



UNIVERSITY OF SCIENCE AND TECHNOLOGY

OF SOUTHERN PHILIPPINES

Alubijid | Balubal | Cagayan de Oro | Claveria | Jasaan | Oroquieta | Panaon | Villanueva

Document Code No.

**USTP-ACAD-01**

Rev. No.	Effective Date	Page No.
00	03.17.25	1 of 13

**College of Information Technology and Computing**  
Information Technology Department

**SYLLABUS**

Course Title: **Fundamentals of Database Systems**

Course Code: **IT 212**

Credits: 3 units (2 hours Lecture, 3 hours Laboratory)

**USTP Vision**

A nationally-recognized Science and Technology (S&T) university providing the vital link between education and the economy

**USTP Mission**

- Bring the world of work (industry) into the actual higher education and training of the students;
- Offer entrepreneurs of the opportunity to maximize their business potentials through a gamut of services from product

Semester/Year: 1st semester SY 2025-2026  
Class Schedule: R1 W 10:00-1:00pm / F 1:00-4:00pm  
Bldg./Rm no.: OC / 9-302

Class Schedule: R2 T 6:00-9:00pm / Th 6:00-8:00pm  
Bldg./Rm no.: 9-304 / OC

Class Schedule: R3 F 6:00-9:00pm / M 6:00-8:00pm  
Bldg./Rm no.: 9-305 / OC

Class Schedule: R4 W 10:00-1:00pm / M 10:00-12:00pm  
Bldg./Rm no.: 9-302 / OC

Class Schedule: R5 Th 10:00-1:00pm / W 3:00-5:00pm  
Bldg./Rm no.: 9-305 / OC

Class Schedule: R6 M 6:00-9:00pm / F 6:00-8:00pm  
Bldg./Rm no.: 9-305 / OC

Class Schedule: R7 W 6:00-9:00pm / T 6:00-8:00pm  
Bldg./Rm no.: MC1 / OC

Class Schedule: R8 M 6:00-9:00pm / T 6:00-8:00pm  
Bldg./Rm no.: 9-305 / OC

Class Schedule: R9 Th 6:00-9:00pm / M 7:00-9:00pm  
Bldg./Rm no.: 9-305 / OC

Prerequisite(s): IT 121, IT 122  
Co-requisite(s): None

Rev. No.	Effective Date	Page No.
00	03.17.25	2 of 13

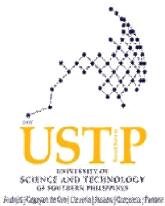
<ul style="list-style-type: none"> <li>conceptualization to commercialization;</li> <li>Contribute significantly to the national development goals of food security and energy sufficiency through technology solutions.</li> </ul> <p><b>USTP Core Values:</b></p> <p>A. <b>Unselfish Dedication</b> – Selfless commitment and complete fidelity towards a course of action or goal.</p> <p>B. <b>Social Responsiveness</b> – Ethical/moral responsibility leading to corrective action on social issues and contributions for the betterment of the environment and the community's quality of life.</p> <p>C. <b>Transformational Leadership</b> – Leading through inspiration and by example to foster positive change with the end goal of developing followers into leaders.</p> <p>D. <b>Prudence</b> – Self-governance leading to circumspection and good judgment in the management of affairs and use of resources.</p>	<p>Instructor: PETAL MAY M. DAL Email: <a href="mailto:petalmay.dal@ustp.edu.ph">petalmay.dal@ustp.edu.ph</a></p> <p>GERALDINE BLANCO Email: <a href="mailto:geraldine.blanco@ustp.edu.ph">geraldine.blanco@ustp.edu.ph</a></p> <p>LADY MAXINE SARSALIJO Email: <a href="mailto:ladymaxine.sarsalijo@ustp.edu.ph">ladymaxine.sarsalijo@ustp.edu.ph</a></p> <p>LEIA RANUCO Email: <a href="mailto:leiah.ranuco@ustp.edu.ph">leiah.ranuco@ustp.edu.ph</a></p> <p>JEANIZZA MARIE BADOLES Email: <a href="mailto:jeanizza.badoles@ustp.edu.ph">jeanizza.badoles@ustp.edu.ph</a></p>	<p>Consultation Schedule: W – 1:00-3:00PM