

## **PHY9107: ADVANCED QUANTUM MECHANICS II 2(2-0)**

**1. Course Name:** Advanced Quantum Mechanics II

**2. Course Code:** PHY9107

**3. Credit Units:** 2

**4. Course Description:**

This course builds on the graduate course of Advanced Quantum Mechanics II. Conservation laws and particles in interacting fields are treated in a much more advanced manner.

**5. Course Objectives:**

At the end of the course, the students should be able to:

- Derive the Klein-Gordon and Dirac equations.
- Solve the Dirac equation for plane waves.
- Use Schwinger's action principle in conservation laws.
- Treat the Lagrangian field theory in a more advanced manner.

## 6. Course Outline:

Content	Hours
<b>Klein and Dirac equations:</b> Derivation; Properties of Dirac equations; Solution of the Dirac equation: plane waves.	15
<b>Lagrangian Field Theory:</b> Solutions of field equations (include Klein-Gordon)	15
<b>Schwinger's Action Principle:</b> Conservation laws (energy-momentum, angular momentum and charge).	10
Interacting fields.	5
<b>Total</b>	<b>45</b>

## 7. Mode of Delivery:

This course will consist mainly of lecture sessions.

## 8. References:

1. Griffiths, David J. Introduction to Quantum Mechanics. 2nd ed. Upper Saddle River, NJ: Pearson Prentice Hall, 2004. ISBN: 9780131118928. (Textbook)
2. Amit Goswami, Quantum Mechanics, Wm C. Brown Publishers (1992)
3. Gasiorowicz, Stephen. Quantum Physics. 3rd ed. Hoboken, NJ: Wiley, 2003. ISBN: 9780471057000.