COURSE SYLLABUS

# ANALYTICS APPLICATION

**1st Semester, SY 2022-2023**

**COLLEGE :** College of Information and Communications Technology

**DEPARTMENT :** Bachelor of Science in Information Technology

**COURSE CODE :** IT 403

**COURSE TITLE :** ANALYTICS APPLICATION

**CREDIT UNITS :** 1-unit Laboratory / 2-unit Lecture

**PRE-REQUISITE/S :** IT 311 and IT 312

**FACULTY :** Charlyn N. Villavicencio, Ph.D.

Lilibeth G. Antonio, MSIT

**CONSULTATION HOURS :** 3 hours per week

# COURSE DESCRIPTION:

The course aims to provide the student with application that help organizations develop insights to make better timely decisions and automate processes. It provides a solid foundation of strategic analytic products and services to take advantage of all the data sources, including structured and unstructured data, and ultimately get the support needed to stay one step ahead of the competition.

# University Vision

Bulacan State University is a progressive knowledge-generating institution, globally-recognized for excellent instruction, pioneering research, and responsive community engagements.

# University Mission

Bulacan State University exists to produce highly competent, ethical and service- oriented professionals that contribute to the sustainable socio-economic growth and development of the nation

# Core Values: SOAR BulSU!

**S**ervice to God and Community

**O**rder and Peace

**A**ssurance of Quality and Accountability

**R**espect and Responsibility

The BulSU Ideal Graduates Attributes (BIG A) reflect the graduate’s capacity as:

1. highly and globally competent;
2. ethical and service-oriented citizen;
3. analytical and critical thinker; and
4. reflective life-long learner.

# Program Educational Objectives (PEO)

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| **Program Educational Objectives (PEO)** | **University Mission** | | | |
| **BIG-A** | **BIG-B** | **BIG-C** | **BIG-D** |
| **PEO1** Apply knowledge and technical competencies in various specialization tracks of Information Technology aligned to the responsive region’s specific development needs. |  |  |  |  |
| **PEO2** Prepare graduates to address various user needs involved in the selection, development, application, integration, and management of computing technologies within an organization through critical thinking and problem solving, being creative, collaborating, and communication effectively. |  |  |  |  |
| **PEO3** Design, implement, and evaluate the local, regional, national, and global impact of information and communications technology through logical writing, making presentations, conducting collaborative research, performing innovative production, rendering extension services, establishing international linkages and partnerships |  |  |  |  |
| **PEO4** Immerse and expose in an actual environment in industry, engage in planning self-learning, and understand professional, ethical, legal, security and social issues and responsibilities in the utilization of information technology towards the realization of  sustainable development goals. |  |  |  |  |

**Program Outcomes (PO)**

On completion of the course, the student is expected to be able to do the following:

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| --- | --- | --- | --- | --- |
| **Program Outcomes (PO) (CMO 15, series 2019)** | **Program Educational Objectives** | | | |
| **PEO1** | **PEO2** | **PEO3** | **PEO4** |
| a. Apply knowledge of computing, science and mathematics appropriate to the discipline. | ✔ | ✔ |  |  |
| b. Understand best practices and standards and their applications. |  | ✔ |  |  |
| c. Analyze complex problems, and identify and define the computing requirements appropriate to its solution. | ✔ | ✔ |  | ✔ |
| d. Identify and analyze user needs and take them into account  in the selection, creation, evaluation and administration of |  |  | ✔ | ✔ |

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| computer-based systems. |  |  |  |  |
| e. Design, implement and evaluate computer-based systems, processes, components, or programs to meet desired needs and requirements under various constraints. | ✔ |  | ✔ |  |
| f. Integrate IT-based solutions into the user environment effectively. | ✔ |  |  |  |
| g. Apply knowledge through the use of current techniques, skills, tools and practices necessary for the IT profession. | ✔ |  |  |  |
| h. Function effectively as a member or leader of a development team recognizing the different roles within a team to accomplish a common goal. |  | ✔ |  | ✔ |
| i. Assist in the creation of an effective IT project plan. | ✔ | ✔ |  |  |
| j. Communicate effectively with the computing community and with society at large about complex computing activities through logical writing, presentations, and clear instructions. |  | ✔ |  |  |
| k. Analyze the local and global impact of computing information technology on individuals, organizations, and society. |  |  | ✔ |  |
| l. Understand professional, ethical, legal, security and social issues and responsibilities in the utilization of information technology. |  |  |  | ✔ |
| m. Recognize the need for an engage in planning self-learning and improving performance as a foundation for continuing professional development. |  | ✔ |  | ✔ |

