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**ASIA PACIFIC COLLEGE**

**3 Humabon Place, Magallanes Makati City**

**SCHOOL of COMPUTING AND INFORMATION TECHNOLOGIES**

**Modeling and Simulation Course Syllabus**

**APC Vision**

Asia Pacific College envisions itself to be the preferred Higher Education Institution bridging academe and industry with its programs founded on the concepts and applications of IT, guided by the core values of integrity, industry and innovation that works.

**APC Mission**

Asia Pacific College, powered by education and industry professionals as faculty and a balanced curriculum, aims to provide business and the information and communications technology industry in the Philippines and in the global community lifelong learning graduates who are anchored on the principles of integrity and professionalism.

**APC Values**

APC aims to produce graduates with strong sense of ***industry*** or hard work, ***integrity*** or being honest and having strong moral / ethical principles, and ***innovation*** or constantly introducing new and creative methods or ideas.

**APC Graduate Attributes**

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| **Solution Provider** | Applies knowledge, concepts, theories, and industry-based skills in order to identify, solve, and recommend solutions aligned to the goals of its users and the organization to which they operate  Develops ideas and solutions with creativity and innovation, and with appropriate considerations to ethical, cultural, and environmental factors |
| **Committed** | Fulfills commitments, made to one's self and the organization, beyond expectations  Copes with the demands of goals, commitments, and responsibilities even when faced with unexpected situations |
| **IT Enabled** | Uses innovative methods and appropriate technologies to perform tasks effectively and efficiently |
| **Professional** | Understands the needs of customers and audiences, as well as the intent and spirit of their requirements, in order to respond appropriately in verbal and nonverbal forms |
| **Team Player** | Functions effectively as an individual and as a member of diverse teams in multidisciplinary settings by respecting and recognizing individual and cultural differences and strengths  Encourages, motivates, and inspires others to perform, cooperate, and achieve team goals |
| **Good Communicator** | Communicates effectively and ethically using the English language |
| **Ethical Professional** | Understands social and ethical responsibilities |
| **Contributor to Nation Building** | Recognizes the needs of society, and contributes ideas to address societal concerns and issues for the betterment of the nation and its citizens |
| **Lifelong Learner** | Recognizes the fast-paced demands of the industry, allowing one to formulate personal goals aligned to organizational goals in order to determine plans of action to improve one’s performance and capability; possesses the ability to engage in independent and life-long learning in the broadest context of technological change; determines one’s developmental needs through self-assessment |

**Bachelor of Science in Computer Science Program Educational Objectives**

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| --- | --- | --- |
| **Program Educational Objectives** | | **Alignment with APC Mission, Vision and Values** |
| **PEO1** | To be able to apply, articulate and discuss computing concepts and theories, algorithmic foundations and new developments and trends in computing in any field in Computer Science | Innovation |
| **PEO2** | To be able to provide a significant contribution using computer science concepts, applications, tools and methodologies to enable innovations in organizational processes and human activities | Innovation |
| **PEO3** | To be able to design and develop IT solutions integrating the perspectives of professionalism, public policy, legal and ethical dimensions of IT, with the core values of APC, balancing the needs of its users and that of society, in general | Integrity and Ethics |
| **PEO4** | To be able to adapt with societal, business, and technological changes by continuously and actively engaging in:   1. career and professional activities 2. continuing education | Industry and Lifelong Learning |
| **PEO5** | To effectively communicate orally and in writing | Industry, Integrity, and Communication |
| **PEO6** | To work effectively and independently in multidisciplinary and multi-cultural teams | Industry and Teamwork |

