BOARD OF STUDIES MEETING–2022-23

K.S.R.M COLLEGE OF ENGINEERING

AUTONOMOUS

Minutes of the Meeting

Date	**12.06.2023**	**Day**	**Monday**
Time	**12.30 PM**	**Venue**	**Online mode**
Dept./SS	**Humanities and Sciences (Physics)**	**Convener**	Sri.Y.Ramana Reddy

Members Present: 11

Members Absent: 00

S. No	Name	Designation	Signature	S. No	Name	Designation
1.	Dr.I. Sreevani	Professor., HOD, Dept. of H&S, KSRMCE				
2.	Prof.R.Padma Suvarna	Professor of Physics, JNTUA-Ananatapuramu.	Online			
3.	Prof.K.Thyagarajan	Professor, Dept. of H&S, HOD,JNTUA,Pulivendula.	online			
4.	Prof.K.Venugopal Reddy	Professor, Dept. of Physics, HOD, NIT, Warangal.	Online			
5.	Prof.Y.P.Venkata Subbaiah	Professor, Department of Physics, YVU, Kadapa.	online			
6.	Sri.Y.Ramana Reddy	Assistant Professor, Department of H&S, K.S.R.M.C.E, Kadapa.				
7.	Sri.D.Mallikarjuna Reddy	Assistant Professor, Department of H&S, K.S.R.M.C.E, Kadapa..				
8.	Smt.S.Moulika	Assistant Professor, Department of H&S, K.S.R.M.C.E, Kadapa..				
9	Sri.R.Jaya Prakash Reddy	Industry, New Space Research &Technology pvt ltd, Design Engineer-2, Bangalore.	online			
10.	Sri.Dasari Gangi Reddy	Alumini, Vibry Business Solution, Hyderabad.	online			

Dr.I.Sreevani, HOD, H&S, welcomed all the members to the meeting and presented the agenda of the meeting.

The resolutions are:

S.No	To do item	Discussion	Resolution	Coordinator /in-charge
1	Overview of R-20 regulations.	The Board of Chairman has presented the syllabus of R-20 regulations and discussed with upcoming regulations.	The members have expressed their satisfaction for the implementation of the subjects to the various branches at various semesters	Sri.Y.Ramana Reddy
2	To revise the syllabus of Open elective subjects for R20 Regulations.	The Board of Chairman has presented the revised open elective syllabus after taking the feedback from all stakeholders and comparing with premier institute syllabus & Convener explained the syllabus briefly.	The committee members have discussed the open elective syllabus for R20 Regulations. above subjects at Length and agreed for the continuation of the subjects under R20 with 20% modification in the existing syllabus.	Sri.Y.Ramana Reddy

The Head of the Department have proposed the Vote of thanks and concluded the meeting.

Convener

HOD-H&S

Dr. I. SREEVANI M.Sc., Ph.D
Professor & HOD
Dept.of Humanities & sciences
K.S.R.M. College of Engineering
KADAPA Dist.

Course Title	ENGINEERING MATERIALS				B. Tech. (Open elective-I)		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
20OE607	Open Elective	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	40	60	100
Mid Exam Duration: 90 Min					End Exam Duration: 3Hrs		

Course Objectives:

1.This introductory course is aimed to obtain basic exposure to the concepts of crystalline solids, its imperfections and basics of various advance engineering materials finding wide spread application in several industries.

2.Describe the process that is used to produce glass-ceramics.

3.To enlighten the periodic arrangement of atoms in crystals to provide fundamentals related to structural analysis through powder diffraction method.

4.Understanding these material systems are vital for investigating the defects and their nature on these classes of materials.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	**Classify** various crystal systems.
CO 2	**Explain** the applications of magnetic materials.
CO 3	**Analyze** the various metallurgical factors influencing the performance of materials for different Structural engineering applications.
CO 4	**Interpret** Lorentz field and Claussius-Mosotti relation in dielectrics.
CO 5	**Identify** applications of semiconductors in electronic devices.

Unit –I: Structure of Metals

Introduction-Different types of bonding in solids – Space lattice, Basis, unit cell and lattice parameters – Bravais Lattice – Crystal systems – Packing fraction – Coordination number – Packing fraction of SC, BCC -Gibbs phase rule and equilibrium diagram -applications.

Unit– II: Magnetic Materials

Introduction to magnetic materials - Classification of magnetic materials: Dia, Para & Ferro – Domain concept of Ferromagnetism (Qualitative) – Hysteresis loop– Soft and Hard magnetic materials-- applications.

Unit– III: Ceramics

Introduction-Types and applications of ceramics- Glasses -Ceramics - Clay Products - Refractories - Abrasives Cements - Advanced Ceramics - Materials of Importance—Piezoelectric Ceramics-applications.