TH/F – 10:00-12:00PM Bldg./Rm: Office Phone no./Local: ICT Building (Building 9), 4<sup>th</sup> floor, IT Faculty Office (088) 856 1739 local 1153</p> <p>Consultation Schedule: W – 1:00-3:00PM Bldg./Rm: Office Phone no./Local: ICT Building (Building 9), 4<sup>th</sup> floor, IT Faculty Office (088) 856 1739 local 1153</p> <p>Consultation Schedule: W – 1:00-3:00PM Bldg./Rm: Office Phone no./Local: ICT Building (Building 9), 4<sup>th</sup> floor, IT Faculty Office (088) 856 1739 local 1153</p> <p>Consultation Schedule: W – 1:00-3:00PM TH Bldg./Rm: Office Phone no./Local: ICT Building (Building 9), 4<sup>th</sup> floor, IT Faculty Office (088) 856 1739 local 1153</p> <p>Consultation Schedule: W – 1:00-3:00PM Bldg./Rm: Office Phone no./Local: ICT Building (Building 9), 4<sup>th</sup> floor, IT Faculty Office (088) 856 1739 local 1153</p>															
<p><b>I. Course Description:</b> [Why does this course exist? How does it fit in with the rest of the field/area's curriculum? ] This course will give the students the introduction of database systems. It will make them understand the advantages of using database system, be able to formulate and interpret business rules, identify different data models, design database systems and implement database systems.</p>																	
<p><b>II. Course Outcomes (CO)</b> <i>List as specifically as possible the course outcomes. It is helpful here to think about the kinds of evidence you will need to assess the students' learning as your objectives should drive your assessment and grading schema. Kinds of evidence include what students say, do, think and/or feel. A well stated objective has two components: substance (content/subject matter like osmosis or absorption) and form: what action must the student perform with regards to the substance (compare and contrast, evaluate, analyze, apply, etc.).</i></p>		<b>Program Outcomes (PO)</b> <table border="1"> <tr> <td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td><td>i</td><td>j</td><td>k</td><td>l</td><td>m</td><td>n</td><td>o</td> </tr> </table>	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o			
<p><b>CO1:</b> Explain the fundamental concepts of database systems, including architecture, components, and data models.</p>		<table border="1"> <tr> <td>I</td><td>E</td><td>I</td><td></td><td>E</td><td>I</td><td>E</td><td></td><td></td><td>E</td><td></td><td>I</td><td>E</td><td></td><td></td> </tr> </table>	I	E	I		E	I	E			E		I	E		
I	E	I		E	I	E			E		I	E					
<p><b>CO2:</b> Analyze business rules and requirements to design conceptual database models using appropriate data modeling techniques.</p>		<table border="1"> <tr> <td>E</td><td>E</td><td>D</td><td>E</td><td>E</td><td>E</td><td>E</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>E</td> </tr> </table>	E	E	D	E	E	E	E								E
E	E	D	E	E	E	E								E			
<p><b>CO3:</b> Design and implement relational databases using entity-relationship diagrams, normalization, and SQL based on given business scenarios.</p>		<table border="1"> <tr> <td>D</td><td>E</td><td>E</td><td>E</td><td>D</td><td>E</td><td>E</td><td>E</td><td>D</td><td>E</td><td></td><td>E</td><td>E</td><td></td><td></td> </tr> </table>	D	E	E	E	D	E	E	E	D	E		E	E		
D	E	E	E	D	E	E	E	D	E		E	E					