**Computer Science Graduate Outcomes**

|  |  |
| --- | --- |
| **CS01** | Apply knowledge of computing fundamentals, knowledge of a computing specialization, and mathematics, science, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements. |
| **CS02** | Identify, analyze, formulate, research literature, and solve complex computing problems and requirements reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines |
| **CS03** | An ability to apply mathematical foundations, algorithmic principles and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices |
| **CS04** | Knowledge and understanding of information security issues in relation to the design, development and use of information systems |
| **CS05** | Design and evaluate ideas and solutions with creativity and innovation for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, ethical and environmental considerations. |
| **CS06** | Create, select, adapt, and apply appropriate techniques, resources and modern computing tools to complex computing activities, with an understanding of the limitations to accomplish a common goal. Uses innovative methods and appropriate technologies to perform tasks effectively and efficiently |
| **CS07** | Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings by respecting and recognizing individual and cultural differences and strengths. Encourages, motivates, and inspires others to perform, cooperate and achieve team goals. |
| **CS08** | Communicate effectively and ethically, with emphasis on the English language, with the computing community and with society at large about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions |
| **CS09** | The ability to recognize the legal, social, ethical, and professional issues involved in the utilization of computer technology and be guided by the adoption of appropriate professional, ethical and legal practices |
| **CS10** | Recognize the need, and have the ability, to engage in independent life-long learning in the broadest context of technological change for continual development as a computing professional. It also recognizes the fast-paced demands of industry allowing one to formulate personal goals aligned to organizational goals in order to determine plans of action to improve one’s performance and capability; determines one’s developmental needs through self-assessment. |
| **CS11** | Recognizes the needs of society and contributes ideas to address societal concerns and issues for the betterment of the nation and its citizens. |
| **CS12** | Understands the needs of customers and audience and the intent and spirit of their requirements in order to respond appropriately in verbal and non-verbal forms. |
| **CS13** | Fulfills commitments, made to self and the organization, beyond expectations. Copes with the demands of goals, commitments, and responsibilities even when faced with unexpected situations |

**Course Code : MODESIM**

**Course Name : MODELING AND SIMULATION**

**Course Description :** This course covers the basic principles of modeling and simulation using a general-purpose programming language. Topics in this course include, but are not limited to, systems definition, stochastic and deterministic models, simulation techniques, and model verification and validation techniques.

**Course Credit** **:** **Three (3) units**

**Course Prerequisite : QUAMET1**

**COURSE OUTCOMES**

At the end of the course, students will be able to:

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| --- | --- |
| Course Outcomes (CO) | Graduate Outcomes Aligned to |
| C1: Quantitatively model and simulate systems using relevant tools. | CS01CS03 |
| C2: Implement simple models, by either replicating or extending established models, and then validate and verify the correctness of these models. | CS03  CS05  CS06 |
| C3: Formulate scientific research questions correctly, and confidently and clearly communicate scientific results, either through a written or oral report. | CS02  CS03  CS08  CS09 |

**Learning Output**

As evidence to measure the achievement of the course outcomes, the following will be required from the learners towards the end of the course:

* A research project that implements a model of a system, runs simulations, and analyzes data.

