



# UNIVERSITÀ DEGLI STUDI DI PALERMO

<b>DEPARTMENT</b>	Scienze Umanistiche		
<b>ACADEMIC YEAR</b>	2021/2022		
<b>BACHELOR'S DEGREE (BSC)</b>	DISCIPLINE DELLE ARTI, DELLA MUSICA E DELLO SPETTACOLO		
<b>INTEGRATED COURSE</b>	HUMANISTIC COMPUTER SCIENCE		
<b>CODE</b>	13563		
<b>MODULES</b>	Yes		
<b>NUMBER OF MODULES</b>	2		
<b>SCIENTIFIC SECTOR(S)</b>	ING-INF/05		
<b>HEAD PROFESSOR(S)</b>	MAZZOLA GIUSEPPE	Ricercatore a tempo determinato	Univ. di PALERMO
<b>OTHER PROFESSOR(S)</b>	MAZZOLA GIUSEPPE	Ricercatore a tempo determinato	Univ. di PALERMO
<b>CREDITS</b>	9		
<b>PROPAEDEUTICAL SUBJECTS</b>			
<b>MUTUALIZATION</b>			
<b>YEAR</b>	2		
<b>TERM (SEMESTER)</b>	2° semester		
<b>ATTENDANCE</b>	Not mandatory		
<b>EVALUATION</b>	Out of 30		
<b>TEACHER OFFICE HOURS</b>	<b>MAZZOLA GIUSEPPE</b> Wednesday 10:00 - 13:00 Ex Dipartimento di Ingegneria Informatica, edificio 6, terzo piano		

**DOCENTE:** Prof. GIUSEPPE MAZZOLA

<b>PREREQUISITES</b>	Basic computer skills.
<b>LEARNING OUTCOMES</b>	<p><b>KNOWLEDGE AND UNDERSTANDING</b> The student will acquire knowledge and methodologies to define, address, and solve problems related to the production and enjoyment of digital audio content. The student will be able to select and evaluate algorithms and fundamental data structures.</p> <p>The course includes class lectures and exercises, analysis, and discussion of simple applications and case studies. For the verification of this objective, the final test consists of an interview on the course topics and the presentation of an essay.</p> <p><b>ABILITY TO APPLY KNOWLEDGE AND UNDERSTANDING</b> The student will be able to apply the acquired knowledge to the use of methods and techniques for the representation and use of digital audio. He/she will also learn how to relate the market realities concerning devices, processes, and applications of the sector. The course includes theoretical and computer exercises (individual and in a group) and the preparation of an essay. For the verification of this objective, the test consists of the discussion of an essay.</p> <p><b>AUTONOMY OF JUDGEMENT</b> Through the methodological approach acquired during the course, the student will gain the ability to use and integrate the learned tools in different application areas. He/she will be able to face new problems and propose solutions even in the presence of limited and incomplete data, integrating the knowledge acquired during the course, and will be able to analyze the merits and defects of the proposed solutions. The course includes class lectures, theoretical and computer exercises (individual and group), the preparation of an essay. For the verification of this objective, the exam includes an interview on the topics of the lectures and the discussion of an essay.</p> <p><b>COMMUNICATION SKILLS</b> The student will be able to work in a group to communicate with competence and language properties problems of digital audio processing, structuring, and management, even in specialized contexts. He/she will be able to interact with designers and technicians for the realization of systems for the production and use of digital audio. The course includes individual and group lectures and exercises. The exam consists of the final interview on the lecture topics; the discussion of an essay.</p> <p><b>LEARNING ABILITY</b> The student will be able to face the problems related to the production and enjoyment of digital audio content. The course includes individual and group exercises. For the verification of this objective, the test consists of the discussion of an essay.</p>
<b>ASSESSMENT METHODS</b>	<p>The assessment of learning (final examination) is subdivided into two phases: 1) Presentation of an essay; 2) Oral test.</p> <p>The essay prepared by the student consists of a project for the management of digital video and audio. It aims to ascertain the possession of the skills and abilities to apply knowledge and understanding of the methods and systems studied during the course. The oral test consists of an interview on the topics of the course.</p> <p>The result of the assessment of learning is a score in 30/30. The evaluation modalities will be the same for attending and non-attending students.</p>
<b>TEACHING METHODS</b>	Class lectures. Computer exercises. Development of simple application projects.

## MODULE COMPUTER SCIENCE FOR ARTS

*Prof. GIUSEPPE MAZZOLA*

### SUGGESTED BIBLIOGRAPHY

De Santo, Colace, Napoletano. "Informatica per le arti visive, la musica e lo spettacolo". Mc Graw Hill.

<b>AMBIT</b>	10645-Attività formative affini o integrative
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<b>INDIVIDUAL STUDY (Hrs)</b>	60
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<b>COURSE ACTIVITY (Hrs)</b>	15
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### EDUCATIONAL OBJECTIVES OF THE MODULE

#### TEACHING METHODS

The overall format of the course is: - Lectures (17 hours)

- Lab sessions (13 hours)

#### ASSESSMENT METHODS

Assessment methods will focus on the evaluation of learning outcomes of the course according to the Dublin descriptors. The final grade will be from 18/30 to 30/30 cum laude.