# Course Outcomes and Relationship to Program Outcomes

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| **Course Outcomes** | **Program Outcomes** | | | | | | | | | | | | | |
| After completing this course,  the student must be able to: | **a** | **b** | **c** | **d** | **e** | **f** | **g** | **h** | **i** | **j** | **k** | **l** | **m** |  |
| **CO1.** Incorporate the VMGO University especially the discipline towards the achievement of professional skills, honesty, moral and  ethical principles. |  |  |  |  | **D** |  |  |  | **D** |  |  | **E** | **E** |  |
| **CO2.** Demonstrate competencies to automate processes and apply data analytics in various fields for development of timely and reliable decisions |  |  | **I** | **I** |  |  | **I** |  |  |  |  |  |  |  |
| **CO3.** Demonstrate awareness of the ethical norms as required under policies and applicable laws governing confidentiality  and non-disclosure of data / | **E** | **E** | **D** | **E** |  |  | **E** | **E** |  |  |  | **D** |  |  |

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| information / documents and proper conduct in the learning process and application of business analytics. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **CO4.** Perform high-quality tasks required by the organization in particular, and the industry in  general. | **I** |  | **E** |  | **E** | **I** | **E** |  |  | **E** |  |  |  |  |
| **CO5.** Develop practical applications of data analytics for generating automated results for more  spontaneous decisions on various business functions. | **E** | **E** | **E** | **E** | **E** | **E** | **E** |  |  |  |  |  |  |  |

***Note: (I)*** *Introductory Course to an Outcome* ***(E)*** *Enabling Course to an Outcome* ***(D)*** *Demonstrative Course to an Outcome*

# LEARNING EPISODES:

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| --- | --- | --- | --- | --- |
| **Course Outcomes** | **Topics** | **Week** | **Learning Activities** | **Suggested Assessment** |
| **CO1.**  Incorporate the VMGO University especially the discipline towards the achievemen t of professional skills, honesty, moral and  ethical principles. | **Class Orientation**   * Vision, Mission, Goals and Objectives * Classroom Policies | 1 | Memorization of the VMGO  -Group sharing | Recitation |
| **CO2.**  Demonstrate competencies to automate processes and apply data analytics in various fields for development of timely and reliable decisions **CO3.** | **Review of Business Analytics**   * Descriptive Statistics * Predictive Analytics * Types of Datasets * Analytics Tools * Types of Machine Learning Algorithms | 2-4 | Discussion  Oral Participation  Virtual Demonstratio n  Virtual hands- | Group activity  Written Exam  Virtual Board work |

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| Demonstrate awareness of the ethical norms as required under policies and applicable laws governing confidentiality and non- disclosure of data / information  / documents and proper conduct in the learning process and application of business analytics. |  |  | on exercise | Actual Exam Using Analytics Tools  Sales Force Training Completion Certificate |
| **CO2.**  Demonstrate competencies to automate processes and apply data analytics in various fields for development of timely and reliable decisions **CO3.**  Demonstrate awareness of the ethical norms as required under policies and applicable laws governing confidentiality and non- disclosure of data / information  / documents and proper conduct in the learning process and application of business analytics. | **Machine Learning in Python**   * Introduction to Data Science and Machine Learning using Python * Supervised Machine Learning * Unsupervised Machine Learning * Representing Data and Engineering Features * Model Evaluation and Improvement | 5-8 | Discussion Brainstorming  Oral Participation  Presentation | Group activity  Individual Case study  Written Exam  Virtual Board work  SPARTA Completion Certificate |
|  | **Midterm Examination** | 9 |  | Presentation |

