

Física

Oxford

https://www2.physics.ox.ac.uk/sites/default/files/2011-06-03/programmespecifications_mphys_updated_25february20_21256.pdf

Programme outcomes

A. Students will develop a knowledge and understanding of:

- ♣ the general theoretical and experimental principles and techniques of physics
- ♣ a broad range of physics topics on all scales from the sub-atomic to the whole cosmos
- ♣ relevant mathematical techniques and how they are applied to physical problems
- ♣ sound experimental procedures, including data recording and analysis and how to write up an experiment
- ♣ basic electronics, computer programming and numerical methods as applied to physics

In addition, those taking the BA will know

- ♣ how to work in a group on an open ended industrial project, present their results, and write up their own contribution

In addition, those taking the MPhys will know

- ♣ two areas of physics, taken as 4th year options, to the advancing edge of the subjects
- ♣ how to plan, execute and write up a challenging, open ended project, often within a research group

Carnegie Mellon

<https://www.cmu.edu/physics/undergrad-program/learning-outcomes.html>

University of California Santa Cruz (UCSC)

https://www.physics.ucsc.edu/academic-programs/undergrads/prog_learning_oc.html

Program Learning Outcomes:

1. Students will demonstrate proficiency in mathematics and the mathematical concepts needed for a proper understanding of physics.
2. Students will demonstrate knowledge of classical and quantum mechanics, statistical mechanics and electromagnetism.
3. Students will show that they have learned laboratory skills, enabling them to take measurements in a physics laboratory and analyze the measurements to draw valid conclusions.
4. Students will communicate effectively, both orally and in writing, and will prove that they can think critically and work independently while doing their senior thesis.
5. Students will demonstrate a basic understanding of various aspects of astronomy. (Astrophysics major only.)

University of Redlands

<https://www.redlands.edu/study/schools-and-centers/college-of-arts-and-sciences/undergraduate-studies/physics/program-learning-outcomes/>

Bachelor of Science

Undergraduate physicists develop an appropriate knowledge of the foundations of the field, an ability to theoretically model and experimentally explore physical systems, and the ability to communicate scientific work and findings. By graduation, B.S. students are intended to develop to an advanced level on all fronts, suitable for entry to a graduate program in physics.

- Knowledge - Students will demonstrate an understanding of the fundamental principles and concepts of physics which include mechanics, electromagnetism, thermodynamics, and quantum mechanics.
- Theoretical-Analytical- Students will competently apply this knowledge and analyze physical systems by constructing mathematical models in which they identify the essential aspects of a problem, formulate a strategy for solution, make appropriate approximations, evaluate the correctness of their solution, and communicate their work clearly.
- Computational - Students will use basic computational techniques for modeling physical systems including those that don't have analytical answers.
- Experimental - Students will systematically explore physical phenomena by setting up experiments, collecting and analyzing data, and interpreting their results.

Universidad Técnica del Norte (Ecuador)

http://www.utn.edu.ec/fecyt/carreras/fisicomatematico/?page_id=23

RESULTADOS DE APRENDIZAJE (licenciatura en física y matemática)

- Aplica conocimientos básicos de Física, Matemática y Estrategias Metodológicas para la planificación de la enseñanza y aprendizaje de una unidad didáctica.
- Analiza el contexto o entorno educativo, definir un problema y formular las alternativas, estrategias y medios de solución.
- Diseña una secuencia de aprendizaje y enseñanza, y someterla a experimentación para determinar sus resultados, mediante el análisis.
- Diseña nuevos recursos didácticos, tanto de carácter material como informático, para el desarrollo de la enseñanza y aprendizaje de Matemática y Física en el bachillerato.
- Trabaja en equipos multidisciplinarios (con docentes de otras áreas de conocimiento) para el diseño de proyectos curriculares contextualizados.
- Investiga las causas y consecuencias de las deficiencias en el aprendizaje de las ciencias Físicas y Matemáticas, y a partir de ese diagnóstico, diseñar una o más opciones de solución.
- Participa con ética profesional en las actividades de actuación en clase, evaluaciones de aprendizaje, presentación de trabajos y proyectos.
- Participa sin dificultad con sus compañeros, directivos y público en general a través del lenguaje escrito y oral, así como de las TICs.
- Discrimina los impactos de carácter social, medioambiental, económico y global del desarrollo de la educación matemática y física, así como de los de otras ciencias.
- Presenta alternativas distintas a las propuestas por los docentes, en los campos de estudio y análisis de las ciencias físicas y matemáticas, así como en la conceptualización y práctica de las teorías pedagógicas.
- Utiliza técnicas de investigación, habilidades metodológicas y herramientas tecnológicas en el estudio y solución de problemas de comprensión científica y/o aplicación pedagógica.