AMITY UNIVERSITY
UTTAR PRADESH

FORMAT FOR COURSE CURRICULUM

Course Title: NANOSCALE TECHNOLOGY **Course Code:**
Credit Units:3

L	T	P/S	SW/FW	TOTAL CREDIT UNITS
3		-	-	3

Course Objectives: Understanding the theories of the modeling for bottom-up nucleation for nanomaterials, quantum structures, quantum computation & some specific techniques of analysis

Pre-requisites: Knowledge of basic quantum mechanics and Properties of materials

Student Learning Outcomes:
The students will understand the different methods of synthesis and fabrication of nanostructures. They will be able to know the theories of the modeling for bottom-up nucleation for nano-materials. They will be able to understand the role of quantum confinement in nanomaterials based devices. They will learn the principle and working of nanomaterial based phovovoltaic cell, fundamentals of Quantum computation and techniques of analysis.

Course Contents/Syllabus:

	Weightage
Module I Nanoscale Technology:	**20**
Descriptors/Topics Theories and modeling of nucleation - particle growth in solids, liquid & vapour states, and at interfaces, Fabrication of Nanocrystalline Structures, Synthesis of nanoparticles by precipitation and sol-gel techniques, Growth of nano thin films	
Module II Quantum Structures :	**20**
Descriptors/Topics 1D, 2D and 3D confinement, Quantum layers, wells, dots and wires, Quantum Nanoelectronics and optical devices	
Module III Solar Cell, Conducting glass plate :	**20**

Descriptors/Topics Solar Photovoltaic Cell, Nanomaterials based Solar Cell, Principle & fabrication of conducting glass plates, Micropower sources.	
Module IV Quantum computation :	**30**
Descriptors/Topics Concept of quantum computation, Quntum bit, Properties of qubit, No cloning theorem, Quantum gate operators, entanglement, 1 & 2 qubit comutations	

Pedagogy for Course Delivery:
The class will be taught using theory and experimental based examples. In addition to this, the student will be exposed to new research frontiers related to the topic.

Lab/ Practicals details, if applicable: No

List of Experiments:

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Assessment/ Examination Scheme:

Theory L/T (%)	Lab/Practical/Studio (%)	End Term Examination
	NA	

Theory Assessment (L&T):

Continuous Assessment/Internal Assessment					End Term Examination
Components (Drop down)	**Assignment**	**Class test**	**Quiz/viva/seminar**	**Attendance**	**Theory**
Weightage (%)	5	15	5	5	70

Lab/ Practical/ Studio Assessment:

	Continuous Assessment/Internal Assessment				End Term Examination		
Components (Drop down							
Weightage (%)							

Text & References:

- Nielsen M.A., Chuang I.L. Quantum computation and quantum information- ex. Solutions
- Nano Electronics and Information Technology: Rainer Waser
- Nanoelectronics & Nanosystems: From Transistor to Molecular & Quantum Devices: Karl Goser, Peter Glosekotter, Jan Dienstuhl., Springer, 2004
- Nanotechnology: basic science and emerging technologies – Mick Wilson, Kamali Kannangara, Geoff Smith, Michelle Simmons, Burkhard Raguse, Overseas Press (2005)

Any other Study Material:

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Remarks and Suggestions:

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Date: Name, Designation, Organisation