School of Healthcare Business

Course Syllabus
HIN.720 – Health Data Programming and Database Structure
[semester] 202x

Faculty Information:
 Name:
 Phone:
 MCPHS Email:
 Office:
 Office Hours:

Course Information

HIN.720 – Health Data Programming and Database Structure - Credits: 3
This is an online course. Students may review each weekly lesson at a time convenient to their individual schedules within the week, but must remain current by completing each lesson and/or assignment within the timeframe indicated in this document.

Course Description:
This course is designed to cover the fundamentals of healthcare database design and management. Course topics will include the principles and methodologies of database design, normalization, database security, relational database models, database languages, and big data principles. Students will learn how to retrieve, analyze, and aggregate relational healthcare data for analytics purposes using SQL to make informed business decisions. Emphasis will be placed on healthcare information systems and databases, research data, and data collection methodologies commonly used in the healthcare sector. Students will be assessed using written assignments, database diagramming and query writing, and healthcare data case studies over the duration of the course.

Text/ Primary Course Materials:
Required Text:
 1. Coronel, C., Morris, S. (2019). *Database systems: Design, implementation, and management*. Cengage.
 2. Supplemental articles and readings as assigned

Recommended Text:
 1. American Psychological Association. (2019). *Publication manual of the American Psychological Association* (7th ed.). Washington, DC: American Psychological Association.

Other Resources:
 1. Useful website for APA style guidelines from the Purdue Online Writing Lab
 2. Enrollment in GitHub Classroom (link provided in week one)
 3. Student account creation for LucidChart
 4. Student account creation for RStudio Cloud

Course Objectives:
1. Demonstrate an understanding of core database principles and their structural elements,
2. Design database models using Entity Relationship (ER) diagrams and database schemas,
3. Deconstruct Entity Relationship diagrams into healthcare business rules/requirements,
4. Differentiate between the Software Development Life Cycle (SDLC) and the Database Development Life Cycle (DBLC) and the purpose the both serve during the database design process,
5. Compose Structured Query Language (SQL) queries to retrieve and display healthcare databases,
6. Optimize data structures and tables that eliminate duplication, unnecessary data entry, and confusion,
7. Explain best practices used in the healthcare industry to ensure the security, privacy, and confidentiality of data stored,
8. Merge, analyze, and query healthcare databases to produce new information elements,
9. Identify the different data storage methodologies and the appropriate use of each method based on the data stored,
10. Understand how databases enable big data and data analytics in the healthcare enterprise.

Assessment of Student Learning and Teaching Effectiveness:

This course will be offered online using Blackboard as the course learning management system. Narrated PowerPoint slides will be posted to Blackboard weekly to present each topic. Students will read the assigned *Readings* outlined in the course calendar for each topic prior to viewing the PowerPoint presentation for that topic. After reviewing the PowerPoint presentation(s), students will participate in associated discussion board activities to promote learning via reflection. A final research paper as well as various other assignments will be used to assess the course objectives.

Course Requirements:
1. **Course Assignments:**   xx%

2. **Case Study – Hospital Readmissions:**   xx%

3. **Case Study – Primary Care Access:**   xx%

4. **Participation/Discussion Board:**   xx%
   - Active learning is essential. Students will participate via *Blackboard* in all posted discussion topics. Participation is mandatory with a minimal requirement of 2 postings per week to the discussion board. Students are required to post twice each week, once by Thursday of the week stating their views and once, by Sunday of the week, with a thoughtful reflection commentary after reading the views of classmates.

- Weekly lessons and assigned readings will be the source of the discussion topics. Questions will be posed at the beginning of each week to initiate discussion
- Each discussion, unless otherwise stated, will be open for one (1) week with no contributions to the topic accepted thereafter. (This means postings must be completed by 12 midnight EST Sunday of each week; if both postings are not done, a grade of zero is assigned).
- The faculty member will not comment on each posting, but may comment to provide direction to the discussion as postings accumulate.
- "Chatter" in the discussion sessions should be avoided; responses to colleagues should advance the conversation and not simply provide praise.

Assignments and Grading

Citations - All assignments, papers, discussion boards, or otherwise will follow American Psychological Association (APA) style guidelines 7th edition. **There are no exceptions.** The APA Guidelines set forth the standards for writing style as well as recognition of sources, evidence, etc.

