IS 325 Advanced Database

***DONNELLY COLLEGE***

Term

Day/Time

Room

3 credit hours

**INSTRUCTOR INFORMATION:**

Name:

Office hours:

Telephone:

E-mail address:

**COURSE DESCRIPTION:**

An in-depth study of the theoretical foundations of database design, implementation, and management as well as social and ethical issues associated with database design. Topics include the enhanced E-R model, object-oriented model, distributed databases, advanced SQL, security, data warehousing and mining. Students design, implement, and present a capstone course project.

**PREREQUISITES:**

Junior level standing and IT 125.

**REQUIRED TEXTBOOK & SUPPLIES:**

**IS 325 Text**: Advanced Database

ISBN: 9781644590898

Publisher: UCertify

**PHILOSOPHY OF GENERAL EDUCATION:**

Donnelly College has consistently maintained a strong commitment to the liberal arts and sciences as a foundation for a complete education. The faculty strongly believes that the liberal arts and sciences provide the context through which students can engage with the larger questions about students’ place in the world and their pursuit of truth. Therefore, the College’s general education requirements are designed to ensure that liberal arts and sciences graduates develop a breadth of content knowledge and the skills and abilities which will enable them to become educated participants in a diverse global community.

**DONNELLY COLLEGE LEARNING OUTCOMES:**

1. **Communication Skills:** Students will communicate effectively in writing and speaking.
2. **Technology and Information Literacy Skills:** Students will demonstrate proficiency in information literacy skills.
3. **Symbolic Problem Solving:** Students will demonstrate competency in qualitative and quantitative problem solving.
4. **Analytical Thinking:** Students will employ reflective thinking to evaluate diverse ideas in the search for truth.
5. **Personal and Interpersonal Skills:** Students will develop an understanding across cultural differences locally, nationally, and internationally.
6. **Academic Inquiry:** Students will engage independently and effectively in lifelong learning.
7. **Values:** Students will demonstrate moral and ethical behavior in keeping with our Catholic identity.

**PROGRAM LEARNING OUTCOMES:**

In addition to the general education learning outcomes – communication skills, technology and information literacy skills, symbolic problem solving, analytical thinking, personal and interpersonal skills, academic inquiry, and values – upon successful completion of the Organizational Leadership program students should be able to demonstrate:

1. The capacity to make informed decisions in computing practice based on legal and ethical principles;
2. The aptitude to analyze qualitative and quantitative data to make informed decisions;
3. The ability to support the delivery, use, and management of information systems;
4. The ability to communicate effectively with a wide-range of people about technical information;
5. The capacity to function effectively on teams to establish goals, plan tasks, meet deadlines, and produce deliverables.
6. The ability to use project management tools in the development and implementation of information systems projects.
7. The aptitude to write and present clear and effective technical documents and reports;

**STUDENT LEARNING OUTCOMES:**

1. The student will have the ability to identify a variety of ways to gather databases requirements.
2. The student will have the ability to define business rules for a database.
3. The student will have the ability to create an entity design for a database.
4. The student will have the ability to normalize and design up to the Third Normal Form (3NF).
5. The student will have the ability to write and run SQL queries.
6. The student will have the ability to understand security concepts for database users.
7. The student will have the ability to collaborate with classmates in virtual projects.