Unit –IV: Dielectric Materials

Introduction to Dielectrics-Electric polarization- Dielectric polarizability, Susceptibility and Dielectric Constant-Types of polarizations (Qualitative)–Frequency dependence of polarization-Lorentz(internal) field- Claussius-Mossotti equation- Applications of Dielectrics.

Unit –V: Electrical Properties of materials

Introduction- Electrical conduction: Ohm's Law - Electrical Conductivity- Electronic and Ionic Conduction - Energy Band Structures in Solids--applications.

Introduction to **Semiconductivity** - Intrinsic Semiconductor - Extrinsic Semiconductor - Temperature Dependence of Carrier Concentration - Hall Effect and Hall coefficient – Applications.

Text Books:

1. Callister's Materials Science and Engineering: Wiley, Second Edition, (2018)
2. V. Raghavan, Materials Science and Engineering, Prentice Hall of India, 5th edition (2013).
3. G.E. Dieter, Mechanical Metallurgy, Mc-Graw Hill, 3rd edition (2013).

Reference Books:

1. L. H. Van Vlack, Elements of Materials Science and Engineering, Addison Wesley, 6th edition (1989).
2. I. J. Polmear, Light Alloys: Metallurgy of the Light Metals, Wiley, 3rd edition (1995).
3. V. Raghavan, Physical Metallurgy: Principles and Practice, PHI Learning Private Limited, 2nd edition (2006).

HOD H&S

Dr. I. SREEVANI M.Sc., Ph.D
Professor & HOD
Dept.of Humanities & sciences
K.S.R.M. College of Engineering
KADAPA Dist.

Course Title	BASICS OF ELECTRICAL, MAGNETIC AND OPTOELECTRONIC MATERIALS				B. Tech. (Open elective-II)		
Course Code	Category	Hours/Week			Credits	Maximum Marks	
20OE608	Open Elective	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	40	60	100
Mid Exam Duration: 90 Min					End Exam Duration: 3Hrs		

Course Objectives:

1. Students will be able to understand the fundamental concepts and applications of electrical, magnetic and optical properties of materials.
2. Apply a multi-disciplinary approach to plan, design, identify and address future needs of all the conventional and novel materials utilizing their properties for the society.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	**Obtain** knowledge about the electrical, magnetic and optoelectronic materials, their properties and applications
CO 2	Successfully **apply** advanced concepts of materials engineering for the design, development and analysis of materials and devices.
CO 3	**Develop** novel materials from the fundamental understanding of materials and apply them to societal needs.
CO 4	**Analyze** the properties of superconductors.
CO 5	**Identifies** the Engineering applications of electrical, magnetic and optoelectronic materials.

Unit – I: Electrical Materials

Introduction -basic definitions- electrical conduction–Dielectric constant -$BaTiO_3$– dielectric loss-dielectric breakdown-piezoelectricity and pyroelectricity-Applications.

Unit – II: Magnetic Materials

Introduction –basic definitions- dia, para, ferro, antiferro and ferri magnetism-properties –Hysteresis loop–hard and soft magnetic materials-Giant Magneto Resistance -applications.

Unit – III: Semiconducting Materials

Introduction –basic definitions-semiconducting materials –concept of doping – simple and compound semiconductors – working principle of p-n junction diode, LED, Photo diode– solar cell – applications.

Unit – IV: Superconducting

Introduction –definition of superconductors-Properties of superconductors-Critical magnetic field - Meissner effect-Type-1 &Type-II superconductors –BCS theory- high critical temperature (T_c)-applications.

Unit – V: Optoelectronic Materials

Introduction to Laser Principles – Ruby laser- CO_2 laser – applications of optoelectronic materials – introduction to optical fibers – light propagation –Fiber optic sensors -Optical storage materials-LCD materials - applications.

Text Books:

1. C. Kittel, Introduction to Solid State Physics, John Wiley and Sons, 7th edition,New Delhi, (2004).
2. Engineering Physics – K. Thyagarajan, McGraw Hill Publishers
3. Engineering Physics – Dr. M.N. Avadhanulu & Dr. P.G. Kshirsagar, S. Chand and Company

Reference Books:

1. V. Raghavan, Materials Science and Engineering, Prentice Hall of India, 5th edition, New Delhi, (2013).
2. B. G. Yacobi, Semiconductor Materials: An Introduction to Basic Principles, Springer, 1st edition, New York, (2013).
3. S. Kasap and P. Capper (eds.), Handbook of Electronic and Photonic Materials, Springer, New York, (2007).

HOD-H&S

Dr. I. SREEVANI M.Sc., Ph.D
Professor & HOD
Dept.of Humanities & sciences
K.S.R.M. College of Engineering
KADAPA Dist.

Course Title	PHYSICS OF RENEWABLE ENERGY					B. Tech. (Open elective-III)		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
20OE613	Open Elective	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	40	60	100
Mid Exam Duration: 90 Min					End Exam Duration: 3Hrs			

Course Objectives:

1. A top priority for developing renewable energy in India is to boost the economy, encourage the development of energy security, and reduce carbon emissions.