Rev. No.	Effective Date	Page No.
00	03.17.25	3 of 13

<b>Program Educational Objectives:</b>  PEO1: Proficient in the IT field and able to engage constantly in technological and professional advancement by pursuing a higher academic level and/or practicing quality improvement in their professional career or entrepreneurial endeavor;  PEO2: Competent in generating new ideas and innovations in Information Technology with more emphasis on Technopreneurship, management, IT solutions and the likes through research collaborations; and  PEO3: Leading practicing professionals in the field of Information Technology who can contribute significantly to	CO4: Evaluate different database architectures and modeling strategies to select appropriate solutions for specific business processes.								
	<b>III. Course Outline:</b>								
	Allotted Time	Course Outcomes (CO)	Intended Learning Outcome(s) (ILO)	Topic/s	Suggested Readings	Teaching-Learning Activities	Assessment Tasks/Tools	Grading Criteria	Remarks
		<i>Specific instructional objectives may be written here and the COs to which this is aligned is identified here.</i>			<i>The TLAs show what kinds of activities will be used to help students achieve the COs.</i>  <i>Different TLAs should be incorporated to address all the COs. Each TLA can be mapped to one or more COs, and vice versa.</i>  <i>The TLAs should show clear evidence of how the activities align with the course COs.</i>	<i>Each student CO is assessed. Details about the nature of the assessment are required, (just stating 'assignment, tests or final exam' is not sufficient).</i>			
	Week 1 2 hours			Course Orientation <ul style="list-style-type: none"><li>● University's VMGO</li><li>● CITC VMGO</li><li>● Class Policies</li><li>● Grading System</li><li>● Course Requirements</li><li>● Course Outline Presentation</li></ul>	Student Handbook				

Rev. No.	Effective Date	Page No.
00	03.17.25	4 of 13

human development, socio-economic transformation, and patriotic initiatives.  <b>Program Outcomes:</b>  a: Apply knowledge of computing, science, and mathematics in solving computing/IT-related problems through critical and creative thinking;  b: Use current best practices and standards in solving complex computing/IT-related problems and requirements;  c: Analyze complex computing/IT-related problems by applying analytical and quantitative reasoning; 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 computer based-systems;	Week 1-2 (Aug. 7-14, 2025) 8 hours	CO1	<ul style="list-style-type: none"> <li>● Name limitations of conventional file processing system</li> <li>● Explain advantages of databases</li> <li>● Identify costs and risks of databases</li> <li>● List components of database environment</li> <li>● Identify categories of database application</li> </ul>	Introduction to Database and Transactions	<p>-Fundamentals of Database Systems Instructional Material</p> <p>-Principles of database management</p> <p>-Database system concepts.</p> <p>- Database systems : design, implementation and management. Australia</p> <p>-Concepts of database management</p> <p>- Database systems : design, implementation and management</p>	Fishbowl Discussion Concept Questions	Oral Questions Short Quiz		
			<ul style="list-style-type: none"> <li>● Understand importance of data modeling</li> <li>● write good names and definitions for entities, relationships, and attributes</li> <li>● Distinguish unary, binary, and ternary relationships</li> <li>● Model different types of attributes, entities, relationships and cardinalities</li> <li>● Draw E-R diagrams for common business situations</li> </ul>	Database Architecture and Data Models	<p>-Fundamentals of Database Systems Instructional Material</p> <p>-Principles of database management</p> <p>-Database system concepts.</p> <p>- Database systems : design, implementation and management. Australia</p> <p>-Concepts of database management</p> <p>- Database systems : design,</p>	Personalized Reading/Text Jigsaw Circle the Questions	Quiz Case Study Lab Exercises	Case Study Rubric	



UNIVERSITY OF SCIENCE AND TECHNOLOGY

## OF SOUTHERN PHILIPPINES

Alubijid | Balubal | Cagayan de Oro | Claveria | Jasaan | Oroquieta | Panaon | Villanueva

Document Code No.		
USTP-ACAD-01		
Rev. No.	Effective Date	Page No.
00	03.17.25	5 of 13