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| **Donnelly College**  **Learning Outcomes** | **Program Learning Outcomes** | **Student Learning Outcomes** | **Application and Assessment** |
| Students will communicate effectively in writing and speaking. | *The student will demonstrate academically accepted written and oral communications*. | The student will have the ability to collaborate with classmates in virtual projects. | Students will apply advanced knowledge of database development and implementation in a final project as follows: algorithm development, internal and external documentation, and coding. Target performance 80%-89% (B). |
| Students will demonstrate proficiency in information literacy skills. | The student will demonstrate an ability to use the techniques, skills, and modern computing tools necessary for technological practice. | The student will have the ability to write and run SQL queries. | Students will apply advanced knowledge of database development by writing and executing SQL queries in a lab environment with 80% proficiency, |
| Students will demonstrate competency in qualitative and quantitative problem solving. | The student will demonstrate an aptitude to analyze qualitative and quantitative data to make informed decisions. | The student will have the ability to identify a variety of ways to gather databases requirements.  The student will have the ability to define business rules for a database.  The student will have the ability to create an entity design for a database.  The student will have the ability to normalize and design up to the Third Normal Form (3NF). | Students will apply advanced knowledge of database development by writing and executing SQL queries in a lab environment with 80% proficiency, |
| Students will employ reflective thinking to evaluate diverse ideas in the search for truth. | The student will demonstrate an ability to design a system, component, or process to meet desired needs within realistic constraints. | The student will have the ability to create a database and use a SQL query to formulate the answers to select problems with realistic constraints and parameters. | The students will apply advanced knowledge of database development by completing database labs and exercises with an 80% proficiency. |
| Students will develop an understanding across cultural differences locally, nationally, and internationally. | The student will demonstrate the capacity to function effectively on teams that understand the impact technology has in a global, economic, environmental, and societal context. | The student will have the ability to understand security concepts for database users. | The students will apply advanced knowledge of database development by completing database labs and exercises with an 80% proficiency. |
| Students will engage independently and effectively in lifelong learning. | The student will demonstrate a recognition of the need for, and an ability to engage in life-long learning through a continuous investigation of contemporary issues. | The student will demonstrate an understanding of the use of databases and SQL queries | The students will apply advanced knowledge of database development by completing database labs and exercises with an 80% proficiency. |
| Students will demonstrate moral and ethical behavior in keeping with our Catholic identity. | The student will demonstrate the capacity to make informed decisions in computing practice based on an understanding of professional, legal, and ethical responsibilities. | The student will have the ability to collaborate with classmates in virtual projects. | The students will apply the knowledge of advance databases to work as team to build a database through use of UCertify lab platform. |

**IS 325 Advanced Database**

(5 projects @ 100 points each)

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| --- | --- | --- | --- |
| **Item Being Measured (Database Design)** | **Rubric** | **Points Available** | **Points Earned** |
| **Tables** | * 2 or 3 tables that work well and support the database. * Appropriate data types assigned. * Delivered on time and in correct format (email, file upload, ER diagrams, etc.) | 20 |  |
| **Notation** | * Diagram uses an appropriate E-R notation. * The notation is used correctly for most elements of the diagram. | 20 |  |
| **Relationships** | * Diagram captures most relationships necessary for a database that would satisfy the initial problem statement. | 20 |  |
| **Attributes and Keys** | * Diagram captures most attributes and primary keys necessary for a database that would satisfy the initial problem statement. | 20 |  |
| **Professionalism** | * Diagram largely presents a professional tone. * It could be shared with a “real-world” customer with minor revisions. | 20 |  |
| **Total** | | **100** |  |

**Attendance and Participation/Online Discussions –** You will be expected to show your attendance through online class discussions. You will receive up to 10 points per each online class discussion, but only if you are participating in the activities and discussions. The points cannot be made up after the discussion closes.