2. Promote sustainable development and promote economic integration.

3. Ensure that any energy sector products that come into use do so with minimal impact on the environment.

4. Take every step to ensure that energy generation, conversion, and use are cost-competitive.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	**Understand** the energy resources.
CO 2	**Apply** the Solar energy.
CO 3	Gain **knowledge** about wind turbines.
CO 4	**Explain** about Underground heat – Micro hydro plants.
CO 5	**Classify** the different types of energy resources.

UNIT I: Bio diversity conception individuals

Introduction to renewable energy– Biogas cogeneration – Wood as a source of energy – Energy crops – Bio diesel – Fuel from plantation – Ethanol – Synthesis fuels -applications.

UNIT II: Solar Energy

Solar thermal: Introduction-Solar collectors – Hot water from Sun – Cooling with the Sun – Solar drying – Air collectors – Solar thermal power plants-applications.

Solar electric: Introduction-Photo voltaic effect –heart of a PV array –solar cell – Grid connected PV arrays – Off grid PV arrays – Solar energy as part of sustainable development-applications.

UNIT III: Wind Energy

Introduction- Power in the wind- Aerodynamics principles of wind turbines – Power available in the wind – Rotor efficiency – Factors affecting wind power – Impact of tower height – Wind turbines sitting – Idealized wind turbine – Power curve – Speed control for maximum power-applications.

UNIT IV: Hydro Energy

Introduction-Water power – Ocean wave and tidal energies – Hydro power nature conservation – Underground heat – Micro hydro plants-applications.

UNIT V: Geothermal Energy

Introduction-Geothermal Resource -Mining Thermal Energy From a Hot Dry Rock-Geothermal Heat Pumps-Active Volcanoes- Plate Tectonics- "Ring of Fire"-applications.

Text books:

1. Hand book of renewable energy technology -A.F.Zobba and R.Bansal, World scientific publications.
2. Renewable energy: The facts - Dieter Scirfried and Walter Witzel. Earth scan publications for sustainable future.

Reference books:

3. http://www.law.du.edu/index.php/the-renewable-energy-reader/6-geothermal.

HOD-H&S

Dr. I. SREEVANI M.Sc., Ph.D
Professor & HOD
Dept.of Humanities & sciences
K.S.R.M. College of Engineering
KADAPA Dist.

Course Title	FUNDAMENTALS OF QUANTUM COMPUTATION AND NANO PHOTONICS					B. Tech. (Open elective-IV)		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
20OE618	Open Elective	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	40	60	100
Mid Exam Duration: 90 Min						End Exam Duration: 3Hrs		

COURSE OBJECTIVES:

1. This course outlines physically the intuitive concepts of quantum computation and nanophotonics using the concept of optical near-fields.
2. Physics of information processing; quantum error correction; quantum communication, Optical near-field is an electromagnetic field that mediates the interaction between nanometric materials used for the realization of novel photonic devices, fabrication techniques, and systems.
3. Prior knowledge of quantum mechanics and photonics is helpful.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	**Explain** the concepts of Quantum mechanics.
CO 2	**Understanding** the basic concepts of quantum computation.
CO 3	**Identify** the different implementations of quantum computers.
CO 4	**Analyze** the nanophotonics and its true nature
CO 5	**Classify** the Interconnections for nanophotonics

UNIT –I: Quantum Mechanics

Introduction to Matter Waves - de Broglie Hypothesis - Heisenberg Uncertainty Principle - Schrodinger's time independent wave equation - Significance of wave function -applications.

UNIT –II: Quantum Computing

Introduction-Basic concepts of quantum mechanics-Quantum kinematics, quantum dynamics-quantum measurements – Stern - Gerlach Experiment - Qubits – Measurements – Gates - Quantum no-cloning and Teleportation-applications.

UNIT -III: Error Correction and Implementations

Introduction -Quantum Error-Correction - three-qubit bit flip code - five-qubit code - General properties of quantum error-correction- applications..

Introduction - First Experimental Implementations - Quantum optics implementations -NMR quantum information processing- applications.

UNIT -IV: Nanophotonics

Introduction -Photons and Electrons: Similarities and Differences - Confinement – Propagation-free space, Forbidden Zone: Tunneling- applications.

UNIT – V: Nanophotonic systems

Introduction -Nanotechnology- Photonics - Nanophotonics - Optical Nanomaterials - Nanoparticle Coatings - Sunscreen Nanoparticles - Self-Cleaning Glass - Fluorescent Quantum Dots – Nanobarcodes- applications..