**COURSE OUTLINE**

| **Week** | **Topics** | **Learning Activities** | **Learning Outcomes** | **Instructional Materials** | **Deliverables/**  **Outcomes** | **Assessment** |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | * Course Outline and Class Policies * Overview of the tools, learning platforms, and coding environments to be used in class * Project Overview * Python Basics * Introduction to Modeling and Simulation * The Modeling Process | * Discussion * Tools demo * Coding exercise * LinkedIn Learning course completion | * Describe the course outline and class policies. * Explain the course outcomes and relate the learning output. * Recall the features of the available learning platforms and coding environments * Review basic programming structures using Python. * Define and explain the terms model, simulation, and system. * Perform the modeling process using Python | * Class orientation slides * APC Handbook * LinkedIn Learning course for Python review: [Hands-On Introduction: Python](https://www.linkedin.com/learning/hands-on-introduction-python?u=35279340) * Introduction to Modeling and Simulation slides * Bikeshare example from [2] to illustrate modeling process | * LinkedIn Learning Certificate * Bikeshare python code | * Quiz * Coding exercise |
| 2 | * Linear Regression * Categorical Independent Variables | * Code demo * Computer simulation | * Determine the best-fit linear model to a given data set * Interpret the coefficients of a linear regression model * Derive and interpret the coefficient of determination and the correlation coefficient in the context of a given data set. | * Linear Models slides * Code samples | * Linear regression model coding assignment | * Coding exercise |
| 3 | * Logistic Regression * Project Overview * Project Work | * Discussion * LinkedIn Learning video viewing on the content for the sections in Project Deliverable 1 * LinkedIn Learning course completion | * Create a logistic regression model given a data set * Apply available Python libraries in developing a logistic regression model and calculating appropriate performance metrics * Interpret the coefficients of a logistic regression model * Create a problem statement for the chosen topic * Write appropriate research questions * Create the hypothesized solutions to the research questions | * Logistic Regression slides * LinkedIn Learning course: [Machine Learning with Python: Logistic Regression](https://www.linkedin.com/learning/machine-learning-with-python-logistic-regression?u=35279340) * Final project templates * LinkedIn Learning videos on research:   + [Independent and dependent variables](https://www.linkedin.com/learning/academic-research-foundations-quantitative/independent-and-dependent-variables?resume=false&u=35279340) (3 min, 25 sec)   + [Elements of a research question](https://www.linkedin.com/learning/academic-research-foundations-quantitative/elements-of-a-research-question?resume=false&u=35279340) (3 min, 26 sec)   + [How to write a research question](https://www.linkedin.com/learning/academic-research-foundations-quantitative/how-to-write-a-research-question?resume=false&u=35279340) (2 min, 39 sec)   + [Create research objectives](https://www.linkedin.com/learning/academic-research-foundations-quantitative/create-research-objectives?resume=false&u=35279340) (3 min, 13 sec)   + [Research frameworks and hypotheses](https://www.linkedin.com/learning/academic-research-foundations-quantitative/research-frameworks-and-hypotheses?resume=false&u=35279340) (3 min, 22 sec) | * Logistic regression model coding assignment * Project Deliverable 1 | * Quiz * Coding exercise * Project Deliverable 1 |
| 4-6 | * Other nonlinear regression models * Project Deliverable 2 * Data Preprocessing * Data Analysis from Questionnaires | * LinkedIn Learning course completion * LinkedIn Learning video viewing on data preprocessing | * Choose an appropriate method in creating a best fit model given a data set. * Decide on how to handle categorical data and missing data. * Explain each group’s project method for analysis. | * LinkedIn Learning videos on nonlinear regression models:   + [Defining natural logs and exponents](https://www.linkedin.com/learning/excel-statistics-essential-training-2-2/defining-natural-logs-and-exponents?u=35279340)   + [Performing exponential regression analysis](https://www.linkedin.com/learning/excel-statistics-essential-training-2-2/performing-exponential-regression-analysis?u=35279340)   + [Performing logarithmic regression analysis](https://www.linkedin.com/learning/excel-statistics-essential-training-2-2/performing-logarithmic-regression-analysis?u=35279340)   + [Performing a power regression analysis](https://www.linkedin.com/learning/excel-statistics-essential-training-2-2/performing-a-power-regression-analysis?u=35279340)   + [Performing polynomial regression analysis](https://www.linkedin.com/learning/excel-statistics-essential-training-2-2/performing-polynomial-regression-analysis?u=35279340)   + [Performing logistic regression](https://www.linkedin.com/learning/excel-statistics-essential-training-2-2/performing-logistic-regression?u=35279340) * LinkedIn Learning course: [Python Data Analysis](https://www.linkedin.com/learning/python-data-analysis-2?u=35279340) (2 hours, 30 minutes) * LinkedIn Learning videos on data preprocessing (all come from the course [Python: Working with Predictive Analytics](https://www.linkedin.com/learning/python-working-with-predictive-analytics?u=35279340) (1 hour, 17 min)):   + [Differentiate data types](https://www.linkedin.com/learning/python-working-with-predictive-analytics/differentiate-data-types?u=35279340) (4 min, 50 sec)   + [Python libraries and data import](https://www.linkedin.com/learning/python-working-with-predictive-analytics/python-libraries-and-data-import?u=35279340) (4 min, 34 sec)   + [Handling missing values](https://www.linkedin.com/learning/python-working-with-predictive-analytics/handling-missing-values?u=35279340) (4 min, 45 sec)   + [Convert categorical data into numbers](https://www.linkedin.com/learning/python-working-with-predictive-analytics/convert-categorical-data-into-numbers?u=35279340) (6 min, 38 sec)   + [Feature scaling](https://www.linkedin.com/learning/python-working-with-predictive-analytics/feature-scaling?u=35279340) (6 min, 58 sec) | * Preprocessed project data set * Project Deliverable 2 | * Coding exercise * Quiz |
| 7 | * Estimating Models from Empirical Data * Forecasting * Stochastic Models * Monte Carlo Simulation * Optimization using Goal Seek | * Discussion * Code demo * LinkedIn Learning course completion | * Explore input data for analysis * Apply basic forecasting models (naïve, moving average, trendline) * Compare different types of forecasting models. * Compute a variety of error measures. * Simulate a stochastic process using the Monte Carlo method * Perform optimization using goal seek. | * Lecture slides * Data sets for demo * LinkedIn Learning course [Excel: Analytics Tips](https://www.linkedin.com/learning/excel-analytics-tips?u=35279340) (2 hours, 1 min) | LinkedIn Learning Certificate | * In-video quizzes * Problem solving exercise |
| 8 | * Introduction to Machine Learning * Python for Data Science * Verification, Validation, Errors | * Microsoft Learn module completion * LinkedIn Learning course completion | * Describe machine learning and differentiate from traditional algorithms * Create and test machine learning models * Load a model and apply it to new sets of data * Differentiate verification from validation * Apply verification and validation guidelines to deterministic and stochastic models | * Microsoft Learn module [Introduction to Machine Learning](https://learn.microsoft.com/en-us/training/modules/introduction-to-machine-learning/) * LinkedIn Learning course [Python for Data Science Essential Training Part 2](https://www.linkedin.com/learning/python-for-data-science-essential-training-part-2?u=35279340) | LinkedIn Learning Certificate  Microsoft Learn badge and certificate | * In-video quizzes * Coding exercise |
| 10 | * Model Evaluation * Project work: Discussion on Project Deliverable 3 + Consultation * Case Study: Agent-Based Modeling – Virus Spread | * Discussion * Excel / Code demo * Project consultation | * Compute and interpret error measures * Evaluate models * Define and identify the components of agent-based models * Apply ABM to virus spread | * Lecture slides * Data sets for demo * LinkedIn Learning course [Applied Machine Learning: Foundations](https://www.linkedin.com/learning/applied-machine-learning-foundations?u=35279340) | LinkedIn Learning certificate | * In-video quizzes * Problem solving exercise |
| 11 | * Case Study: Epidemiology – SIR Model * Project work: Discussion on Project Deliverable 4 + Consultation | * Discussion * Code demo | * Define and explain the SIR Model * Apply the SIR model to virus spread * Simulate virus spread when interventions are executed | * Lecture slides * Data sets for demo | Simulation code | * Coding exercises and results interpretation |
| 12 | * Case Study: Queues * Project work: Project Deliverable 4 completion | * Lecture * Demo * Computer Simulation | * Describe queueing theory * Simulate queues at check-out counters * Complete the pre-final draft copy of the final project | * Lecture slides * Data sets for demo | Paper pre-final draft | Pre-final draft |
| 13 | * Final paper peer review | Lecture, demo, computer simulation | * Give objective feedback on another group’s project. | * Pre-final draft * Peer reviewer form | Filled-out Peer Reviewer form | Peer review |
| 14 | * Project Completion: Integration to final paper of peer reviews | * Group work * Consultation | * Integrate peer feedback into the final project. * Complete the final project. | * Final paper template * Final project rubrics | Final paper  Presentation slides  Presentation Recording | Final project |

