UNIVERSIDAD POLITÉCNICA DE YUCATÁN BIS Universities

Subject: Introduction to programming
Syllabus

PROFESSOR: Juan Manuel Vázquez Montejo
Engineering Program: Data engineering

LEARNING PURPOSE OF THE SUBJECT	The student will identify the general panorama of information technologies through fundamental concepts, emerging technologies and the labor field to determine the relevance of their discipline				
QUARTER	First				
TOTAL HOURS	Contact	Non-contact	WEEKLY HOURS	Contact	Non-contact
	90	15		6	1

EXPEXTED OUTCOME TO WHICH THE SUBJECT CONTRIBUTS

HIGH-LEVEL OUTCOME: Manage data resources, considering the definition of the problem, requirements engineering, selection of various sources, acquisition and preparation of relevant data, exploratory analysis, analytical tools, hardware and software, database theory, applicable regulations and safety, to optimize resources that allow data processing and support alternative solutions to the problem.

PROFICENCY UNITS	FACULTIES	PERFORMANCE CRITERIA
Select the sources of databases by defining the problem, quality criteria of the sources of information and importance of the data, validity and reliability parameters, software tools, hardware and internet services, applicable regulations, for data exploration and analysis.	Plan maintenance strategies and technical support to computer equipment and systems based on a diagnosis of infrastructure and systems, using administrative tools to ensure availability and optimize the resources of the organization.	Prepare a database cleanup report, which includes: a) Proposal for infrastructure and data exploration b) List of data presentation tools and version controller c) Cleaning algorithms developed: - Elimination of apocryphal data - Change of data format - Data reduction d) Digital archive of the clean database
	Validate the consistency and disposition of the databases through exploratory data analysis, basic analytical tools, scientific method and graphic representation, for optimal processing and that the results are valid.	Prepare a report of the consistency validation of the database, which includes: a) Selection of analytical tools b) Results of the exploratory data analysis: representation in tables, graphs, hypothesis validation c) Conclusions and recommendations: - Variable selection - Models

Subject:
Professor:
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PROFICENCY UNITS	FACULTIES	PERFORMANCE CRITERIA
	Define the problem by analyzing the problem and its context, research methods specific to data science, tools and requirements engineering techniques, to identify viable solution options	Prepare a document describing the problem, containing: a) Description of the problem: - Problem context - Nature of the data - Objectives to respond b) Requirements and limitations d) Schedule: activities and times

LEARNING UNITS	TOTAL HOURS	PICE SUBMISSION DEADLINE
1. Algorithms and flowcharts	24	7/feb/2020
2. Programming languages	24	6/mar/2020
3. Algorithmic structures and subalgorithms	24	27/mar/2020
4. Command line and git	18	17/apr/2020
TOTAL	90	

Grading Policy
(From Doc.: Academic Guidelines)

√ Evaluation scale is twofold:

    I. Competent (approved):
        a) Competent
        b) Independent
        c) Advanced Basic
        d) Basic

    II. Not Competent (not approved).

According to the next criteria:

Achieved Grade	Registered Grade
0.0 to 6.99	6 Not Competent (NC)
7.0 to 7.49	7 Basic (BU)

7.50 to 8.49	8 Advanced Basic (BA)
8.50 to 9.49	9 Independent (I)
9.50 to 10.00	10 Competent (C)

√ The student must approve every single learning unit in order to approve the subject.

√ Types of Assessment
I. Ordinary;
II. Extemporaneous;
III. Extraordinary;
IV. Special.

√ The minimum attendance rate for regular assessments will be 80%.

Teacher's contact information

E-mail: juan.vazquez@upy.edu.mx

Schoology: 8DR8-GDKM-9GDBF

Schedule

Class Schedule A-group B-group	Tuesday 7:00-8:40 9:00-10:40	Thursday 10:40-12:20 7:00-8:40	Friday 7:00-8:40 9:00-10:40

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LEARNING UNITS

LEARNING UNIT	I. Algorithms and flowcharts
EXPECTED OUTCOME	The student will formulate algorithms in natural language for problem solving.
HOURS	24

TOPICS	KNOWLEDGE	KNOW-HOW	SESSION DATES
Fundamental concepts	Define concepts and characteristics of algorithms	Pose algorithms of everyday situations	Week 1
Algorithm representation	Differentiate control structures in the design and construction of an algorithm: - Selective structures - Repetitive structures - nested structures Describe the types of algorithm representation: - Graph: Flow chart - Written: pseudocode **	Represent algorithmic structures in the form of pseudocode and flowchart.	Week 2-3
Data types and expressions	Define the characteristics of the variables and constants Distinguish the types of computational data: - Numeric - Logic - String and characters - Arrangements Describe the representation of computational data: -Variables -Constants Explain the types of computational operations: Operators: - Arithmetic - Logic - Relationships Operands: -Variables -Constants Expressions: - Arithmetic - Logic	Algorithmically represent arithmetic and logical expressions.	Week 4
Problem solving methods	Explain the phases in solving a problem: - Problem analysis - Algorithm design - Coding - Compilation and execution - Check - Debugging - Maintenance - Documentation	Formulate troubleshooting algorithms.	Week 4