Text Books:

1. Quantum Computing Basics and Concepts by S. M. Girvin - arXiv , 2013
2. Principles of Nanophotonics by Motoichi Ohtsu, Kiyoshi Kobayashi, Tadashi Kawazoe, Takashi Yatsui and Makoto Naru -New York, USA: CRC Press-Taylor & Francis Group, 2008.
3. Paras. N. Prasad, Nanophotonics. New Jersey, USA:John Wiley & Sons Inc.,2004

Reference Books:

1. Quantum Computing by John Watrous - University of Calgary , 2006
2. Basic Concepts in Quantum Computing by Artur Ekert, Patrick Hayden, Hitoshi Inamori – ar Xiv , 2000
3. An Introduction to Quantum Computing for Non-Physicists" Eleanor Rieffel FX Palo Alto Labratory and Wolfgang Polak Consultant FX Palo Alto Laboratory.

HOD-H&S

Dr. I. SREEVANI M.Sc., Ph.D
Professor & HOD
Dept.of Humanities & sciences
K.S.R.M. College of Engineering
KADAPA Dist.

Course Title	ENGINEERING MATERIALS				B. Tech. OPEN ELECTIVE- 1			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
180E2602	BSC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2Hrs					End Exam Duration: 3Hrs			

COURSE OBJECTIVES:

1.This introductory course is aimed to obtain basic exposure to the concepts of crystalline solids, its imperfections and basics of various advance engineering materials finding wide spread application in several industries.

2.Describe the process that is used to produce glass-ceramics.

3.To enlighten the periodic arrangement of atoms in crystals to provide fundamentals related to structural analysis through powder diffraction method.

4.Understanding these material systems are vital for investigating the defects and their nature on these classes of materials.

Course Outcomes: Upon completion of the course, the student will be able to:	
CO1	**Classify** various crystal systems.
CO2	**Explain** the applications of magnetic materials.
CO3	**Analyze** the various metallurgical factors influencing the performance of materials for different Structural engineering applications.
CO4	**Interpret** Lorentz field and Claussius-Mosotti relation in dielectrics.
CO5	**Identify** applications of semiconductors in electronic devices .

Unit –I: Structure of Metals

Introduction-Different types of bonding in solids – Space lattice, Basis, unit cell and lattice parameters – Bravais Lattice – Crystal systems – Packing fraction – Coordination number – Packing fraction of SC, BCC .

Unit– II: Magnetic Materials

Introduction to magnetic materials - Classification of magnetic materials: Dia, Para & Ferro – Domain concept of Ferromagnetism (Qualitative) – Hysteresis loop– Soft and Hard magnetic materials.

Unit– III: Ceramics

Introduction-Types and applications of ceramics- Glasses - Glass-Ceramics - Clay Products - Refractories - Abrasives Cements - Advanced Ceramics - Materials of Importance—Piezoelectric Ceramics

Unit –IV: Dielectric Materials

Introduction to Dielectrics-Electric polarization- Dielectric polarizability, Susceptibility and Dielectric constant-Types of polarizations(Qualitative)–Frequency dependence of polarization-Lorentz(internal) field- Classius-Mosotti equation- Applications of Dielectrics.

Unit –V: Electrical Properties of materials

Electrical conduction: - Ohm's Law - Electrical Conductivity- Electronic and Ionic Conduction - Energy Band Structures in Solids.

Semiconductivity: - Intrinsic Semiconductor - Extrinsic Semiconductor - The Temperature Dependence of Carrier Concentration - Hall Effect - Applications

Text Books:

1. Callister's Materials Science and Engineering: Wiley, Second Edition, (2018)
2. V. Raghavan, Materials Science and Engineering, Prentice Hall of India, 5th edition (2013).
3. G.E. Dieter, Mechanical Metallurgy, Mc-Graw Hill, 3rd edition (2013).

Reference Books:

1. L. H. Van Vlack, Elements of Materials Science and Engineering, Addison Wesley, 6th edition (1989).
2. I. J. Polmear, Light Alloys: Metallurgy of the Light Metals, Wiley, 3rd edition (1995).
3. V. Raghavan, Physical Metallurgy: Principles and Practice, PHI Learning Private Limited, 2nd edition (2006).

HOD-H&S

Dr. I. SREEVANI M.Sc.,Ph.D
Head of Humanities & Sciences
K.S.R.M. College of Engineering
KADAPA - 516 005

Course Title	BASICS OF ELECTRICAL,MAGNETIC AND OPTOELECTRONIC MATERIALS					B. Tech. OPEN ELECTIVE- 2		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
180E2607	BSC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2Hrs					End Exam Duration: 3Hrs			

COURSE OBJECTIVES:

1. Students will be able to understand the fundamental concepts and applications of electrical, magnetic and optical properties of materials.
2. Apply a multi-disciplinary approach to plan, design, identify and address future needs of all the conventional and novel materials utilizing their properties for the society.