Plagiarism Software and Review - Students are expected to abide by the University Academic Honesty Policy as explained in the Student Handbook and University Catalog. Plagiarism is considered a violation of this policy. To deter plagiarism and ensure the appropriate use of resources, the University subscribes to verification services like Turnitin. Students must submit their written work via Blackboard where similarity checking is carried out and authenticity verified. **Note:** When the submission is complete, a confirmation email is automatically sent to your MCPHS email.

Assignment Due Dates

- All assignments must be submitted on the due date indicated.
- Submissions are required by 11:59 p.m. EST by default unless your instructor indicated an alternative date/time.
- Assignments are submitted via Blackboard (see the assignment for the specific method).

If you experience an illness or other excusable absence, contact your instructor immediately. Your instructor will provide guidance. **Please note**: to receive a Documented Absence it must be submitted within 5 days of the first absence (see Documented Absence Policy). Without proper documentation from the Dean of Students, or exception granted by your instructor, no exceptions will be made for late assignments.

Please note:

- If you have questions or concerns about an assignment, contact your instructor **prior** to the due date.
- You are encouraged to maintain copies of all assignments, projects, proposals, and discussion posts submitted for your own records. Courses may not be available to you after the semester concludes.

- After you submit your assignment, you are encouraged to double-check to make sure that it has been received/recorded.
- Writing assignments are submitted via Turnitin. When the submission is complete, a confirmation email is automatically sent to your MCPHS email.

Late Assignments

A late assignment is any assignment submitted after the stated due date without a documented absence granted by the Dean of Students Office, or confirmation of an exception granted by your instructor. Late assignments without documented absence, or granted exception will be graded according to the following scale:

- Submitted within 1 day / 24 hours – 20% penalty
- Submitted within 2 days / 48 hours – 35% penalty
- Submitted within 3 days / 72 hours – 50% penalty
- After 72 hours, assignments will not be accepted and marked as a 0

Assignment Grading

- Grades for the course assignments/requirements will be posted via the Blackboard Grade Center.
- Any questions about grades should first be sent to your instructor in writing from your MCPHS email address.
- Any exception to the due dates or late submissions (see above) must be discussed with your instructor and confirmed in writing.

Academic Honesty and Plagiarism

The School of Healthcare Business faculty believes in honesty and integrity in all educational pursuits. We are steadfast in our commitment to academic integrity and the standards identified in the Student Handbook and University Catalog. All students are expected to abide by these policies. Students must uphold the highest standards of academic integrity, including presenting all work, writing assignments, discussion posts, etc., without any instance of plagiarism, intentional or otherwise. Plagiarism is defined as submitting another person's work as one's own without proper acknowledgment or using the words or ideas of others without crediting the source of those words or ideas. If an incident of plagiarism is identified it will be addressed as follows:

The First Incidence of Plagiarism/Academic Dishonesty - Students will be notified via their MCPHS email of the identified offense and required to discuss the situation with the instructor, program director, or Dean. To receive credit, a revised submission is required within seven (7) days, or no points will be awarded.

- A penalty of 20% will be applied to the revision.
- Any further plagiarism or academic dishonesty in the revised submission will constitute the second incidence of plagiarism (see below).
- Student Affairs will be notified of the first incident and the academic penalty that has been imposed. Please note - The DOS/Student Affairs may impose additional penalties.

The Second Incidence of Plagiarism/Academic Dishonesty Students will be notified via their MCPHS Email of the identified offense and required to discuss the situation with the instructor, program director, or Dean. To receive credit, a revised submission is required within seven (7) days, or no points will be awarded.

- A penalty of 40% will be applied to the revision.
- Any further plagiarism or academic dishonesty in the revised submission will constitute the third incidence of plagiarism (see below).
- Student Affairs will be notified of the second incident and the academic penalty that has been imposed. Please note - The DOS/Student Affairs may impose additional penalties.

The Third Incidence of Plagiarism/Academic Dishonesty - Students will be notified via their MCPHS Email of the identified offense and required to discuss the situation with the instructor, program director, or the Dean.

- No revisions are accepted.
- The assignment will be automatically graded with a 0 (zero).
- Students may be required to repeat the course (see grading section)
- The DOS/Student Affairs will be notified of the incident and the academic penalty that has been imposed. Please note – The DOS/Student Affairs may impose additional penalties.

