SUBJECT PROGRAM

I. IDENTIFICATION OF THE SUBJECT.

Subject: **DATA STRUCTURES.**		Acronym: **INF 134.**	Approval date 03/25/2014 (CC.DD Agreement 01/2014)
UTFSM Credits :**3**	Prerequisites:**IWI 131.**	Exam: **Does not have.**	Faculty.
SCT Credits :**5**			**Computer Science Department**
Lecture Hours Weekly :**3**	Assistantship Hours Weekly :**1.5**	Weekly Laboratory Hours :**0**	Semester in which it is taught: Odd / Even **x** / Both
Formative axis : **Engineering Sciences and Advanced Programming.**			
Total time dedicated to the Subject : **154.5 chronological hours.**			

Subject Description

This subject is part of the curriculum of the Ingeniería Civil Informática degree at the Advanced Programming Line, leading to the Licenciatura en Ciencias de la Ingeniería Informática. The purpose of this subject is for the student to know and apply basic data structures and recognize when to use them in different scenarios of their work. This includes the design, analysis, evaluation and programming of data structures using the abstract data type methodology.

Entry requirements

- Understand algorithms.
- Programming proficiency in C language.

Contribution to the graduation profile

The activities carried out in this subject contribute to developing in students the following specific and transversal skills:

General profile skills:

P1. Conceive, model, design, evaluate and implement alternative computer technology solutions, based on the analysis of specific problems in any business area.
P5. Act with autonomy, flexibility, and initiative in their work.
P6. Incorporate a dynamic of permanent updating of their skills, typical of a rigorous, effective, and efficient task, based on their determination and tenacity.
P7. Manifest behaviors and attitudes of responsibility and social solidarity, respecting ethical and regulatory principles typical of the Engineering professional as the foundations of their work, as well as of Computer Science in particular.

Specific Competence:

CE2.: Analyze problems that can be solved computationally, design algorithms and program the solutions using the appropriate tools in terms of programming language and data structures.

Elements of Competition:

EC22.: Analyzes problems, designs algorithms and programs with different data structures to solve a given problem.

Transversal Competencies:

- Communicate oral and written information effectively within the organizations in which one works, as well as with entities in the environment.
- Act with autonomy, flexibility, initiative, and critical thinking when facing professional problems.
- Manifest behaviors and attitudes of social responsibility and tolerance, valuing ethical principles

Learning Results that are expected to be achieved in this subject.

1. It implements simple computational solutions, based on the concept of abstract data types.
2. It implements simple computational solutions, based on algorithms that use data structures: lists, stacks, queues, trees, hashing and graphs.
3. Recognize when to use and what data structures to use, analyzing possible computational solutions.
4. Implements simple computational solutions, applying sorting and search algorithms.

Thematic contents

1. Programming concepts: pointers and recursion.
2. Abstract data type concept.
3. Algorithm complexity analysis.
4. List, stack and queue data structures.
5. Trees.
6. Hashing techniques.
7. Graphs.
8. Sorting algorithms.

Teaching and learning methodology.

- Expository method.
- Autonomous Learning.
- Resolution of exercises.
- Collaborative work.
- Problem-based learning.

Evaluation and grading of the subject. (Adjusted to Institutional Regulations-Regulation No. 1)

Approval requirements and qualification	**Evaluation system:** The evaluations carried out in this subject are through programming tasks and exams: • **C= Average of Exams (03).** • **T= Average number of programming tasks.** **Formula:** **NF= C*0.7+ T*0.3**

Learning resources Bibliography:

Guide Text	• C. Shaffer, *Data Structures and Algorithm Analysis* , Dover Publications, 2011. • L. Joyanes Aguilar, I. Zahonero Martínez, *Metodología, Algoritmos y Estructuras de Datos*, McGraw-Hill, 2001.
Complementary or Optional	• T. Cormen, C. Leiserson, R. Rivest, and C. Stein, *Introduction to Algorithms* , 3rd Ed., MIT Press and McGrawHill, 2009. • Y. Langsam, MJ Augenstein, AM Tenenbaum, *Data Structures with C and C* , 2nd Ed., Prentice Hall, 1996. • A. Drozdek, *Data Structures and Algorithms in C++* , 2nd ed. Thomson Learning, 2001.

II. CALCULATION OF NUMBER OF HOURS OF DEDICATION - (SCT-Chile) - SUBJECT SUMMARY TABLE

ACTIVITY	Number of hours of dedication		
	Number of hours by hours	Number of	Total number of weeks weeks
PRESENCE			
Lecture or theoretical classes	3	17	51
Assistantship/Exercises	1.5	17	25.5
Industrial visits (from Field)			
Laboratories / Workshop			
Evaluations (exams, others)			
Presentations			
NO PRESENCE			
Assistantship			
Mandatory tasks	3	9	27
Personal Study (Individual or group)	3	17	51
Others (specify)			
TOTAL (HOURS)			**154.5**
Total number of TRANSFERABLE CREDITS			**5**