COURSE OUTCOMES: Upon completion of this course, the student will be able to:

CO1	**Obtain** knowledge about the electrical, magnetic and optoelectronic materials, their properties and applications
CO2	Successfully **apply** advanced concepts of materials engineering for the design, development and analysis of materials and devices.
CO3	**Develop** novel materials from the fundamental understanding of materials and apply them to societal needs.
CO4	**Analyze** the properties of superconductors.
CO5	**Identifies** the Engineering applications of electrical, magnetic and optoelectronic materials.

Unit – I: Electrical Materials

Introduction to electrical conduction–Dielectric constants – dielectric loss, dielectric breakdown, piezoelectricity and pyroelectricity.

Unit – II: Magnetic Materials

Introduction to dia, para, ferro, antiferro and ferri magnetism –Hysteresis loop–hard and soft magnetic materials- applications

Unit – III: Semiconducting Materials

Introduction to semiconducting materials – concept of doping – working principle of p-n junction diode, LED, Photo diode– solar cell – applications.

Unit – IV: Superconducting

Introduction to superconductors-Properties-Meissner effect-Type-1 &Ttype-II superconductors –BCS theory- high critical temperature (Tc)-applications.

Unit – V: Optoelectronic Materials

Introduction to Laser Principles – ruby, CO_2 lasers – applications of optoelectronic materials – introduction to optical fibers – light propagation –Fiber optic sensors- applications.

Text Books:

1. C. Kittel, Introduction to Solid State Physics, John Wiley and Sons, 7th edition,New Delhi, (2004).
2. Engineering Physics – K. Thyagarajan, McGraw Hill Publishers
3. Engineering Physics – Dr. M.N. Avadhanulu & Dr. P.G. Kshirsagar, S. Chand and Company

Reference Books:

1. V. Raghavan, Materials Science and Engineering, Prentice Hall of India, 5th edition, New Delhi, (2013).
2. B. G. Yacobi, Semiconductor Materials: An Introduction to Basic Principles, Springer, 1st edition, New York, (2013).
3. S. Kasap and P. Capper (eds.), Handbook of Electronic and Photonic Materials, Springer, New York, (2007).

Faculty Incharge

HOD-H&S

Dr. I. SREEVANI M.Sc.,Ph.D
Head of Humanities & Sciences
K.S.R.M. College of Engineering
KADAPA - 516 005

Course Title	PHYSICS OF RENEWABLE ENERGY				B. Tech. OPEN ELECTIVE – 3			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
180E2612	BSC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2Hrs					End Exam Duration: 3Hrs			

COURSE OBJECTIVES:

1. A top priority for developing renewable energy in India is to boost the economy, encourage the development of energy security, and reduce carbon emissions.

2. Promote sustainable development and promote economic integration.

3. Ensure that any energy sector products that come into use do so with minimal impact on the environment.

4. Take every step to ensure that energy generation, conversion, and use are cost-competitive.

COURSE OUTCOMES: Upon completion of the course, the student will be able to:

CO1	**Understand** the energy resources.
CO2	**Apply** the Solar energy.
CO3	Gain **knowledge** about wind turbines.
CO4	**Explain** about Underground heat – Micro hydro plants.
CO5	**Classify** the different types of energy resources.

UNIT I: Bio diversity conception individuals

Introduction to renewable energy– Biogas cogeneration – Wood as a source of energy – Energy crops – Bio diesel – Fuel from plantation – Ethanol – Synthesis fuels.

UNIT II: Solar energy

Solar thermal: Solar collectors – Hot water from Sun – Cooling with the Sun – Solar drying – Air collectors – Solar thermal power plants.

Solar electric: Photo voltaic effect – The heart of a PV array – The solar cell – Solar energy as part of sustainable development.

UNIT III: Wind Energy

Power in the wind: Aerodynamics principles of wind turbines – Power available in the wind – Rotor efficiency – Factors affecting wind power – Impact of tower height – Wind turbines sitting – Idealized wind turbine – Power curve – Speed control for maximum power.

UNIT IV: Hydro-Energy

Introduction -Water power – Ocean wave and tidal energies – Hydro power nature conservation – Underground heat – Micro hydro plants.

UNIT V: Geothermal Energy

Introduction-Geothermal Resource -Mining Thermal Energy From a Hot Dry Rock-Geothermal Heat Pumps-Active Volcanoes, Plate Tectonics, and the "Ring of Fire".

Text books:

1. Hand book of renewable energy technology -A.F.Zobba and R.Bansal, World scientific publications.
2. Renewable energy: The facts - Dieter Scirfried and Walter Witzel. Earth scan publications for sustainable future.