Please note:
- Each incidence of plagiarism or academic dishonesty, is cumulative while enrolled as a student in the School of Healthcare Business.
- All incidences of plagiarism or academic dishonesty, either intentional or unintentional, will be reported to the DOS/Student Affairs as outlined above.
- University level consequences related to plagiarism may be applied to each incidence as determined by the DOS/Student Affairs.
- After three incidences the DOS/Student Affairs will be notified by the Dean with a recommendation for dismissal.

Grading
Grades for the course assignments/requirements listed above will be posted via the Blackboard Grade Center. Students are strongly encouraged to maintain copies all assignments, projects, proposals, and discussion posts submitted for your own records and so your work can be resubmitted if there is a posting

or transmission error.

Grading Scale

Please note that the graduate grade scheme does not include the grades that are Bolded. Students receiving below a passing grade in graduate level courses will be graded with an F, regardless of the letter grade. Check the grading policies for your program in the University Catalog.

Students enrolled in the DHA and DScPAS programs must pass the course with a minimal grade of 83%/B
Students in the MBA and MSCM programs must pass the course with a minimal grade of 80%/B-

A	100-93	*C+*	*79-78*
A-	92-90	*C*	*77-73*
B+	89-88	*C-*	*72-70*
B	87-83	**D**	**69-60**
B-	*82-80*	**F**	**<60**

Course Policies

Any issues arising from the syllabus or course requirements should be addressed to the course faculty immediately. If changes to the syllabus are required the faculty member will notify students of the changes.

Reuse of Your Own Work: Self-Plagiarism

Plagiarism also includes submitting the same work for assignments in more than one class (copying from oneself) without permission from the instructor and without appropriate citation, the same or subsequent semesters. If you are retaking a course, you must seek approval from your current course instructor about the reuse of materials previously submitted for class assignments and discussions. Your instructor reserves the right to deny this request. If you have previously submitted an assignment via Turnitin/SafeAssign and you submit the same work for another course or a retake, it will be highlighted on the similarity report as possible plagiarism.

Documented Absence Process

To be permitted to make up missed coursework MCPHS students must seek a documented absence from the Dean of Students office. In all cases, it is the student's responsibility to notify the Dean of Students. In the case of an absence (anticipated or urgent), every effort must be made to notify course faculty AND the Dean of Students office. Email notification is preferred.

Regardless of the reason for absence, a student must notify the Dean of Students office and their course faculty or preceptor of the absence. **Students must also complete the online form and upload supporting documentation within five (5) business days from the first date of absence to the Dean of Students office**. A documented absence does not always excuse a student from missing academic work. Students are expected to abide by the course syllabus and academic program's policy related to class absences. Reasons of work conflict, travel, and poor time management are not eligible for documented absence,

and acceptance of late work is solely at the instructor's discretion. Permitted absences do not exclude the enforcement of the late submission policy with potential point deductions.

Email Statement
All MCPHS students are required to open, utilize, and maintain the MCPHS email account they are assigned within limits set by Information Services. Official college communications and notices, including communications for this course are ONLY delivered to MCPHS email accounts. All students are responsible for regularly checking their MCPHS email and for information contained therein.

Guidelines for Faculty Email Communications and Questions
You are strongly encouraged to use the Q&A section of the course to post course/assignment-specific questions as peers may either have the answer or benefit from the responses. When you need to contact the faculty by email, they will respond to email messages in a timely manner, generally within 24 hours. Note that weekends and other University holidays affect the timing of email responses from faculty. Students are expected to treat faculty, peers and group members with the same respect that they expect and deserve.

Office of Student Access and Accommodations (OSAA)
A student's right to equal education is protected under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act. All students must abide by the Academic Policies and Procedures set forth in the MCPHS Academic Catalog. Questions regarding accommodations can be directed to the Office of Student Access and Accommodations.

Under the ADA/Section 504, students with documented disabilities/conditions, that impact their access to education, and wish to request reasonable accommodations can contact the Office of Student Access and Accommodations (OSAA). To initiate services, students can complete the Student Request for Services Form: https://mcphs-accommodate.symplicity.com/public_accommodation/

OSAA can be contacted via email at OSAA@mcphs.edu or via phone at 617-879-5995.

Center for Academic Success & Enrichment (CASE) - WOR/MAN/Graduate/Online Programs
The Center for Academic Success and Enrichment (CASE) supports students through providing a number of academic support services introducing them to the strategies that will enhance performance in their academic programs and ultimately contribute to their professional lives.

