Universidad de Navarra

Form and Matter (Properties). Gr. Diseño

Guía docente 2026-27

INTRODUCTION

- **Degree:** Design
- **Module in the degree program:** Técnica del diseño. Fundamentos físicos del diseño
- **Course name: FORM AND MATTER (PROPERTIES)**
- **Course description**: The course provides the basic tools for the proper physical conception of objects design. With a strong reflective character supported by the practice and physics, they are shown as instruments that determine the realization of reality.
- **Type of course**: Basic
- **Credits**: 6 ECTS
- **Year/Semester:** First year / Second semester
- **Instructors:** Prof. Raúl Cruz Hidalgo (*Dr. rer. nat.*), course director, (raulcruz@unav.es); Prof. Borja Iraola (Ph.D.) (bisaenz@unav.edu): Zhineng Hi.
- **Language**: English
- **Department**: Building Construction, Services and Structures. Department of Physics and Applied Mathematics
- **Lectures schedule:** Mondays 12:00 to 14:00 & Friday 9:00 to 11:00. Changes due to projects and visiting professors will be announced.
- **Classroom**: A3 School of Architecture.

LEARNING OUTCOMES (Competencies)

BASIC COMPETENCES

BC1 – Students should have demonstrable knowledge and understanding of an area of study that builds on the base knowledge of general secondary education, and at a level at which, although supported by advanced text books, also includes aspects that imply knowledge related to the vanguard of the field of study.

BC4 – Students should be able to communicate information, ideas, problems and solutions to both a specialized and general audience.

BC5 – Students should have developed the learning and study skills that are necessary for undertaking studies with a high degree of autonomy.

GENERAL COMPETENCES

GC2 – Analyze, evaluate and present the creative qualities of the different technical and material resources in the field of design.

GC5 – Skillfully manage modern technologies geared toward creation and manufacturing processes specific to the design world.

GC6 – Ability to speak English, B2 level, with knowledge of scientific and academic terminology related to the world of art, design, and applied arts.

SPECIFIC COMPETENCES

SC3 – Describe and apply the principles of general mechanics, static, mass geometry, and vector and tensorial fields to the study of design.

SC7 – Know the composition, as well as the plastic, elastic, and resistance qualities of materials related to the world of design.

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PROGRAM

1. Generalities (Material properties. Scalar and vectorial fields. Geometry of masses.)
2. Project 4 review.
3. Moment of inertia. Forces.
4. Stresses.
5. Mechanical properties of materials.
6. Basics of fracture mechanics.
7. EXAM (Continuous Evaluation Test1). Basics of thermodynamics A.
8. Basics of thermodynamics B.
9. Basics of heat transport.
10. Basics of Vibration.
11. Fluids.
12. Basics of Lighting and Electricity.
13. Presentation of Development of Project 5.
14. Exercises & Laboratory.

EDUCATIONAL ACTIVITIES

I. Classroom teaching activities

1. Lectures (30 hours). Lectures are given by the professor on the themes indicated in the syllabus with the help of the blackboard, PowerPoint presentations and practical examples.

2. Practical classes (30 hours). Practical classes are given by the professor in the classroom or the workshop. During these classes, the professor will answer questions on the topics of the proposed exercises.

3. Seminars (required) (6 hours). They may include: Lectures of Visiting Professors, Responses to students' questions by the professor and classmates, Presentation by the professor of current scientific issues related to the course and Oral presentations by the students on topics proposed by the professor. At the end of the presentation, the students will have to answer questions.

4. Evaluation. Oral presentations, projects, and exams to assess the successful accomplishment of the objectives

II. Workshop teaching activities

1. Guided work (3 hours) and personal work (27 hours). The professor guides the work of the students in their different projects. Special guidance will be given to the cases and students that write on their Journal.

2. One-to-one tutorials (2 hours). Each student may have personal interviews with the professor to help him/her with personal study and learning.

III. Personal work (52 hours)

Students must understand themes covered early in the course to be able to comprehend information presented later in the course and will have to be able to integrate material learned throughout the course. Therefore, it is important that they do not fall behind and try to set aside regular times outside of class to work on the course material on a daily basis.

1. Students must read the assigned reading for a subject before the lecture covering that topic. Being familiar with topics beforehand will allow students to get the most out of the lecture.

2. Students must conduct personal study using the professor's notes, notes taken in lectures and recommended books if needed.

3. Students must prepare hand-in exercises and oral presentations in English.

4. Students must prove their knowledge of the topics within the exercises and projects that are asked to work in.

Credits/hours distribution of the activities.