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| **CO3.**  Demonstrate awareness of the ethical norms as required under policies and applicable laws governing confidentiality and non- disclosure of data / information / documents and proper conduct in the learning process and application of business analytics.  **CO4.** Perform high-quality tasks required by the organization in particular, and the industry in  general. | **R-Programming**   * Fundamentals of R Language * Data types, variable, operators * Loop control, array, strings and functions * Vectors, Lists, and Matrices * Factors, Data frames, and Packages * Data and File Management * Charts and Graphs | 10-12 | Discussion Buzz Session  Oral Participation  Presentation  Virtual Demonstratio n | Group activity  Written Exam  Virtual Board work  Actual Exam Using Analytics Tools |
| **CO2.**  Demonstrate competencies to automate processes and apply data analytics in various fields for development of timely and reliable decisions  **CO3.**  Demonstrate awareness of the ethical norms as required under policies and applicable laws governing confidentiality  and non- disclosure of | **WEKA**   * Data pre-processing * Data Mining Model Development * Regression Model Development * Classification Model Development | 13-14 | Discussion Buzz Session  Oral Participation  Presentation  Virtual Demonstration | Group activity  Written Exam  Virtual Board work  Actual Exam Using Analytics Tools |

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| data / information / documents and proper conduct in the learning process and application of business analytics |  |  |  |  |
| **CO5.** Develop practical applications of data analytics for generating automated results for more spontaneous decisions on various business functions | **Rapid Miner**   * Introduction to Rapid Miner Studio * Visualizing Data * Marketplace – Product Extensions * Data Loading * Importing Data into Repository * Turbo Prep * Machine Learning * Creating a Decision Tree Model * Applying, Testing, and Validating a Model * Finding the Right Model * Text Mining * Sentiment Analysis | 15-16 | Discussion Buzz Session  Oral Participation  Presentation  Virtual Demonstration | Group activity  Written Exam  Virtual Board work  Actual Exam Using Analytics Tools |
| **CO5.** Develop practical applications of data analytics for generating automated results for more spontaneous decisions on various business  functions | **Final Project** | 17 | Creating Portfolio | Oral Presentation |
|  | **Final Examination** | 18 |  | Written and  Actual Exam |

**COURSE OUTPUT:**

The students are required to take the Sparta Course SP101 Getting Grounded on Analytics and SP901 Data Science and Machine Learning Using Python as part of the final requirements for this course.

# OTHER REQUIREMENTS AND ASSESSMENTS:

Aside from the final output, the student will be assessed at other times during the term by the following:

* + Regular Class Attendance / Work Ethics
  + Submission of Sales Force Completion Certificates
  + Submission of Sparta Completion Certificates
  + Activities/Problem Analysis
  + Major Examinations (Midterm and Final Term)
  + Projects /Case studies
  + Quizzes

# GRADING SYSTEM:

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| Term Examinations | 20% |
| Quizzes and Activities | 20% |
| Sales Force Certificate of Completion | 20% |
| SPARTA Certificate of Completion/Activities | 20% |
| Attendance | 10% |
| Participation/Recitation | 5% |
| Promptness | 5% |
| **TOTAL** | **100%** |

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| **Range** | **Grade** |
| 97-100 | 1.00 |
| 94 – 96 | 1.25 |
| 91 – 93 | 1.50 |
| 88 – 90 | 1.75 |
| 85 – 87 | 2.00 |
| 82 – 84 | 2.25 |
| 79 – 81 | 2.50 |
| 76 – 78 | 2.75 |
| 75 | 3.00 |
| 74 and  below | 5.00 |

**REFERENCES**:

1. Cios, K. J., Pedrycz, W., & Swiniarski, R. W. (2012). *Data mining methods for knowledge discovery* (Vol. 458). Springer Science & Business Media.
2. Gama, J. (2010). *Knowledge discovery from data streams*. Chapman and Hall/CRC.
3. Hilderman, R. J., & Hamilton, H. J. (2013). *Knowledge discovery and measures of interest* (Vol. 638). Springer Science & Business Media.
4. Liebowitz, J. (Ed.). (2013). Business analytics: An introduction. CRC Press.
5. Sherman, R. (2014). *Business intelligence guidebook: From data integration to analytics*. Newnes.
6. Bentley, D. (2017). *Business Intelligence and Analytics*.Library Press, NY.
7. Laursen, G. H., & Thorlund, J. (2016). *Business analytics for managers: Taking business intelligence beyond reporting*. John Wiley & Sons.
8. Han, J., Kamber, M., & Pei, J. (2012). *Data Mining Concepts and Techniques.*

Morgan Kaufmann Publishers, USA.