Rev. No.	Effective Date	Page No.
00	03.17.25	6 of 13

<p>j: Communicate effectively in both oral and in written form by being able to deliver and comprehend instructions clearly; and present persuasively to diverse audience the complex computing / IT-related ideas and perspectives;</p> <p>k: Assess local and global impact of computing information technology on individuals, organizations, and society;</p> <p>l: Act in recognition of professional, ethical, legal, security and social responsibilities in the utilization of information technology;</p> <p>m: Recognize the need to engage in independent learning and be at pace with the latest developments in a specialized field in IT, with emphasis on Database Management and Information System; Network Design and Administration; and Computer Vision and Image processing for continual</p>			<ul style="list-style-type: none"> <li>• Create tables with entity and relational integrity constraints</li> <li>• Use normalization to convert anomalous tables to well-structured relations.</li> </ul>		management. Australia  -Concepts of database management  - Database systems : design, implementation and management				
			<ul style="list-style-type: none"> <li>• Describe the physical database design process</li> <li>• Choose storage formats for attributes</li> <li>• Select appropriate file organizations</li> <li>• Describe three types of file organization</li> <li>• Describe indexes and their appropriate use</li> <li>• Translate database model into efficient structures</li> <li>• Know when and how to use denormalization</li> </ul>		Relational Database Design				
	Week 7-8 (Sept. 5-26, 2025) 5 hours	CO2, CO3, CO4			-Fundamentals of Database Systems Instructional Material  -Principles of database management  -Database system concepts.  - Database systems : design, implementation and management. Australia  -Concepts of database management  - Database systems : design, implementation and management	Personalized Reading/Text Jigsaw	Lab Exercises		
<b>MIDTERM EXAM</b>									
Week 10-13 Oct. 10-13, 2025) 15 hours	CO1	<ul style="list-style-type: none"> <li>• Understand Relational Algebra and calculus</li> <li>• Identify the different relational algebra operations</li> </ul>	Relational Algebra	-Fundamentals of Database Systems Instructional Material  -Principles of database management	Lecture Concept Questions	Problem-solving Quiz			

Rev. No.	Effective Date	Page No.
00	03.17.25	7 of 13

development as a computing professional;  n: Participate in generation of new knowledge; or in research and development projects aligned to local and national development agenda or goals with the end view of contributing to the local and national economy; and  o: Preserve and Promote “Filipino historical and cultural heritage”.	Week 14- 17 (Oct 27- Nov. 28, 2025) 20 hours	CO1	<ul style="list-style-type: none"> <li>• Perform relational algebra operations</li> <li>• Understand tuple relational calculus</li> <li>• Understand domain relational calculus</li> </ul>		<ul style="list-style-type: none"> <li>-Database system concepts.</li> <li>- Database systems : design, implementation and management. Australia</li> <li>-Concepts of database management</li> <li>- Database systems : design, implementation and management</li> </ul>				
			<ul style="list-style-type: none"> <li>• Define a database using SQL data definition language</li> <li>• Write single table queries using SQL</li> <li>• Establish referential integrity using SQL</li> <li>• Write single and multiple table SQL queries</li> <li>• Define and use three types of joins</li> </ul>	Constraints, Views and SQL	<ul style="list-style-type: none"> <li>-Fundamentals of Database Systems Instructional Material</li> <li>-Principles of database management</li> <li>-Database system concepts.</li> <li>- Database systems : design, implementation and management. Australia</li> <li>-Concepts of database management</li> <li>- Database systems : design, implementation and management</li> </ul>	Discussion Forums Jigsaw	Practical Exercises  Laboratory Quiz	Project Rubric	



## UNIVERSITY OF SCIENCE AND TECHNOLOGY

### OF SOUTHERN PHILIPPINES

Alubijid | Balubal | Cagayan de Oro | Claveria | Jasaan | Oroquieta | Panaon | Villanueva

Document Code No.

**USTP-ACAD-01**

Rev. No.	Effective Date	Page No.
00	03.17.25	8 of 13

	Week 18 (Dec. 1-4, 2025 5 hours	CO1	<ul style="list-style-type: none"><li>● Explain transactions and their properties</li><li>● Define concurrency control</li><li>● Identify the role of concurrency control in database maintenance</li></ul>	Transaction Management and Concurrency Control	<p>-Fundamentals of Database Systems Instructional Material</p> <p>-Principles of database management</p> <p>-Database system concepts.</p> <p>- Database systems : design, implementation and management. Australia</p> <p>-Concepts of database management</p> <p>- Database systems : design, implementation and management</p>	Lecture Jigsaw Teaching	Quiz		
					<b>FINAL EXAM</b>				

#### IV. Course Requirements:

##### 1. Class standing (attendance, participation, etc.) policy:

(a) Expected classroom behavior (may want to develop this with the students, e.g., What guidelines are appropriate for behavior and participation in a large class

- Students must come to class on time.
- Strict observance of deadlines.
- Class participation is encouraged.
- Observe proper courtesy.