**TEXTBOOK**

1. Kinser, J. M. (2022). [*Modeling and Simulation in Python*](https://library.apc.edu.ph/cgi-bin/koha/opac-detail.pl?biblionumber=36593). Taylor & Francis.

**REFERENCES**

1. Downey, A. (2017). [*Modeling and Simulation in Python*](https://library.apc.edu.ph/cgi-bin/koha/opac-detail.pl?biblionumber=12817&query_desc=kw%2Cwrdl%3A%20downey). Needham, MA: Green Tea Press. Retrieved from <http://greenteapress.com/modsimpy/ModSimPy3.pdf>.
2. Gordon, S. & Guilfoos, B. (2017). [*Introduction to modeling and simulation with Matlab and Python*](https://library.apc.edu.ph/cgi-bin/koha/opac-detail.pl?biblionumber=13053). Boca Raton, FL: CRC Press Taylor & Francis Group, LLC.
3. McKinney, W. (2018). [*Python for Data Analysis*](https://library.apc.edu.ph/cgi-bin/koha/opac-detail.pl?biblionumber=10562&query_desc=kw%2Cwrdl%3A%20python%20data). Sebastopol, California : O'Reilly Media, Inc.
4. Nagar, S. (2018). [*Introduction to Python for Engineers and Scientists : Open-Source Solutions for Numerical Computation*](https://library.apc.edu.ph/cgi-bin/koha/opac-detail.pl?biblionumber=10567&query_desc=kw%2Cwrdl%3A%20nagar). Berkeley, CA : Apress.
5. Sundnes, J. (2020*).* [*Introduction to Scientific Programming with Python*](https://library.apc.edu.ph/cgi-bin/koha/opac-detail.pl?biblionumber=12127&query_desc=kw%2Cwrdl%3A%20sundnes). Springer International Publishing.
6. Tagliaferri, L. et al. (2019). [*Python Machine Learning Projects*](https://library.apc.edu.ph/cgi-bin/koha/opac-detail.pl?biblionumber=12125&query_desc=kw%2Cwrdl%3A%20python). DigitalOcean.
7. Velten, K. (2009). [*Mathematical modeling and simulation: introduction for scientists and engineers*](https://library.apc.edu.ph/cgi-bin/koha/opac-detail.pl?biblionumber=5241). Wiley-VCH.
8. Williams, E. (2019). [*Python for Data Science*](https://library.apc.edu.ph/cgi-bin/koha/opac-detail.pl?biblionumber=15244&query_desc=kw%2Cwrdl%3A%20python).

**INSTRUCTIONAL MATERIALS**

1. [Sustainable Development Goals](https://www.undp.org/content/undp/en/home/sustainable-development-goals.html) (learning output motivation)
2. Books
3. Video clips
4. Online courses from LinkedIn Learning
5. Possible data sources:
   1. [Kaggle Datasets](https://kaggledatasets.github.io/)
   2. [Google Dataset Search](https://toolbox.google.com/datasetsearch)
   3. [Open Data Philippines](https://data.gov.ph/)
   4. [World Bank Open Data](https://data.worldbank.org/)

**GRADING SYSTEM**

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| Project Deliverables / Problem Sets | 40% |
| Project Proposal / Final Project | 30% |
| Assignments / Lab Exercises | 25% |
| Class Participation | 5% |
| **Total** | **100%** |

**Final Course Grade: 50% (1st half grade) + 50% (2nd half grade)**

\*1st half grade (i.e. midterm grade) is computed from scores obtained in week 1 up to week 7.

\*2nd half grade is computed from scores obtained in week 8 up to week 14.

**Learning Output RUBRICS**

**Research Paper**

| ***Aspects of Paper*** | ***5*** | ***4*** | ***3*** | ***2*** | ***1*** |
| --- | --- | --- | --- | --- | --- |
| **Title Section** | Title, and members’ information complete | 1 to 2 errors in the title section | 3 to 4 errors in the title section | 4 or more errors in the title section | No title nor members’ names indicated |
| **Abstract** | Can be understood by those with minimal knowledge of the discipline; uses an introduction/body/conclusion structure which logically follows the chronology of the work; is concise without being choppy | Uses an introduction/body/conclusion structure which logically follows the chronology of the work; is concise without being choppy | Uses an introduction/body/conclusion structure which logically follows the chronology of the work; however, some parts are choppy | States the abstract in a single sentence | Incomplete and/or unfocused |
| **Body** | Each paragraph has thoughtful supporting detail sentences that develop the main idea. | Each paragraph has enough supporting detail sentences that develop the main idea. | Some paragraphs have enough supporting details that develop the main idea | Each paragraph lacks the supporting detail sentences. | Each paragraph fails to develop the main idea. |
| **Figures, tables, and equations** | All figures, tables, and equations are clearly and logically identified and strongly support the text. | Most figures, tables, and equations are clearly and logically identified and support the text. | Only a few of the figures, tables, and equations are clearly and logically identified and somehow support the text. | Most of the figures, tables, and equations are identified but does not support the text. | None of the figures, tables, and equations are clearly and logically identified and does not support the text. |
| **Organization** | Writer demonstrates logical and subtle sequencing of ideas through well-developed paragraphs; transitions are used to enhance organization. | Paragraph development present but not perfected. | Logical organization; some ideas are fully developed | Logical organization; organization of ideas not fully developed. | No evidence of structure or organization. |
| **Mechanics** | No errors in punctuation, capitalization, and spelling. | Almost no errors in punctuation, capitalization and spelling. | Few errors in punctuation, capitalization, and spelling | Many errors in punctuation, capitalization and spelling. | Numerous and distracting errors in punctuation, capitalization and spelling. |
| **Citation** | All cited works are done in the correct format with no errors. | Some cited works are done in the correct format with no errors | Few cited works are done in the correct format with no errors. | Citation exists but in an incorrect format | No citation at all |