**IS 325 Advanced Database Final Project Rubric** (1 project @ 200 points)

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| --- | --- | --- | --- | --- |
| **Item Being Assessed** | **Excellent**  **(A – 90-100%)** | **Good**  **(B – 80-89%)** | **Satisfactory**  **(C – 70-79%)** | **Unsatisfactory**  **(Below 70%)** |
| **Define Problem** | Demonstrates the ability to construct a clear and insightful problem statement with evidence of all relevant contextual factors. | Demonstrates the ability to construct a problem statement with evidence of most relevant contextual factors, and problem statement is adequately detailed. | Begins to demonstrate the ability to construct a problem statement with evidence of most relevant contextual factors, but problem statement is superficial. | Demonstrates a limited ability in identifying a problem statement or related contextual factors. |
| **Identify Strategies** | Identifies multiple approaches for solving the problem that apply within a specific context. | Identifies multiple approaches for solving the problem, only some of which apply within a specific context. | Identifies only a single approach for solving the problem that does apply within a specific context. | Identifies one or more approaches for solving the problem that do not apply within a specific context. |
| **Propose Solutions/Hypotheses** | Proposes one or more solutions/hypotheses that indicates a deep comprehension of the problem. Solution/hypotheses are sensitive to contextual factors as well as all of the following: ethical, logical, and cultural dimensions of the problem. | Proposes one or more solutions/hypotheses that indicates comprehension of the problem. Solutions/hypotheses are sensitive to contextual factors as well as the one of the following: ethical, logical, or cultural dimensions of the problem. | Proposes one solution/hypothesis that is “off the shelf” rather than individually designed to address the specific contextual factors of the problem. | Proposes a solution/hypothesis that is difficult to evaluate because it is vague or only indirectly addresses the problem statement. |
| **Evaluate Potential Solutions** | Evaluation of solutions is deep and elegant (for example, contains thorough and insightful explanation) and includes, deeply and thoroughly, all of the following: considers history of problem, reviews logic/reasoning, examines feasibility of solution, and weighs impacts of solution. | Evaluation of solutions is adequate (for example, contains thorough explanation) and includes the following: considers history of problem, reviews logic/reasoning, examines feasibility of solution, and weighs impacts of solution. | Evaluation of solutions is brief (for example, explanation lacks depth) and includes the following: considers history of problem, reviews logic/reasoning, examines feasibility of solution, and weighs impacts of solution. | Evaluation of solutions is superficial (for example, contains cursory, surface level explanation) and includes the following: considers history of problem, reviews logic/reasoning, examines feasibility of solution, and weighs impacts of solution. |
| **Implement Solution** | Implements the solution in a manner that addresses thoroughly and deeply multiple contextual factors of the problem. | Implements the solution in a manner that addresses multiple contextual factors of the problem in a surface manner. | Implements the solution in a manner that addresses the problem statement but ignores relevant contextual factors. | Implements the solution in a manner that does not directly address the problem statement. |
| **Evaluate Outcomes** | Reviews results relative to the problem defined with thorough, specific considerations of need for further work. | Reviews results relative to the problem defined with some consideration of need for further work. | Reviews results in terms of the problem defined with little, if any, consideration of need for further work. | Reviews results superficially in terms of the problem defined with no consideration of need for further work |

Source: Rhodes, T. (2009). Assessing outcomes and improving achievement: Tips and tools for using the rubrics. Washington, DC: Association of American Colleges and Universities. [<https://www.aacu.org/value-rubrics>].

**GRADING POLICY:**

* Homework (10 assignments @ 20 points each) → 200 points
* Projects (5 assignments @ 100 points each) → 500 points
* Mid-term exam (200 points) → 200 points
* Comprehensive course project (200 points) → 200 points
* Participation online discussions (100 points) → 100 points

→ 1,200 total points

**GRADING SCALE:**

Grades will be assigned according to the following scale:

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| Letter Grade | Percentage | Total Points Range |
| A | 90% – 100% | 1,080 – 1,200 |
| B | 80% – 89% | 960 – 1,079 |
| C | 70% – 79% | 840 – 959 |
| D | 60% – 69% | 720 – 839 |
| F | Below 60% | Below 720 |