The CASE staff are available to meet with students on an appointment basis Monday – Friday 9:00 a.m. to 4:00 p.m. EST. To schedule an appointment with a CASE staff member, visit the following link: mywconline.com/casewm and select your schedule and program to bring you to the correct availability.

Questions related to CASE services can be directed to case.wm@mcphs.edu.

University Learning Network (ULN)

HIN.720 – Health Data Programming and Database Structure

The ULN is intended to support students to meet the challenges of our health science based programs with our resources consisting of: Enrichment/Professional Tutoring, English Language Resource Center, Writing Center, and TutorMe.

Students can utilize the ULN's appointment-based services (Enrichment/Professional Tutoring, English Language Resource Center, & Writing Center) by visiting www.mywco.com/uln. TutorMe can be accessed through the Tools section of the course's Blackboard page.

Questions related to University Learning Network services can be directed to ULN@mcphs.edu.

Course Outline

Unit 1	Unit 1 Dates:	Unit 1 Title: Course Introduction Unit 1 Learning Objectives: • Introduce HIN.720, and • Establish course objectives and outcomes.	Unit 1 Reading/Viewing: 1. Course introduction lecture 2. Coronel, Appendix F: Client/Server Systems
Unit 2	Unit 2 Dates:	Unit 2 Title: Introduction to Database Systems Unit 2 Learning Objectives: • Compare and contrast 'data' and 'information', • Describe the basic structural elements of a database, • Explain best practices of database design, • Describe different types of databases available for organizations to use, and • Explain the difference between structured and unstructured data and the problems unstructured data can cause.	Unit 2 Reading/Viewing: 1. Coronel, Ch. 1
Unit 3	Unit 3 Dates:	Unit 3 Title: Introduction to Data Models Unit 3 Learning Objectives: • Explain the basic components of a data model diagram, • Explore the process of converting business requirements into a database design, • Compare and contrast entity relationship diagrams, object-oriented models, and object/relational models, • Understand the different types of data relationships, and • Compose data relationship statements from business requirements.	Unit 3 Reading/Viewing: 1. Coronel, Ch. 2

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Unit 4	Unit 4 Dates:	**Unit 4 Title:** Relational Database Modeling **Unit 4 Learning Objectives:** • Identify the basic components of a relational database table, • Explain the structural characteristics of a relational database table, • Discuss the importance of a data dictionary when building relational databases, and • Describe the purpose of data redundancy and indexing in relational databases.	**Unit 4 Reading/Viewing:** 1. Coronel, Ch. 3
Unit 5	Unit 5 Dates:	**Unit 5 Title:** Entity Relationship (ER) Modeling **Unit 5 Learning Objectives:** • Describe the different types of 'keys' used in relational databases, • Define 'cardinality' and its importance in database design, • Compare and contrast 'Chen's Notation', 'Crow's Foot', and 'UML Notation' and identify when they are most appropriately used, • Explain the process of defining entity relationships and the best practices for their review, and • Identify how entity relationship diagrams affect the database design process.	**Unit 5 Reading/Viewing:** 1. Coronel, Ch. 4

Unit 6	Unit 6 Dates:	**Unit 6 Title:** Advanced Data Modeling **Unit 6 Learning Objectives:** • Explain the uses of 'extended entity relationships,' • Describe how good database keys are selected and implemented, • Understand the concepts of entity clusters and their purpose in entity relationship diagrams, • Explore different advanced database modeling concepts to adjust for changing business requirements, and • Explain how changing business requirements are planned, diagrammed, and implemented.	**Unit 6 Reading/Viewing:** 1. Coronel, Ch. 5
Unit 7	Unit 7 Dates:	**Unit 7 Title:** Database Design and Normalization **Unit 7 Learning Objectives:** • Describe the importance of good database design concepts, • Explore the Systems Development Life Cycle (SDLC) and the purpose it serves with database design, • Identify and describe each of the normalization process forms, • Compose normalization statements to correct existing database table structures, and • Compare centralized and decentralized, and top-down and bottom-up database design strategies, and • Understand the database evaluation process using either the SDLC or DBLC frameworks.	**Unit 7 Reading/Viewing:** 1. Coronel, Ch. 9 2. Coronel, Ch. 6

