

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/236121235>

Digital Signal Processing

Book · January 1992

CITATIONS

2,243

READS

20,160

2 authors:



[J.G. Proakis](#)

University of California, San Diego

248 PUBLICATIONS 25,203 CITATIONS

[SEE PROFILE](#)



[Dimitris Manolakis](#)

Massachusetts Institute of Technology

166 PUBLICATIONS 9,746 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



thermal infrared hyperspectral imaging. [View project](#)



LWIR HSI [View project](#)



Philadelphia University
Faculty of Engineering
Department of Communications & Electronics

Course Syllabus

Course Title: Digital Signal Processing	Course code: 610534 , 650534
Course Level: Level 5	Course prerequisite (s) and/or corequisite (s): Engineering Analysis 3, Signal Analysis & Processing
Lecture Time:	Credit hours: 3

Academic Staff

Specifics

Name	Rank	Office Number and Location	Office Hours	E-mail Address

Course module description:

This course aims to provide students with capabilities to
Signals and systems in discrete time
Discrete and fast Fourier transform
The z- transform arithmetic
Design techniques for digital filters
FIR, IIR, recursive and non-recursive filters.
effect of finite word length
applications.

Course module objectives:

At completing this course the student should be able to:
use Z-transform in solving difference equations. develop algorithms.
convert discrete time signal(sequence) to frequency domain using fast Fourier transform(FFT)..
design digital filters.

Course/ module components

- **Books (title , author (s), publisher, year of publication)**

Title: Digital Signal Processing

Author: John G. Proakis & Dimitris G. Manolakis

Publisher: Prentice Hall, 4th edition, 2007

Teaching methods:

Lectures, discussion groups, tutorials, problem solving, debates, etc.

Lectures, discussion in class, tutorials, and problem solving.

Duration: 16 weeks, 48 hours in total

Lectures: 48 hours, 3 per week + two exams (two hours)

Learning outcomes:**A) Knowledge and understanding Skills:**

Students will obtain knowledge and understanding of:

- 1) The structure of different communication systems.
- 2) The way of thinking and how to design.
- 3) The methods of developing the communication systems.
- 4) How to build, as hardware, different communication systems.

B) Intellectual Skills:

The students will acquire and develop the thinking skills that should enable them to:

- 1) Apply appropriate techniques to the transmission systems that are currently used for data, voice and video over LAN and WAN broadband networks.
- 2) Analyze and identify the specifications and tools to design typical process control applications, applicable to data communications and its related electronics systems.

C) Practical Skills:

Students will acquire and develop the practical skills that should allow them to:

- 1) Use appropriate numerical and mathematical skills to describe, analyze and solve a problem in electronics or/and communication system.
- 2) Use various laboratory equipment as diagnostic tool to detect a faults and identify a problem in electronics or/and communication system.
- 3) Analyze, design, evaluate, system behavior and test electronic or/and communication system using simulation or computer-based tool (engineering software tool).
- 4) Implement electronic circuits for communication system.

D) Practical and subject specific skills (Transferable Skills):

Students will acquire and develop the key transferable skills that will enable them to:

- 1) Work with a wide variety of people.
- 2) Manage tasks, and solve problems.
- 3) Think logically and critically.

Assessment instruments

<u>Allocation of Marks</u>	
Assessment Instruments	Mark
First examination	15%
Second examination	15%
Final examination: 50 marks	50%
Quizzes, Projects	20%
Total	100%

** Make-up exams will be offered for valid reasons only with consent of the Dean. Make-up exams may be different from regular exams in content*

Documentation and Academic Honesty

Submit your home work covered with a sheet containing your name, number, course title and number, and type and number of the home work (e.g. tutorial, assignment, and project).

Any completed homework must be handed in to my office (room 821) by 13:00 on the due date. After the deadline “zero” will be awarded. You must keep a duplicate copy of your work because it may be needed while the original is being marked.

You should hand in with your assignments:

- 1- A printed listing of your test programs (if any).
- 2- A brief report to explain your findings.
- 3- Your solution of questions.