**Online Discussion Rubric**

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| --- | --- | --- | --- | --- |
| **Points** | 10 | 7 | 3 | 0 |
| **Quality of Post** | Appropriate comments: thoughtful, reflective, and respectful of other’s postings. | Appropriate comments and responds respectfully to other's postings. | Responds, but with minimum effort. (e.g. "I agree with Bill"). | No posting. |
| **Relevance of Post** | Posts topics related to discussion topic; prompts further discussion of topic. | Posts topics that are related to discussion content. | Posts topics which do not relate to the discussion content; makes short or irrelevant remarks. | No posting. |
| **Contribution to the Learning Community** | Aware of needs of community; attempts to motivate the group discussion; presents creative approaches to topic. | Attempts to direct the discussion and to present relevant viewpoints for consideration by group; interacts freely. | Does not make effort to participate in learning community as it develops. | No feedback provided to fellow student. |

If you have questions about using Canvas, check the Online Student Guide available at <https://community.canvaslms.com/docs/DOC-10701-canvas-student-guide-table-of-contents>

For any technical problems, call the assistance line at 1-855-593-5537. This line is available 24/7.

**CANVAS:** All course materials, grades, and communication with the instructor will be conducted in the Canvas online learning platform. Students are expected to check their accounts on a daily basis. *Note:* All communications regarding this course will be made via your Donnelly College email account.

**COURSE REQUIREMENTS:**

* You must check your Donnelly College e-mail account and Canvas postings on a daily basis.
* Attendance is assessed by your participation in online discussions (see Attendance Policy below).
* All assignments are due on the scheduled due date posted on Canvas.
* Late work will be assessed a 20% deduction.

**ACADEMIC INTEGRITY: “**…Academic integrity is to be maintained at all times to insure genuine educational growth. Cheating and plagiarism in all forms, therefore, will be subject to disciplinary action. Serious infractions will be reviewed by an ad hoc committee, appointed by the appropriate dean. Appropriate sanctions will be imposed.”

**PLAGIARISM:** Plagiarism – the appropriation or imitation of the language or ideas of another person and presenting them as one’s original work – sometimes occurs through carelessness or ignorance. Students who are uncertain about proper documentation of sources should consult their instructors.

**ACCOMMODATIONS:** In compliance with the Americans with Disabilities Act, Donnelly College will make every attempt to provide equal access for persons with disabilities. Students in need of accommodations must request them in writing from the Vice President of Academic and Student Affairs.

**CIVILITY & DECORUM:** As noted in its Code of Conduct, Donnelly College is committed to maintaining an overall atmosphere of civility and respect. Civility and decorum both inside and outside the classroom are fundamental foundations of the values at Donnelly College. Classroom discussions and interactions outside the classroom will at all times be focused on the learning process and should always be respectful of both students and faculty. In open discussions of ideas and issues, disagreements should focus on ideas and facts. Name calling and assaults (either in person or on-line) will not be tolerated. Should any problems occur, the instructor should be notified immediately. Those who do not comply with civility and decorum requirements may be subject to a grade reduction and/or other sanctions up to and including dismissal from Donnelly College.

**ATTENDANCE POLICY:**

* You must check your Donnelly College e-mail account and Canvas postings on a daily basis.
* You must post responses to the discussion board and must read and respond to at least one other student’s posting (10 postings @ 10 points each). Responses must be more than “I agree” or “Good job.” They should be substantive and should reference reading assignments, web references, lecture notes or outside resources.
* You will be counted as “present” for a class week if you participate in that week’s Discussion Board question. If you do not post to the proper discussion board forum during the class week you will be counted as not attending class that week.
* If absence/participation is unavoidable, it is your responsibility to arrange with the instructor how to complete any work missed.
* **Note:** Posting assignments does not count toward fulfilling the requirement for participation in online discussions/attendance.

**ASSISTANCE:**

* Please feel free to email me directly with questions of a personal nature, grading questions, advising help or with any other issues that are not appropriate for the rest of the class to read. I check my email regularly and will respond to all emails within 24 hours during the work week.
* If you have questions about using Canvas, check the Online Student Guide available at <https://community.canvaslms.com/docs/DOC-10701-canvas-student-guide-table-of-contents>
* If you have any technical problems, call the assistance line at 1-855-593-5537. This line is available 24/7.