6 ECTS= 150 h (25 h/ECTS)

	ECTS	hours	%	Required
Lectures	1.2	30	20%	In-person
Seminars	0.24	6	4%	In-person
CLASSROOM ACTIVITIES	**1.44**	**36**	**24%**	
Practical classes	1.2	30	20%	In-person
Guided work	0.12	3	2%	In-person
Personal work	1.08	27	18%	
WORKSHOP ACTIVITIES	**2.4**	**60**	**40%**	
One-to-one tutorial	**0.08**	**2**	**1%**	In-person
Personal study and work	**2.08**	**52**	**35%**	
TOTAL	**6**	**150**	**100%**	

Quick reference: Students are required to work or study at least one hour at home for each ECTS that a subject has in a semester. Form&Matter has 6 ECTS in the second semester, therefore students are required to work or study for this subject at least **6 hours a week at home**.

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ASSESMENT

Important attendance remark (80% required)

Attendance to the lectures and classroom/workshop activities is compulsory. Failing to attend to a 20% will automatically and indefeasible lead to a "No presentado" grade in the ordinary evaluation of May. Nevertheless, it will have no effect on the evaluation of June.

Assessment criteria

To calculate the final grade, course performance and grading will be determined as follows:

Required percentage	Type	Included	Percentage
0-30%	Attendance and participation	**X**	10%
30-60%	Individual and in-group works	**X**	30 %
20-40%	Oral presentations	**X**	20 %
0-40%	Exams (middle term and final)	**X**	40 %

Exams are 40% of the final grade

A. Continuous Assessment: Test 1 (90 minutes): **20%**

B. FINAL EXAMINATION

Test 1 retake if necessary: (90 minutes) **(20%)**

Test 2: (90 minutes) **20%**

Essential requirements to pass the subject:

1. The student MUST pass Test 1 and Test 2, obtaining in each of them 5 out of 10 or better

2. After the reweight final grade calculation, the student MUST obtain 5 out of 10 or better

3. Minimum attendance of 80%

Final grading

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Students that pass the subject will be assigned a final grade according to their numerical grade as follows:

5,0 – 6,9 Aprobado

7,0 – 8,9 Notable

9,0 – 10 Sobresaliente

Exceptional students with a numerical grade between 9,0 and 10 may be graded as Matrícula de honor.

Grade Reviews

Grades obtained during the course may be reviewed seven days after the publication of the grades, the request for the review must be asked during that period.

Students will be able to review the final exam in an interview with the professor, after the publication of the grades, in a day and place that will be indicated. Please note that only in-person reviews will be admitted, so please take it into consideration when scheduling your travels.

Special assessment

For those who do not pass the course in May (grades Suspenso or No presentado) there will be an extraordinary practical exercise and/or exam including all the topics of the course in June.

As stated in the General Evaluation Regulations of the University of Navarra approved in May 2019, “Students who request it may be evaluated in the extraordinary call, even if they have passed the course in that course. To do this they must request to be included in the minutes at least five days before the start of the exam period of that call. The final grade of the subject will be that of the extraordinary call, even if it is lower than the one obtained previously".

Those interested must submit an instance through Academic Management choosing the option "convocatoria extraordinaria: solicitud para concurrir (grado)", before the 1st of June.

Students with special learning needs

Reasonable adjustment will be done for students with special learning needs, either regarding the methodology and/or evaluation of the course, but they will be expected to fulfill all course objectives. Such students must communicate to the Course Director their condition in January.

Retakers

Retakers might be asked to do special exercises and presentations during the course which may not be related with the rest of the subjects. The general attendance criterion is applied to those who did not achieve the 80% attendance in previous years.

ACADEMIC INTEGRITY

Academic Integrity is a fundamental value, essential to the pursuit of learning and scholarships at the University of Navarra (UN). Participating honestly, respectively, responsibly, and fairly in this academic community ensures that the UN degree that you earn will continue to be valued and

respected as a true signifier of a student's work and academic achievement. As a result, the UN treats cases of academic misconduct very seriously.

The University of Navarra's CODE OF CONDUCT/EVALUATION: RULES AND PROCEDURES documents outline the behaviours that constitute academic misconduct, the process for addressing academic offences, and the penalties that may be imposed. Students are expected to be familiar with them,

(https://www.unav.edu/documents/10162/32684638/Normativa+general+sobre+la+evaluaci%C3%B3n+%28English%29.pdf/455c05fb-ad0e-9083-04b3-1f285832d4d9?t=1588076072000/ https://www.unav.edu/documents/11310/16248366/Code+of+Conduct.pdf)

Potential offences include, but are not limited to:

IN PROJECTS, EXERCISES AND ASSIGNMENTS

· Using someone else's ideas or words without appropriate acknowledgement.

· Submitting your own work in more than one course without the permission of the instructor.

· Making up sources or facts.