ASSESSMENT PROCESS		
PERFORMANCE EVIDENCE	**%**	**ASSESSMENT INSTRUMENTS**
Team projects	15	Report
In class projects and homework	50	Rubric of projects
Expositions	10	Presentation
Unit examination	25	Schoology online quiz
TOTAL	100%	

LEARNING UNIT	**II. Programming languages**
EXPECTED OUTCOME	The student will detect the elements of structure and errors in pseudocode and flowcharts to contribute algorithm functionality
HOURS	24

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TOPICS	KNOWLEDGE	KNOW-HOW	SESSION DATES
Types of programming languages	Identify the types of programming languages, their characteristics and applications: - Low level - High level		Week 5
Program structure	Identify the structure of computer programs: - Headboard - Bookstores - Variables - Start - Body - The end Differentiate the elements of the computer programs: - Reserved words - Identifiers - Constants - Operators - Punctuation marks	Locate the sections of the computer structure in a code. Locate the computer program elements in a code.	Week 6
debugging a program	**Identify the types of errors in computer programs:** **- Syntax** **- Logic** **- Execution**	**Detect syntax and logic errors in pseudocode and flowcharts**	Week 7-8

ASSESSMENT PROCESS

PERFORMANCE EVIDENCE	%	ASSESSMENT INSTRUMENTS
Team projects	15	Report
In class projects and homework	50	Rubric of projects
Expositions	10	Presentation
Unit examination	25	Schoology online quiz
TOTAL	100%	

LEARNING UNIT	III. Algorithm structures and subalgorithms
EXPECTED OUTCOME	The student will develop algorithms to optimize problem solving
HOURS	24

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TOPICS	KNOWLEDGE	KNOW-HOW	SESSION DATES
Sub-Algorithms	Explain the fundamentals of the modular programming methodology. Describe the concept of subalgorithm. Differentiate the types of modules: - Functions - Procedures	Represent algorithms in the form of functions and procedures. Determine the functions and procedures that integrate the solution to a problem.	Week 9-10
Further algorithm properties	Classifications Time and space complexity	Classify and value complexity of algorithms	Week 11
	HOURS OF KNOWLEDGE: 8	HOURS OF KNOW-HOW: 16	

ASSESSMENT PROCESS		
PERFORMANCE EVIDENCE	%	ASSESSMENT INSTRUMENTS

Team projects	15	Report
In class projects and homework	50	Rubric of projects
Expositions	10	Presentation
Unit examination	25	Schoology online quiz
TOTAL	100%	

LEARNING UNIT	IV. Command line and git
EXPECTED OUTCOME	The student would navigate through the command line, fetch information and do version control of code
HOURS	18

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TOPICS	KNOWLEDGE	KNOW-HOW	SESSION DATES
Command line	Define the basic comands of the prompt to: -navigate -compare -find -get the state of the computer	Perform basic scripts	Week 12-13
git	Define the characteristics of version control Describe the commands of version control (init, push, pull, commit) Describe github and other cloud VCM	Follow version control with git	Week 14
	HOURS OF KNOWLEDGE: 6	HOURS OF KNOW-HOW: 12	

ASSESSMENT PROCESS		
PERFORMANCE EVIDENCE	%	ASSESSMENT INSTRUMENTS
Team projects	15	Report
In class projects and homework	50	Rubric of projects
Expositions	10	Presentation
Unit examination	25	Schoology online quiz
TOTAL	100%	

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CODE OF CONDUCT IN THE CLASSROOM

Mutual respect
Honesty
Integrity
Punctuality
Food is not allowed (only water is accepted)
No use of cell phone or any other communication device in classes
Listen closely to classmates at exhibitions
No smoking in indoor areas (or UPY facilities)
Keep the classroom clean
Keep desks ordered
English must be used as communication language

BIBLIOGRAPHIC REFERENCES

AUTHOR	YEAR	DOCUMENT TITLE	PLACE OF PUBLICATION
Allen B. Downey	2012	*Think python*	http://www.greenteapress.com/thinkpython/html/index.html
Guido Van Rossum	2011	*An introduction to python*	http://tdc-www.harvard.edu/Python.pdf
Zed Shaw	2015	*Learn C the hard way*	USA
Brian W. Kernighan	1998	*The C programming language*	USA
Jhon Bird	2010	*How to design programs*	https://htdp.org/
Steve Oualline	1997	*Practical C programming*	USA