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Unit 8	Unit 8 Dates:	**Unit 8 Title:** Introduction to Structured Query Language (SQL) **Unit 8 Learning Objectives:** • Describe how data definition language and data manipulation languages are used to construct SQL statements, • Understand the different SQL operators and vocabulary usage, • Compose SQL statements to retrieve data from a database, • Compose SQL statements to join multiple database tables together, and • Explore best practices for composing SQL statements.	**Unit 8 Reading/Viewing:** 1. Coronel, Ch. 7
Unit 9	Unit 9 Dates:	**Unit 9 Title:** Advanced SQL and Query Optimization **Unit 9 Learning Objectives:** • Compose SQL statements to create and copy tables manually, • Manipulate the structure of existing tables based on changing business requirements, • Compose SQL statements that perform data manipulation operations, • Compose SQL statements that create triggers, stored procedures, and other SQL functions, and • Differentiate between rule and cost-based optimization practices.	**Unit 9 Reading/Viewing:** 1. Coronel, Ch. 8 2. Coronel, Ch. 11

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Unit 10	Unit 10 Dates:	**Unit 10 Title:** Case Study: Hospital Readmissions **Unit 10 Learning Objectives:** • Compose various SQL queries to extract data from a remote healthcare database, • Prepare the extracted dataset and normalize data tables for statistical analysis, • Use RStudio Cloud to perform regression analyses to determine if statistical predictors exist in the dataset, and • Use RStudio Cloud to build a formula to predict the likelihood of a hospital scoring below or above national 30-day readmission rates.	**Unit 10 Reading/Viewing:** 1. Provided on Blackboard (Marc, Ch. 9)
Unit 11	Unit 11 Dates:	**Unit 11 Title:** Case Study: Primary Care Access and Preventative Care Utilization **Unit 11 Learning Objectives** • Compose various SQL queries to extract data from a remote healthcare database, • Combine multiple datasets to evaluate a hypothesis, • Determine if a statistical relationship exists between variables using RStudio Cloud, and • Use RStudio Cloud to perform regression analyses to determine if statistical predictors exist in the dataset.	**Unit 11 Reading/Viewing:** 1. Provided on Blackboard (Marc, Ch. 14)

| Unit 12 | Unit 12 Dates: | **Unit 12 Title:**
Database Administration and Security

Unit 12 Learning Objectives:
• Describe the processes and systems in the information security framework,
• Identify the different standards, strategies, and tools used in database administration,
• Understand the Data-Information-Decision-Making Cycle and its purpose in the enterprise,
• Define the role of the database administrator (DBA) and their general functions,
• Understand the technical tasks and regular maintenance functions that contribute to overall database security. | **Unit 12 Reading/Viewing:**
1. Coronel, Ch. 16 |
| Unit 13 | Unit 13 Dates: | **Unit 13 Title:**
Healthcare Business Intelligence and Data Storage Models

Unit 13 Learning Objectives:
• Explore the evolution of business intelligence and its integration into the healthcare enterprise,
• Differentiate between **operational** data and **decision support** data,
• Identify the purpose, characteristics, and components of data warehouses and data lakes,
• Define the roles and functions of data analytics, visualization, and mining in the healthcare enterprise, and
• Demonstrate how data mining can be used to produce knowledge to make actionable clinical and administrative decisions. | **Unit 13 Reading/Viewing:**
1. Coronel, Ch. 13 |

| Unit 14 | Unit 14 Dates: | Unit 14 Title:
Big Data and NoSQL

Unit 14 Learning Objectives:

• Define 'Big Data' and explore its uses in the healthcare enterprise,
• Describe the 5 'V's' of big data and their importance in big data,
• Describe the basic architecture components of Hadoop ecosystems and how this differs from relational databases,
• Understand the differences and approaches of additional NoSQL systems and how this differs from relational databases, and
• Explore other big data ecosystems like NewSQL, MongoDB, and Neo4j. | Unit 14 Reading/Viewing:
1. Coronel, Ch. 14 |
| Unit 15 | Unit 15 Dates: | **Final Exam Week** | |

Course Assignments/Rubrics
All course assignments and rubrics will be made available through the course's Blackboard course site.

Students must abide by the Academic Policies and Procedures set forth in the MCPHS University Catalog and Student Handbook. *Important information regarding Description of Credit Hour Policy, Excused Absence Approval, Disability Support Services for students, Academic Honesty and Plagiarism and other academic policies is set forth in the Academic Policies and Procedures section of the MCPHS Catalog.*

MCPHS University Course Catalog
    https://www.mcphs.edu/academics/university-course-catalog
MCPHS University Student Handbook
    https://my.mcphs.edu/departments/student-affairs

Students must read, understand, and comply with all of these policies and procedures.