Reference books:

3. http://www.law.du.edu/index.php/the-renewable-energy-reader/6-geothermal

HOD-H&S
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Head of Humanities & Sciences
K.S.R.M. College of Engineering
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Course Title	FUNDAMENTALS OF QUANTUM COMPUTATION AND NANO PHOTONICS				B. Tech. OPEN ELECTIVE - 4			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
180E2607	BSC	L	T	P	C	Continuous Internal Assessment	End Exams	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2Hrs					End Exam Duration: 3Hrs			

COURSE OBJECTIVES:

1. This course outlines physically the intuitive concepts of quantum computation and nanophotonics using the concept of optical near-fields.
2. Physics of information processing; quantum error correction; quantum communication, Optical near-field is an electromagnetic field that mediates the interaction between nanometric materials used for the realization of novel photonic devices, fabrication techniques, and systems.
3. Prior knowledge of quantum mechanics and photonics is helpful.

Course Outcomes: Upon completion of the course, the student will be able to:

CO1	**Explain** the concepts of Quantum mechanics.
CO2	**Understanding** the basic concepts of quantum computation.
CO3	**Identify** the different implementations of quantum computers.
CO4	**Analyze** the nanophotonics and its true nature
CO5	**Classify** the Interconnections for nanophotonics

UNIT –I: Quantum Mechanics

Introduction to Matter Waves - de Broglie Hypothesis - Heisenberg Uncertainty Principle - Schrodinger's time independent wave equation - Significance of wave function.

UNIT –II: Quantum Computing

Basic concepts of quantum mechanics – Stern - Gerlach Experiment - Qubits – Measurements – Gates - Quantum no-cloning and Teleportation.

UNIT -III: Error Correction and Implementations

Quantum Error-Correction - three-qubit bit flip code - five-qubit code - General properties of quantum error-correction.
First Experimental Implementations - Quantum optics implementations -NMR quantum information processing.

UNIT -IV: Nanophotonics

Photons and Electrons: Similarities and Differences - Confinement – Propagation-free space, Forbidden Zone: Tunneling.

UNIT – V: Nanophotonic systems

Nanotechnology- Photonics - Nanophotonics - Optical Nanomaterials - Nanoparticle Coatings - Sunscreen Nanoparticles - Self-Cleaning Glass - Fluorescent Quantum Dots – Nanobarcodes.

Text Books:

1. Quantum Computing Basics and Concepts by S. M. Girvin - arXiv , 2013
2. *Principles of Nanophotonics by* Motoichi Ohtsu, Kiyoshi Kobayashi, Tadashi Kawazoe, Takashi Yatsui and Makoto Naru -New York, USA: CRC Press-Taylor & Francis Group, 2008.
3. Paras. N. Prasad, Nanophotonics. New Jersey, USA:John Wiley & Sons Inc.,2004

Reference Books:

1. Quantum Computing by John Watrous - University of Calgary , 2006
2. Basic Concepts in Quantum Computing by Artur Ekert, Patrick Hayden, Hitoshi Inamori – ar Xiv , 2000
3. An Introduction to Quantum Computing for Non-Physicists" Eleanor Rieffel FX Palo Alto Labratory and Wolfgang Polak Consultant FX Palo Alto Laboratory.

HOD-H&S
Dr. I. SREEVANI M.Sc.,Ph.D.
Head of Humanities & Sciences
K.S.R.M. College of Engineering
KADAPA - 516 005