· Obtaining or providing unauthorized assistance on any assignment (this includes collaborating with others on assignments that are supposed to be completed individually).

ON TEST AND EXAMS

· Using or possessing any unauthorized aid, including a mobile phone, accessing to (AI) artificial intelligence tools

· Looking at someone else's answers

· Misrepresenting your identity.

· Submitting an altered test for regrading.

MISREPRESENTATION:

· Falsifying institutional documents or grades.

· Falsifying or altering any documentation required by the University, including (but not limited to), medical notes.

VERY IMPORTANT: In the event that any **exam or coursework submission** appears to be AI-generated, the professor will meet with you to discuss your answers prior to making a final decision regarding your grade.

The minimum penalty for such offenses is to fail the assignment; the more common penalty is to **fail the course**. If there is any question about what is or is not permitted in the course, please do not hesitate to contact the course instructor. For any questions about appropriate research and citation students are expected to seek out additional information from the instructor.

MISSED TESTS AND ASSIGNMENTS

Students who miss a test, exercise, or any assignment for reasons entirely beyond their control (e. g., illness) may submit a request to schedule a makeup in the case of the exercises of assignments. Provided that notification and documentation are provided in a timely manner, and that the request is subsequently approved, no academic penalty will be applied.

In such cases, students must notify professors on the date of the missed exercise/assignment due date and submit supporting documentation (e.g. Verification of Student Illness or Injury Form) within 48 hours of the originally scheduled due date. Students who do not provide the professor with appropriate or sufficient supporting documentation will be given a grade of 0 (zero) for the missed course deliverable.

Note that the physician's report must establish that the patient was examined and diagnosed at the time of illness, not after the fact. Statements that merely confirm a report of illness made by the student and documented by the physician will not accept a statement. (IN CASE A STUDENT MISSES ANY MIDTERM TEST FOR LEGITIMATE REASONS, HE/SHE WILL HAVE TO REPEAT IT AT THE END OF THE SEMETER).

LATE ASSIGNMENTS

Students who, for reasons beyond their control, are unable to submit an assignment by its deadline must obtain approval from the instructor for an extension. Supporting documentation will be required as per the policy on missed tests and assignments.

EMAILS

At times, the course instructors may decide to communicate important course information by email. As such, all students are required to have a valid University email address. Students are responsible for ensuring that their university address is set up and properly entered on the University intranet.

ADI

The online course page for this course is accessible through ADI. To access the course page, go to the University portal, login and log in using your UN user and password. Once you have logged in, look for the My Courses module where you'll find the link to all your course websites.

Lectures and course materials prepared by the professors, or the invited guests are considered by the University to be an instructor's intellectual property. Students wishing to record a lecture or other course material in any way are required to ask the instructor's explicit permission, and may not do so unless permission is granted (note: students who have been previously granted permission to record lectures as an accommodation for a disability are, of course, excepted). This includes tape recording, filming, photographing PowerPoint slides, ADI materials, etc.

If permission is granted by the instructor, it is intended for the individual student's own study purposes and does not include permission to publish them in anyway. It is absolutely forbidden for a student to publish an instructor's notes to a website or sell them in any other form without formal permission.

OFFICE HOURS

Prof. Raúl Cruz Hidalgo (Ph.D.), course director, (raulcruz@unav.es); Wednesdays 17:00-19:00 and Thursday 17:00-19:00. O-210. Edificio Los Castaños. Facultad de Ciencias. Schedule a meeting by email.

Prof. Borja Iraola (Ph.D.) (bisaenz@unav.edu) Fridays at 12:00. Office A1111. An appointment by email is required.

BIBLIOGRAPHY AND RESOURCES

Normative on Academic Discipline of the students. Universidad de Navarra (LINK).

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Basic

- University Physics, volume 1 and 2. 14th edition. Sears, Zemansky, Young, Freedman. Ed. Pearson Addison Wesley. Find it in the Library
- Engineering Mechanincs. Statics. Volume 1. Ed. John Wiley & Sons, Inc. Find it in the Library Find it in the Library electronic spanish version
- Engineering Materials I: An Introduction to Properties, Applications, and Design, Fourth Edition 2012, Michael F. Ashby and David R. H. Jones.Find it in the Library electrónic version
- Selección de materiales en el proceso de diseño. 2nd Academic Edition. J. Peña de Andrés. Find it in the Library

Complementary

- Física de Feynman. Autores: Feynman - Leighton - Sands. Editorial: Pearson Educación. Find it in the Library
- Física conceptual. Autor: Hewitt. Editorial: Pearson Educación. Find it in the Library
- Structural packaging : workbook Find it in the Library
- Advanced packaking.
- How to fold. Laurence K. Withers. https://archive.org/details/howtofoldmethode0000with/page/n1/mode/2up