For the research report, you are required to write a report similar to a research paper. It should include:

- **Abstract:** It describes the main synopsis of your paper.
- **Introduction:** It provides background information necessary to understand the research and getting readers interested in your subject. The introduction is where you put your problem in context and is likely where the bulk of your sources will appear.
- **Methods (Algorithms and Implementation):** Describe your methods here. Summarize the algorithms generally, highlight features relevant to your project, and refer readers to your references for further details.
- **Results and Discussion (Benchmarking and Analysis):** This section is the most important part of your paper. It is here that you demonstrate the work you have accomplished on this project and explain its significance. The quality of your analysis will impact your final grade more than any other component on the paper. You should therefore plan to spend the bulk of your project time not just gathering data, but determining what it ultimately means and deciding how best to showcase these findings.
- **Conclusion:** The conclusion should give your reader the points to “take home” from your paper. It should state clearly what your results demonstrate about the problem you were tackling in the paper. It should also generalize your findings, putting them into a useful context that can be built upon. All generalizations should be supported by your data, however; the discussion should prove these points, so that when the reader gets to the conclusion, the statements are logical and seem self-evident.
- **Bibliography:** Refer to any reference that you used in your assignment. Citations in the body of the paper should refer to a bibliography at the end of the paper.

• Protection by Copyright

1. Coursework, laboratory exercises, reports, and essays submitted for assessment must be your own work, unless in the case of group projects a joint effort is expected and is indicated as such.
2. Use of quotations or data from the work of others is entirely acceptable, and is often very valuable provided that the source of the quotation or data is given. Failure to provide a source or put quotation marks around material that is taken from elsewhere gives the appearance that the comments are ostensibly your own. When quoting word-for-word from the work of another person quotation marks or indenting (setting the quotation in from the margin) must be used and the source of the quoted material must be acknowledged.
3. Sources of quotations used should be listed in full in a bibliography at the end of your piece of work.

• **Avoiding Plagiarism.**

1. Unacknowledged direct copying from the work of another person, or the close paraphrasing of somebody else's work, is called plagiarism and is a serious offence, equated with cheating in examinations. This applies to copying both from other students' work and from published sources such as books, reports or journal articles.
2. Paraphrasing, when the original statement is still identifiable and has no acknowledgement, is plagiarism. A close paraphrase of another person's work must have an acknowledgement to the source. It is not acceptable for you to put together unacknowledged passages from the same or from different sources linking these together with a few words or sentences of your own and changing a few words from the original text: this is regarded as over-dependence on other sources, which is a form of plagiarism.
3. Direct quotations from an earlier piece of your own work, if not attributed, suggest that your work is original, when in fact it is not. The direct copying of one's own writings qualifies as plagiarism if the fact that the work has been or is to be presented elsewhere is not acknowledged.
4. Plagiarism is a serious offence and will always result in imposition of a penalty. In deciding upon the penalty the Department will take into account factors such as the year of study, the extent and proportion of the work that has been plagiarized, and the apparent intent of the student. The penalties that can be imposed range from a minimum of a zero mark for the work (without allowing resubmission) through caution to disciplinary measures (such as suspension or expulsion).

Course/module academic calendar

week	Basic and support material to be covered	Homework/reports and their due dates
(1)	signals in discrete time	
(2)	systems in discrete time	
(3)	the z- transform arithmetic	Quiz1 9-3-2008
(4)	the inverse z- transform arithmetic	
(5)	Difference equations	
(6)	Finite impulse response(FIR)	
(7)	infinite impulse response(IIR)	
(8) Midterm examination	System transfer function	Quiz1 13-4-2008
(9)	Solution of difference equation	
(10)	Frequency response of analog filter	
(11)	Design of digital filters	
(12)	Realization of digital filter	
(13)	Discrete Fourier	

	transform	
(14)	Fast Fourier transform	Quiz1 23-5-2008
(15)	Applications	
(16) Final Examination		

Expected workload:

On average students need to spend 2 hours of study and preparation for each 50-minute lecture/tutorial.

Attendance policy:

Absence from lectures and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.

Course references

Books

1. Lonnie C. Ludman, "Fundamentals of Digital Signal Processing" John Wiley & Sons Ed.1985.
2. Roman Kuc. "Introduction to Digital Signal Processing" McGraw-Hall .1988.
3. Emmanuel C. Ifeachor "Digital Signal Processing/ A practical Approach " 2nd Edition
4. Prentice-Hall 2002

Websites

- 1- Digital signal processing
http://en.wikipedia.org/wiki/Digital_signal_processing
- 2-MatlabTutorials
http://www.mathworks.com/academia/student_center/tutorials/launchpad.html