1. Reynolds, G. (2010)*. Information Technology for Managers.* Cengage Learning.
2. Liebowitz, J. (Ed.). (2013). Business analytics: An introduction. CRC Press.
3. Sherman, R. (2014). Business intelligence guidebook: From data integration to analytics. Newnes.
4. Scheps, S. (2011). *Business intelligence for dummies*. John Wiley & Sons.
5. Winston, W. (2016). *Microsoft Excel data analysis and business modeling*. Microsoft press.

# ONLINE RESOURCES:

1. https://[www.tutorialspoint.com/management.../business\_intelligence\_system.htm](http://www.tutorialspoint.com/management.../business_intelligence_system.htm)
2. <https://www.tutorialspoint.com/statistics/arithmetic_mean.htm>
3. [https://www.statisticshowto.datasciencecentral.com/probability-and-](https://www.statisticshowto.datasciencecentral.com/probability-and-statistics/descriptive-statistics/) [statistics/descriptive-statistics/](https://www.statisticshowto.datasciencecentral.com/probability-and-statistics/descriptive-statistics/)
4. <https://www.oracle.com/database/what-is-data-management/1>
5. <https://www.tutorialspoint.com/management.../business_intelligence_system.htm>
6. <https://www.tutorialspoint.com/statistics/arithmetic_mean.htm>
7. [https://www.statisticshowto.datasciencecentral.com/probability-and-](https://www.statisticshowto.datasciencecentral.com/probability-and-statistics/descriptive-statistics/) [statistics/descriptive-statistics/](https://www.statisticshowto.datasciencecentral.com/probability-and-statistics/descriptive-statistics/)
8. <https://www.oracle.com/database/what-is-data-management/1>
9. https://www.w3schools.com/r/
10. http://bit.ly/dp-weka
11. https://academy.rapidminer.com/learning-paths/get-started-with-rapidminer-and-machine-learning

# Class Policies:

* 1. The students are expected to follow the rules and policies of the University.
  2. Each student is expected to be in attendance every class period. In case of illness, emergencies, etc., students are required to give excuse letter signed by their respective superior and/or guardian. A valid ID must also be presented for validation of the signature.
  3. Requirements e.g. assignment, project, case study etc. which not submitted on or before the due date will no longer be accepted.
  4. Any form of dishonesty or cheating is not tolerated. While all students are encouraged to openly discuss and ask questions, the final work to be submitted must be the student’s own.
  5. Any form of copying or plagiarizing from past or current students’ project code is not acceptable.
  6. Enrolled students must go to the class promptly. Must come to each class prepared.
  7. Students are expected to take all examinations on the date scheduled and participate actively in the discussion as well as the different activities involved on the subject and the college as well.
  8. The use of electronic gadgets like cell phones, tablets, laptops, mp3, etc. are not allowed during class hours unless needed.

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Prepared by:

# Charlyn N. Villavicencio, Ph.D.

Instructor

# Lilibeth G. Antonio, MSIT

Instructor

Evaluated by:

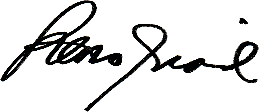
# Melanie M. Orbeso, MIT

Area Chair

# Rosemarie M. Bautista, DIT.

Department Head, BSIT Program

Approved:



**Keno C. Piad, DIT**

Dean

**Declaration**

I have read and understood the above syllabus in full and in participating in this course I agree to the above rules. I have a clear understanding of the policies and my responsibilities, and I have discussed everything unclear to me with the instructor.

I will adhere to the academic integrity and policy and I will treat my fellow students and my teacher with due respect.

I understand that this syllabus can be modified or overruled by announcements of the instructor in class or on any social media site at any time

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| --- | --- | --- | --- | --- |
| Student’s Printed name |  | Signature |  | Date |
| Parent’s Printed name |  | Signature |  | Date |

***Student’s Copy***

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| --- | --- | --- | --- | --- |
| Student’s Printed name |  | Signature |  | Date |
| Parent’s Printed name |  | Signature |  | Date |

***Instructor's Copy***