outcome Measured:** | LO1, LO2, LO3, LO5 |
| **Total Marks:** | 100 |
| **Weighting:** | 50% |
| **Date:** | To be held during the official examination period. Please refer to the Exam Timetable available on the Student Online Resources website (<http://my.uowdubai.ac.ae>) closer to the exam period. |

## Late submissions:

Please note that late submissions will incur a penalty of 20% per day, including weekends.

## Grades Awarded

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| The approved grades of performance and associated ranges of marks for undergraduatesubjects are: | |
| High Distinction (HD)  Distinction (D)  Credit (C)  Pass (P)  Pass Supplementary (PS)  Fail (F)  Technical Fail (TF) | 85 – 100%  75 – 84%  65 – 74%  50 – 64%  50%  0 – 49% (and not meeting the attendance requirements)  Not meeting the final exam passing requirements – see the Assessment Policy PP-REG-DB-2.1 |

## Satisfactory Completion Requirements

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| In order to be considered for a grade of Pass (P) or better in this subject, students **must achieve the minimum required mark in the Final Examination (see page 1 for required score);** students who obtain a composite mark greater than or equal to 50% but do not satisfy the Final Examination minimum pass requirements in the final examination will be awarded a “Technical Fail” grade.  Students must ‘reasonably’ complete all assessment tasks (including the required score for the Final Examination,) and submit these as specified in the subject outline. ‘Reasonable’ completion of an assessment task will be determined based on the instructions given to the student including: word length, demonstration of research and analysis where required, adherence to the Plagiarism Policy guidelines, and completion of each section/component of the assessment. Failure to submit all assessment tasks may result in a Fail grade awarded for the subject. |

## Relevant Policies and Documents

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| All students must read and be familiar with the following UOWD policies and documents, which are available on the Student Online Resources (my.uowdubai.ac.ae) website by following the Policies link:   |  | | --- | | * Academic Grievance Policy | | * Academic Integrity Policy | | * Campus Access and Order Rules | | * Code of Conduct – Library Users | | * Code of Practice – Students | | * Copyright Policy | | * Intellectual Property Policy | | * Library Regulations | | * Minimum Rate of Progress | | * Music, Video and Software Piracy | | * Non-Discriminatory Language and Practice & Presentation Policy and Guidelines | | * Special Consideration Policy & Procedure | | * Student Attendance Policy | | * Student Conduct Rules | | * Rules for use of UOWD ITTS Facilities | | * Teaching and Assessment: Code of Practice – Teaching | | * Teaching and Assessment: Assessment and Feedback Policy | | * Teaching and Assessment: Subject Delivery Policy | |

## SSP & Studiosity

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| SSP (Student Support Program) is a program committed to assisting students in developing their academic skills and getting the most out of their studies. As part of their services, SSP provides Peer Tutoring Program and Academic Workshops (<https://my.uowdubai.ac.ae/ssd/index.php>).  Studiosity is an online study tool that students can access 24 hours, 7 days a week!   Students can receive feedback on submitted writing in less than 24 hours and receive one-to-one, personal help in real time with a subject specialist. The service can be accessed through the subject’s Moodle site**.**  For further information, please contact:  SSP Coordinator  [ssp@uowdubai.ac.ae](mailto:ssp@uowdubai.ac.ae)  Phone Number: +971 4 278 1756 |

## Academic Integrity

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| Plagiarism and cheating are serious offences that can lead to expulsion from the university. Students must be familiar with the *Academic Integrity* policy which outlines the procedure that will be followed in case of academic misconduct including cheating and plagiarism. Please refer to *How to Avoid Plagiarism* available on the Student Online Resources website (<http://my.uowdubai.ac.ae>). |

## Turnitin

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| Students are required to submit all written assignments in soft copy through the TurnItIn system which is available online at www.turnitin.com. Every student must have a TurnItIn account. Failure to submit an assignment through TurnItIn will result in marks for that assignment being withheld. **Students do NOT need to hand in a printed copy of the TurnItIn Originality Report.** More information about TurnItIn (including how to create an account and add a class) will be provided in the first lecture. Students can download Frequently Asked Questions (FAQs) about TurnItIn from the SSP section of UOWD website (https://www.uowdubai.ac.ae/academic-resources/student-support-programs). |

**TurnItIn information required to add this subject:**

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| **Class ID:** | Moodle Link |
| **Password:** | Moodle Link |

## Reference & In-Text Citation

For information about referencing and in-text citation please review the *Academic Writing Presentation* available on the Student Online Resources website (<http://my.uowdubai.ac.ae>).

## UOWD Rules & Policies

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| For information about UOWD Rules and Policies, please go to the Student Online Resources website (<http://my.uowdubai.ac.ae>) and click on the POLICIES link. |

## Attendance Requirements

Attendance in this subject is compulsory. Failure to attend all tutorials and computer labs as per the Student Attendance Policy may result in a FAIL grade. Students are strongly encouraged to become familiar with this policy (which can be found on the Online Resources website at my.uowdubai.ac.ae).

## Tutorial/Computer Lab Enrolments

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| All students must sign up for one tutorial and/or computer lab in Week 1. Admission to a tutorial/computer lab will not be possible unless the student’s name is on the Attendance List for that class. No changes will be allowed once a student has enrolled in a tutorial/computer lab. |

## Supplementary Assessments

A supplementary assessment may be offered to students whose performance in this subject is close (45-49 in the final examination and 48-49 in the composite score) to that required to pass the subject, and are otherwise identified as meriting an offer of a supplementary assessment. The precise form of a supplementary assessment will be determined at the time the offer of a supplementary is made.

1. **Lecture Capture**

UOWD supports the recording of lectures as a supplemental study tool, to provide students with equity of access, and as a technology-enriched learning strategy to enhance the student experience.

To make your own recording of a lecture you **must** receive theexplicit permission of the Educator and those people who are also being recorded.

You may only use recorded lectures, whether they are your own or recorded by the university, for your own educational purposes. Recordings cannot be altered, shared or published on another platform, without permission of the University. UOWD’s Lecture Capture policy is underdevelopment.

1. **Sustainability**

UOWD encourages all students to act in a sustainable manner when planning and submitting assessments. If possible, students should not use plastic items, such as folders, covers, and bindings, and other synthetic materials, for presentations, workshops, and other activities. Students are also encouraged to avoid unnecessary printing; and if printing is required, please consider printing double-sided and only printing essential illustrations avoiding blocks of any colour as the use of ink is harmful to the environment. Always behave in a sustainable way.