(b) Ground Rules for participation in discussions or activities.

- Only one student may talk at a time.
- Must follow instructions for every activity given.
- For group activity, each member must participate accordingly.



## UNIVERSITY OF SCIENCE AND TECHNOLOGY

### OF SOUTHERN PHILIPPINES

Alubijid | Balubal | Cagayan de Oro | Claveria | Jasaan | Oroquieta | Panaon | Villanueva

Document Code No.

**USTP-ACAD-01**

Rev. No.	Effective Date	Page No.
00	03.17.25	9 of 13

#### 2. Course Readings/Materials:

##### (a) Titles, authors, and editions of textbooks and other materials, required and recommended

1. Jocelyn B. Barbosa and Petal May M. Dal (2021): Fundamentals of Database Systems Instructional Material
2. Gabrielle Reid. (2022). Principles of database management. New York : Clanrye international.
3. Abraham Silberschatz, Henry F. Korth, S. Sudarshan. (2020). Database system concepts. New York : McGraw-Hill Education
4. Carlos Coronel and Steven Morris. (2019). Database systems : design, implementation and management. Australia : Cengage.
5. Joy L. Starks, Philip J. Pratt and Mary Z. Last. (2019). Concepts of database management. Australia : Cengage Learning.
6. Mitchell Penn. (2019). Database systems : design, implementation and management. USA : Willford Press.

##### (b) Supplies needed (calculators, software, workbooks, disks, CDs, lab supplies, art supplies, etc.)

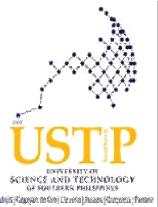
- Xampp
- Supabase
- Instructional Materials

##### (c) URLs for online resources

- DBMS Tutorial: Learn Database Management System
- <https://www.guru99.com/dbms-tutorial.html>
- Database Tutorials
- [https://www.tutorialspoint.com/database\\_tutorials.htm](https://www.tutorialspoint.com/database_tutorials.htm)
- SQL Tutorial
- <https://www.w3schools.com/sql/>
- Database Tutorial
- <https://www.quackit.com/database/tutorial/>
- Relational Database
- <https://www.udacity.com>

#### 3. Assignments, Assessment, and Evaluation

##### (a) Policy concerning homework (grading, posting, late policy, etc.)



## UNIVERSITY OF SCIENCE AND TECHNOLOGY

### OF SOUTHERN PHILIPPINES

Alubijid | Balubal | Cagayan de Oro | Claveria | Jasaan | Oroquieta | Panaon | Villanueva

Document Code No.

**USTP-ACAD-01**

Rev. No.	Effective Date	Page No.
00	03.17.25	10 of 13

Students may share ideas as they work on their assignments but the submitted assignments must be their own work.

(b) Policy concerning make-up exams

No special examination is given unless a student has valid reasons stipulated in the Student Handbook Article 3: Excused Absences.

(c) Policy concerning late assignments/requirements

- Assignments: no assignment for a particular date, will have a grade of zero (0).
- Projects: late submission of projects will have a corresponding consequence. There will be a deduction of points for every day that the project submission will be late.

(d) Preliminary information on term papers or projects, with due dates

- Projects for midterm and finals are given ahead of time along with its corresponding due dates, rubrics, and other requirements for the completion of the projects.
- Non-submission of projects does not mean you

(e) List of assignments that will impact the final grade and % weight given each

- Portfolio: grade will be part of the PIT.