**WITHDRAWAL FROM COURSES OR FROM SCHOOL:** It is the responsibility of the student to withdraw from class. If a student decides to withdraw from a class, ideally, they should see an advisor and the financial aid staff before taking the withdrawal form to the Registrar's office for processing.  However, any verifiable contact (e-mail, fax, phone, mail, etc.) with authorized college personnel expressing the student's intent to withdraw from a class will be honored.

If students withdraw before they have earned their financial aid, they will owe Donnelly College a debt for the unearned portion of the financial aid as well as for any unpaid balances (subject to the College's refund policy). Not attending class is not a withdrawal from class.

**Donnelly College reserves the right to withdraw a student from class(es) if the student does not meet their financial obligations, including two missing or incomplete payments, or loss of financial aid.** Faculty may initiate an administrative withdrawal on the basis of non-attendance. In extreme circumstances (i.e. a disciplinary problem), the Vice President of Academic Affairs may initiate an administrative withdrawal. The student remains responsible for the tuition owed in this instance.

The deadlines for withdrawing from classes are as follows:

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| 14 to 16 weeks | 3 weeks before the end of the class |
| 6 to 8 weeks | 7 weekdays before the end of class |
| 4 to 5 weeks | 4 weekdays before the end of class |
| Less than 4 weeks | Withdrawals are not allowed |

Withdrawal deadline dates will be published in the academic calendar.

**TENTATIVE COURSE CALENDAR:**

The schedule is subject to change based on the progress or needs of the class.

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| **Week #** | **Content to Be Covered[[1]](#footnote-1)** | **Date** |
| 1 | Course logistics and online introductions  Pre-assessment | 8/17 & 8/19/2021 |
| **Database Concepts** | | |
| 2 | Chapter 1 – Database Systems  Chapter 2 – Data Models | 8/24 & 8/26/2021 |
| **Design Concepts** | | |
| 3 | Chapter 3 – The Relational Database Model  Chapter 4 – Entity Relationship (ER) Modeling | 8/31 & 9/2/2021 |
| 4 | Chapter 5 – Advanced Data Modeling  Chapter 6 – Normalization of Database Tables | 9/07 & 9/09/2021 |
| **Advanced Design and Implementation** | | |
| 5 | Chapter 7 – Introduction to Structured Query Language (SQL) | 9/14 & 9/16/2021 |
| 6 | Chapter 8 – Advanced SQL | 9/21 & 9/23/2021 |
| 7 | Chapter 9 – Database Design | 9/22 & 9/30/2021 |
| 8 | **Mid-term exam**  Details about types of questions, time limit, etc., will be explained during the chat session in Week #7 and posted on Canvas | 10/5 & 10/7/2021 |
| **Advanced Database Concepts** | | |
| 9 | Chapter 10 – Transaction Management and Concurrency Control | 10/12 & 10/14/2021 |
| 10 | Chapter 11 – Database Performance Tuning and Query Optimization | 10/19 & 10/21/2021 |
| 11 | Chapter 12 – Distributed Database Management Systems | 10/26 & 10/28/2021 |
| 12 | Chapter 13 – Business Intelligence and Data Warehouses | 11/02 & 11/04/2021 |
| 13 | Chapter 14 – Big Data Analytics and NoSQL | 11/09 & 11/11/2021 |
| **Database Administration** | | |
| 14 | Chapter 16 – Database Administration and Security  Final project will be assigned | 11/16 & 11/18/2021 |
|  | Thanksgiving Break | 11/24 – 11/26 |
| 15 | Time to work on final project  Post-assessment | 12/1 & 12/3/2021 |
| 16 | **Final Course Project Is Due** | 12/6 &12/8/2021 |

1. Weekly announcements, reading materials, homework, and projects are posted on Canvas. [↑](#footnote-ref-1)