**Presentation Rubric**

| ***Aspects of Presentation*** | ***4*** | ***3*** | ***2*** | ***1*** |
| --- | --- | --- | --- | --- |
| **Organization** | Well thought out with logical progression; significance clearly stated; use of proper language; content level appropriate for audience; strong opening and closing | Talk easy to follow; content was presented in mostly logical sequence; significance clearly stated; content level not always appropriate; use proper language; fairly strong opening and closing | Talk somewhat disorganized; content was presented in inadequate sequence; shows somewhat effort to use proper language; significance somewhat unclear; includes irrelevant content and inappropriate content level; weak opening and closing | Talk difficult to follow; little thought given to sequence of content; repetitive; transitions choppy; does not understand significance of work; unclear language; lacked opening and closing |
| **Creativity**  **and**  **Visual Aids** | Tables and graphs summarize data and/or conclusions; size and label are clear; very little text; figures and images explained and described well; presentation has no misspellings or grammatical errors | Text appropriately sized; very little text; most figures and images explained and described well; presentation as occasional misspelling or grammatical error | Labels and legends somewhat unclear; text size somewhat small; too much detail on slides; blocks of text on slides; figures are explained; presentation has multiple misspellings and/or grammatical errors | Labeling is not clear; size is too small to see; no logical placement of information; mostly text and very few images; figures are not explained; presentation has numerous misspellings and/or grammatical errors |
| **Understanding of Scientific Content** | Identifies the research question / research field; has advanced understanding of the experimental approach and significance; critically evaluates results, methodology, and conclusions; scientifically rigorous and well researched | Identifies the research question / research field; understands the experimental approach and significance; limited evaluation of results, methodology, and conclusions; well researched | Research question / research field somewhat unclear; description of experimental approach somewhat confusing; results and conclusions stated but not critically evaluated; does not integrate outside readings | Does not understand the research; does not understand the experimental approach; does not understand conclusions or recognize implications for future work |
| **Style / Delivery** | Uses time wisely; poised, clear articulation; proper volume; steady rate of speaking; good eye contact; does not read information; enthusiastic; confident; uses engaging tone and appropriate vocabulary | Clear articulation but not polished; volume and rate of speaking fluctuated; some eye contact; speaks well, but often repeats comments; some enthusiasm and confidence; uses good vocabulary and tone | Presentation poorly timed; some mumbling; some hesitation and uncertainty are apparent; volume uneven; little eye contact or enthusiasm; looks at notes; monotone and non-engaging delivery | Presentation poorly timed; Speaking inaudible or too loudly; very little eye contact; rate too slow; speaker seemed uninterested; speaks to quietly or quickly for audience to hear and understand |
| **Ability to Answer Questions** | Anticipates audience questions; understands audience questions; can integrate knowledge to answer questions; thoroughly responds to questions | Does not anticipate audience questions; understands audience questions; can integrate knowledge to answer questions; thoroughly responds to most questions | Does not anticipate audience questions, makes an effort to address question; can address some questions; often responds poorly to questions | Either makes no effort to respond to questions or does so poorly |

**CLASSROOM POLICIES**

1. All APC policies on attendance and plagiarism/cheating, among others, are enforced.
2. Students are expected to attend all scheduled synchronous classes. It is the responsibility of the student to catch up for all lectures missed due to his/her absence.
3. All assignments/deliverables must be submitted on or before their respective deadlines. Ensure that you press the **Turn In** button when submitting the final version of an assignment.
4. If, for some reason, you fail to submit deliverables on time, please send a notification to your instructor. Adjustments may be made on a case-to-case basis.
5. The instructor reserves the right to modify this syllabus as the pace of the class dictates.

**CONSULTATION HOURS**

You may send your queries about the subject to your instructor through email or via Microsoft Teams. For long discussions, set a meeting through Microsoft Teams. For questions that require short and quick answers, you may send them via Microsoft Teams chat.

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| **Prepared by:** | Gardon, R.W. | **Reviewed by:** |  | **Approved by**: |  |
| Date | December 2022 | Date |  |  |  |