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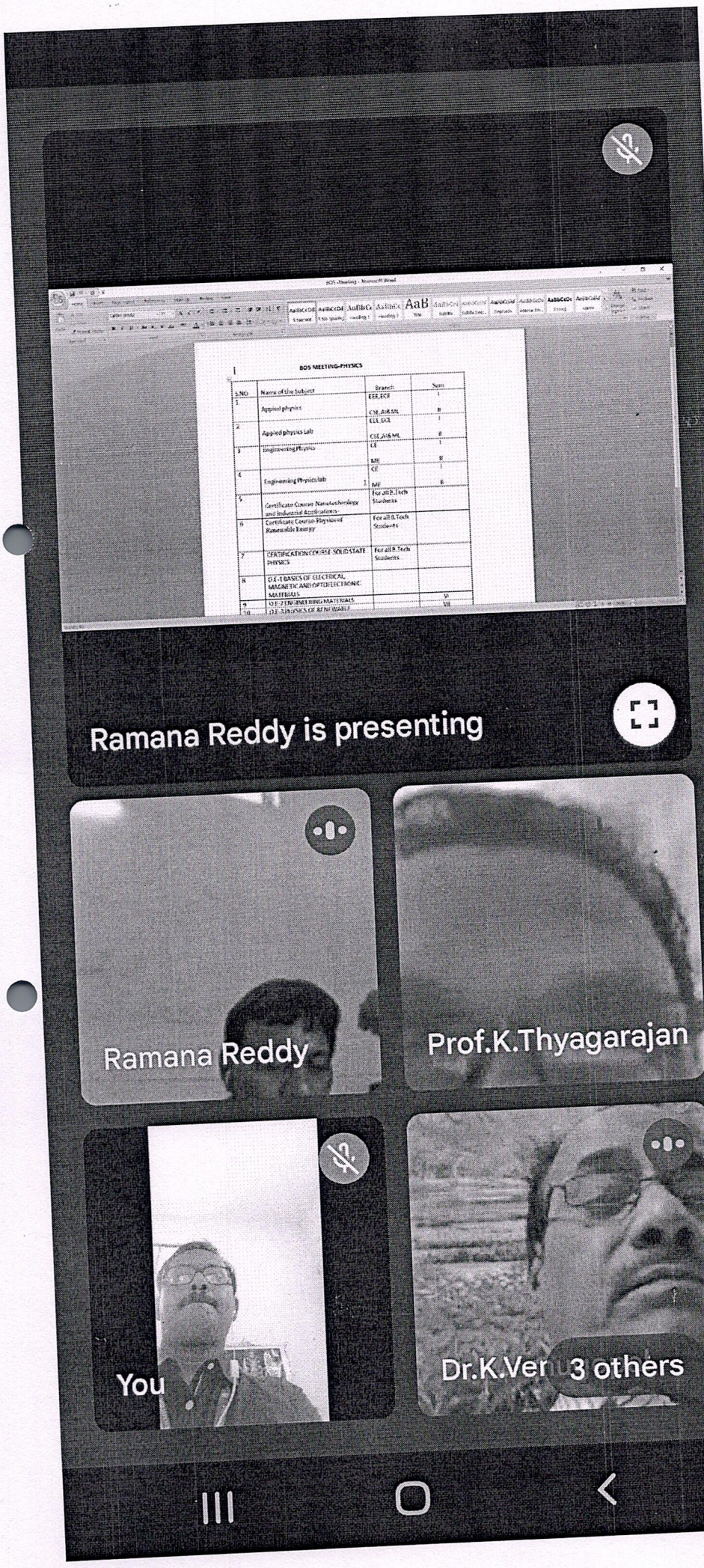
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Certificate Course Nanotechnology and Industrial Applications
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Certificate Course-Physics of Renewable Energy
For all B.Tech Students
CERTIFICATION COURSE-SOLID STATE PHYSICS
For all B.Tech Students
OE-1 BASICS OF ELECTRICAL, MAGNETIC AND OPTOELECTRONIC MATERIALS
VI
OE-2 ENGINEERING MATERIALS
VII
Ramana Reddy is presenting
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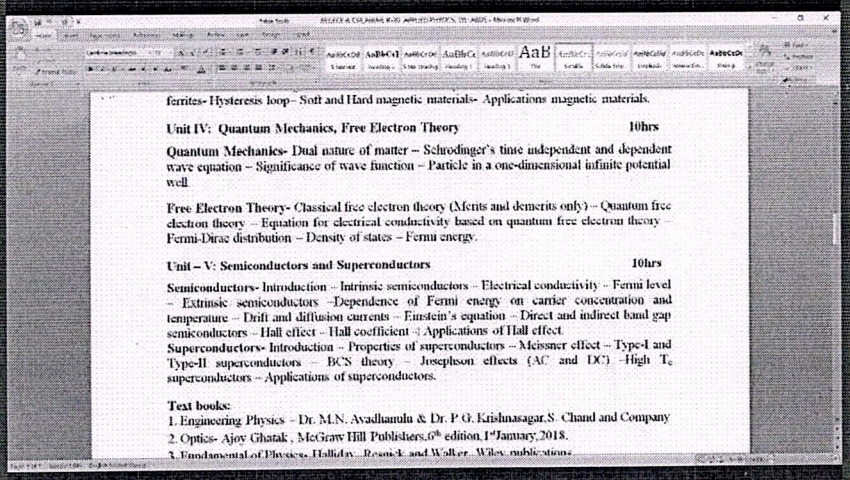


ferrites- Hysteresis loop– Soft and Hard magnetic materials- Applications magnetic materials.

Unit IV: Quantum Mechanics, Free Electron Theory **10hrs**

Quantum Mechanics- Dual nature of matter – Schrodinger's time independent and dependent wave equation – Significance of wave function – Particle in a one-dimensional infinite potential well.

Free Electron Theory- Classical free electron theory (Merits and demerits only) – Quantum free electron theory – Equation for electrical conductivity based on quantum free electron theory – Fermi-Dirac distribution – Density of states – Fermi energy.

Unit – V: Semiconductors and Superconductors **10hrs**

Semiconductors- Introduction – Intrinsic semiconductors – Electrical conductivity – Fermi level – Extrinsic semiconductors –Dependence of Fermi energy on carrier concentration and temperature – Drift and diffusion currents – Einstein's equation – Direct and indirect band gap semiconductors – Hall effect – Hall coefficient – Applications of Hall effect.

Superconductors- Introduction – Properties of superconductors – Meissner effect – Type-I and Type-II superconductors – BCS theory – Josephson effects (AC and DC) –High T_c superconductors – Applications of superconductors.

