**Course Plan**

**Preparatory Courses: M.Sc.**

1. **Course Data**

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| --- | --- |
| **Course Title** | Advanced Solid State Physics Code: EMP 511 |
| **Academic Year / Semester** | 2014 / 2015 First Semester |
| **No. of Hours per week** | Lecture: 3 hours Tutorial: -- Total: 3 hours |
| **Course Coordinator** |  |
| **Course Instructor** |  |

1. **Course Contents and Lectures**

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| --- | --- |
| **Lecture / Week** | **Topic** |
| 1 | Atomic Bonding in solids - Elastic Crystals - Crystal lattice |
| 2 | Atomic Bonding in solids - Elastic Crystals - Crystal lattice |
| 3 | Atomic Bonding in solids - Elastic Crystals - Crystal lattice |
| 4 | Diffusion in solids - Free-electron theory in solids |
| 5 | Diffusion in solids - Free-electron theory in solids |
| 6 | Diffusion in solids - Free-electron theory in solids |
| 7 | State density - Effect of impurities |
| 8 | State density - Effect of impurities |
| 9 | State density - Effect of impurities |
| 10 | Types of electron emission - Boltzmann equation - electrical resistance |
| 11 | Types of electron emission - Boltzmann equation - electrical resistance |
| 12 | Types of electron emission - Boltzmann equation - electrical resistance |
| 13 | Types of electron emission - Boltzmann equation - electrical resistance |
| 14 | Types of electron emission - Boltzmann equation - electrical resistance |

1. **Assessment Details**

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| --- | --- | --- | --- |
| Methods of Assessment | Grading Mode | Weighting % | Outline Details |
| Assignments / Reports | 60 | 20% |  |
| Attendance |  |  |  |
| Oral Exam | 60 | 20% |  |
| Final Exam | 180 | 60% | Week 15: 3 hours |

1. **References**

**Course Notes:**

* Lecture material and training sheets.

**Recommended Books:**

* Out of the Crystal Maze. Chapters from the History of Solid State Physics, ed. Lillian Hoddeson, Ernest Braun, Jürgen Teichmann, Spencer Weart (Oxford: Oxford University Press, 1992).
* M. A. Omar, Elementary Solid State Physics (Revised Printing, Addison-Wesley, 1993).
* Neil W. Ashcroft and [N. David Mermin](http://en.wikipedia.org/wiki/N._David_Mermin), Solid State Physics (Harcourt: Orlando, 1976).
* [Charles Kittel](http://en.wikipedia.org/wiki/Charles_Kittel), Introduction to Solid State Physics (Wiley: New York, 2004).
* H. M. Rosenberg, The Solid State (Oxford University Press: Oxford, 1995).
* [Steven H. Simon](http://en.wikipedia.org/wiki/Steven_H._Simon), The Oxford Solid State Basics (Oxford University Press: Oxford, 2013).