(f) Description in detail of grading processes and criteria (how many quizzes, tests, papers; weighting of each; amount of homework, etc.) or the GRADING POLICY



## UNIVERSITY OF SCIENCE AND TECHNOLOGY

## OF SOUTHERN PHILIPPINES

Alubijid | Balubal | Cagayan de Oro | Claveria | Jasaan | Oroquieta | Panaon | Villanueva

Document Code No.

USTP-ACAD-01

Rev. No.	Effective Date	Page No.
00	03.17.25	11 of 13

Lecture Grade      75 %	
Performance Item/Criteria	%
Class Performance Item	10%
Quizzes (All quizzes, prelim and pre-final exams)	40%
Major Exams (i.e, Midterm and Final Exams)	30%
Performance Innovative Task / Project	20%
<b>TOTAL</b>	<b>100%</b>
Laboratory Grade      25 %	
Performance Item/Criteria	%
Laboratory Exercises/Reports	30%
Laboratory Major Exam	40%
Hands on Exercises	30%
<b>TOTAL</b>	<b>100%</b>
<b>Periodic Grade = 75% Lecture Grade + 25% Laboratory Grade</b>	

Criteria and Weights in computing the FINAL GRADE (FG)

(a) If the final exam coverage are all topics discussed from the beginning of the semester:

$$\text{Final Grade (FG)} = \frac{1}{3} \text{ MTG} + \frac{2}{3} \text{ FTG};$$

MTG – Midterm Grade



## UNIVERSITY OF SCIENCE AND TECHNOLOGY

### OF SOUTHERN PHILIPPINES

Alubijid | Balubal | Cagayan de Oro | Claveria | Jasaan | Oroquieta | Panaon | Villanueva

Document Code No.

**USTP-ACAD-01**

Rev. No.	Effective Date	Page No.
00	03.17.25	12 of 13

FTG – Final term grade

(b) If the final exam coverage are all topics from the midterm examination.

$$\text{Final Grade (FG)} = 1/2 \text{ MTG} + 1/2 \text{ FTG}$$

(g) Subject-to-change notice

(h) Date and time of Midterm and Final Exam

Midterm Exam: October 2, 2025 – October 8, 2025

Final Exam: December 5, 2025 – December 13, 2025

4. Use of USTeP and other applications in class *to distribute course materials, to communicate and collaborate online, to post grades, to submit assignments, and to give you online quizzes and surveys.*

#### *Disclaimer:*

*Every attempt is made to provide a complete syllabus that provides an accurate overview of the subject. However, circumstances and events make it necessary for the instructor to modify the syllabus during the semester. This may depend, in part, on the progress, needs, and experiences of the students.*

Prepared by:

PETAL MAY M. DAL

Recommending Approval:

LOVE JHOYE M. RABOY, PhD

Approved by:

JUNAR A. LANDICHO, PhD



UNIVERSITY OF SCIENCE AND TECHNOLOGY

OF SOUTHERN PHILIPPINES

Alubijid | Balubal | Cagayan de Oro | Claveria | Jasaan | Oroquieta | Panaon | Villanueva

Document Code No.

USTP-ACAD-01

Rev. No.	Effective Date	Page No.
00	03.17.25	13 of 13

	Instructor	Chair, IT Department	Dean, CITC
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**PIT Rubric**

CRITERIA	OUTSTANDING (10pts)	VERY SATISFACTORY (9-8pts)	SATISFACTORY (7pts)	NEEDS IMPROVEMENT (<=6 pts)	SCORE
Normalized ERD	Normalized to 3NF; Referential Integrity enforcement	85% Normalized to 3NF; Referential Integrity enforcement	70% Normalized to 3NF; Referential Integrity enforcement	Not normalize; no referential integrity implementation	
Populated database	All tables are populated accordingly	85% of the tables are populated accordingly	70% of the tables are populated accordingly	less than 70% of the tables are populated accordingly	
Atleast one (1) select query is implemented (may contain arithmetic operations, aggregate functions, comparison operators, logical operators, and JOINS)	implementation of select query without any errors	85% implementation of select query without any errors	70% implementation of select query without any errors	less than 70% implementation of select query without any errors	
<b>TOTAL</b>					