COURSE SYLLABUS

University  | Alexandru Ioan Cuza University of Iași
---|---
Faculty  | Physics
Department  | Physics
Domain  | Physics
Level  | Postgraduate (MA) (Plasma Physics, Spectroscopy & Selforganization)
Course title  | High Temperature Plasma Physics

Course category (FC/SC/CC\(^1\))  | FC
Term (1-4):  | 4
Course type (Co/El/F\(^2\)):  | Co

I. Course structure

<table>
<thead>
<tr>
<th>Course</th>
<th>Seminar</th>
<th>Lab.</th>
<th>Project</th>
<th>Credits</th>
<th>Total class hours/semester</th>
<th>Total hours of individual activity</th>
<th>Examination type (C/Ex/CE(^3))</th>
<th>Teaching language</th>
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</thead>
<tbody>
<tr>
<td>6</td>
<td>56</td>
<td>124</td>
<td>C</td>
<td>English</td>
<td></td>
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II. Instructors

<table>
<thead>
<tr>
<th>Academic degree(^4)</th>
<th>Scientific degree</th>
<th>Name and surname</th>
<th>Faculty position (tenure/associate - organization)</th>
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</thead>
<tbody>
<tr>
<td>Course Assoc. Professor</td>
<td>PhD</td>
<td>Alexandroaei Dumitru</td>
<td>tenure</td>
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<tr>
<td>Seminar Assoc. Professor</td>
<td>PhD</td>
<td>Alexandroaei Dumitru</td>
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<tr>
<td>Laboratory Assoc. Professor</td>
<td>PhD</td>
<td>Alexandroaei Dumitru</td>
<td>tenure</td>
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III. Prerequisites

Basic knowledge of Mathematics, Electrodynamics and General Plasma Physics

IV. Course objectives

The course has to introduce students to the special problematic of the high temperature plasmas. There are introduced question regarding the characteristics and parameters of these plasmas, phenomenology, their production and devices with special interest to the fusion reactor or the stellar plasmas. Also problems of theoretical and experimental investigation for this kind of plasmas are presented.

V. Course content

Course

Seminar
Resolving and discussing problems of thermodynamic equilibrium, distributions - Saha equation – examples. Motion of charged particles in electric and magnetic fields, adiabatic invariants, acceleration and heating of the particles of hot plasmas, modeling and simulation. Confinement of hot plasmas in magnetic field - devices, stability. Problems of heating in different fusion devices. Models of stellar atmosphere, star evolutions. Instabilities in high

\(^1\) FC – fundamental course, SC – specialty course, CC – complementary course
\(^2\) Co – compulsory, El – elective, F – facultative
\(^3\) C – colloquium, Ex – exam, CE – colloquium AND exam
\(^4\) Professor / Associate professor / Lecturer / Assistant professor / Teaching assistant
Motion of charged particles in different configurations electric field – magnetic field (comparison between modeling and experiment – electrostatic and magnetic lenses). Diffusion coefficient of plasma particles in the presence of the magnetic field. Stellar atmosphere characterization. Pulsed discharges for hot plasmas obtaining – devices and characterization.

VI. Minimal required references

VII. Didactic methods
- Course - oral presentations
- Seminars – free exercises concerning course material, home works – documentation papers
- Laboratoratory – special practical works

VIII. Assessment
| Pre-conditions | Attendance and active participation to class activities, etc. |
| Exam dates | |
| 1st Assessment | at the half of the 4-th semester |
| 2nd Assessment | at the final of the 4-th semester |
| Exam/Colloquium | final written / oral test | 60% |
| Seminar | hourly class seminar activity | 20% |
| Laboratory | hourly lab activity | 20% |