- Assessment of Objective 1: Knowledge and understanding

This objective will be assessed by an oral discussion concerning the theoretical topics of the syllabus. Objective 1 will count as 15% of the final grade.

- Assessment of Objective 2: Applying knowledge and understanding

This objective will be assessed by an oral discussion of case studies analyzed by the student during team sessions in the lab. Objective 2 will count as 15% of the final grade.

- Assessment of Objective 3: Making judgments

This objective will be assessed by a discussion of an essay, produced at home and in the lab, by the student alone or together with other students. The essay will concern the design and implementation of a video, resulting from an editing process of sounds, video, images and animations. A live demo of the system will be shown during the examination. In particular, Objective 3 will be assessed by discussing the design and implementation choices performed by the student team. Objective 3 will count as 30% of the final grade.

- Assessment of Objective 4: Communication skills

This objective will be assessed by the oral discussions concerning Objectives 1,2,3 and by the analysis of the essay concerning Objective 3. Objective 4 will count as 10% of the final grade.

- Assessment of Objective 5: Learning skills

This objective will be assessed by means of the discussion of the essay described in Objective 3. In particular, Objective 5 will be assessed by discussing, in particular, the theories and techniques autonomously learned by the student team and employed in the implementation of the video. Objective 5 will count as 30% of the final grade.

Learning outcomes according to the Dublin descriptors:

Objective 1: Knowledge and understanding

The student will acquire the theoretical knowledge necessary to understand the problems related to the representation and editing of sounds, images and videos.

The student will thus study the theoretical foundations and the principal topics concerning the editing of sounds, images and videos. To achieve this goal, the course will include lectures; class discussions; seminars.

Objective 2: Applying knowledge and understanding

The student will acquire the practical capabilities necessary to design and implement case studies of editing of sounds, images and videos. He/she will be able to design a system starting from case studies, to identify the problems, to formulate algorithms, to implement and evaluate the performances of the proposed solutions. To achieve this goal, the course will include sessions in the lab, or autonomously, by exploiting the most important open source software for sounds, images and videos editing.

Objective 3: Making judgments

The student will acquire the necessary methodologies to implement and evaluate simple system for the editing of sounds, images and video.

He/ she will be able to analyze problem data at disposal, even if limited and incomplete, and to propose design solutions tailored to the problem at hand. The student will be able to compare strengths and weaknesses of the proposed solutions and to evaluate the performance of the solutions also by esthetical aspects.

- Objective 4: Communication skills

The student will be able to work in a team and to communicate with competence and correctness the issues related to the editing of audio, images and video.

- Objective 5: Learning skills

The student will be able to autonomously learn and study specific problems related to audio, images and video editing.

### EDUCATIONAL OBJECTIVES

The course aims to provide the main notions regarding the methodologies of representation and processing of multimedia content, such as sounds, images and videos. The main opensource software to support the professions of the arts, music and entertainment will be analyzed. The course will be articulated alternating as much as possible moments of exercises to lectures.

The exercises will be aimed at putting into practice what has been discussed at the theoretical level and will be a basis for the realization of a final paper that will assess the skills acquired.

**PREREQUISITES** There are no mandatory prerequisites. However, a basic knowledge of computer science is suggested.

## SYLLABUS

Hrs	Frontal teaching
5	Digital representation of information. Digital Representation of Images. Resolution. Bit rate.
5	Digital representation of video. Video production techniques. Examples of DVE.
5	Methodologies for Animation
2	Digital representation of sounds. Representation formats. Physical and psychophysical characteristics of sound.
Hrs	Practice
4	Practical exercises using Gimp.
4	Exercises with DVE programs
4	Exercises with Blender
1	Introduction to Audacity

## MODULE MUSIC COMPUTER SCIENCE

*Prof. GIUSEPPE MAZZOLA*

### SUGGESTED BIBLIOGRAPHY

Vincenzo Lombardo, Andrea Valle: Audio e Multimedia, Apogeo. Quarta edizione. ISBN: 9788838789861  
Curtis Roads: The Computer Music Tutorial, MIT Press. Qualunque edizione. ISBN: 9780262680820

<b>AMBIT</b>	10645-Attività formative affini o integrative
<b>INDIVIDUAL STUDY (Hrs)</b>	120
<b>COURSE ACTIVITY (Hrs)</b>	30

### EDUCATIONAL OBJECTIVES OF THE MODULE

The general topics of Sound and Music Computing are in agreement with the ACM Computing Classification System. In particular, the educational objectives of the course cover all or parts of the Sound and Music Computing 2007 roadmap of the S2S2 (Sound to Sense, Sense to Sound) Consortium, established as Coordination Action by European Commission under 6th FET Open Call: <http://smcnetwork.org/roadmap>

More in details, the lectures of the course will cover the "in-focus content areas" reported in Appendix A of the roadmap, representing the core disciplines of a course in Sound and Music Computing:

- Sound Modelling
- Sound Analysis and Coding
- Music Information Processing - Music Performance

## SYLLABUS

Hrs	Frontal teaching
3	Introduction of sound and music computing
3	Fundamentals of acoustics and sound perception
3	Digital representation of sound and music
3	Audio file compression
3	Sound synthesis
3	MIDI protocol
3	Algorithmic composition
3	New frontiers of computer music
Hrs	Practice
3	The software system Audacity
3	The MIDI software system MuLab