Text books:

1. Engineering Physics – Dr. M.N. Avadhanulu & Dr. P.G. Krishnasagar,S. Chand and Company
2. Optics- Ajoy Ghatak , McGraw Hill Publishers,6th edition,1st January,2018.
3. Fundamental of Physics, Halliday, Resnick and Walker, Wiley publications

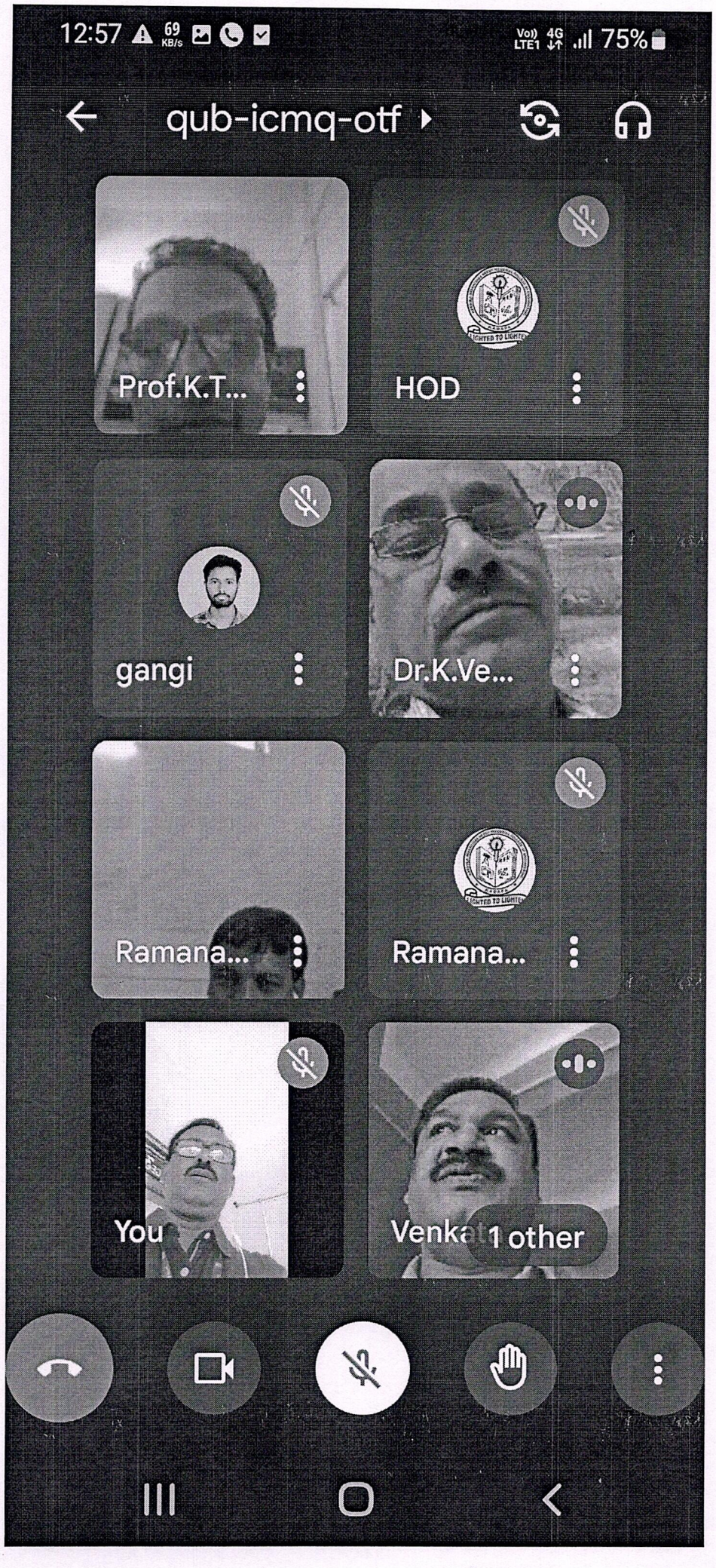
Ramana Reddy is presenting

Ramana Reddy

HOD

You

Dr.K.Ver 3 others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KSRM COLLEGE OF ENGINEERING
IDEAS TO INNOVATIONS
ESTD 1980

Ramana Reddy Y <ramanareddy@ksrmce.ac.in>

Re: BOS MEETING-PHYSICS-Reg.

Venugopal Reddy Krishnareddy <drkvgreddy@gmail.com>
To: Ramana Reddy Y <ramanareddy@ksrmce.ac.in>
Thu, Jun 22, 2023 at 8:37 AM

Dear Ramana Reddy

Received your mail regarding BOS meeting in Physcis and syllabus. I have gone through the theory and laboratory syllabus. As a BOS member I approved the syllabus.
Professor K. Venu Gopal Reddy
NIT,Warangal

Sent from my iPhone

> On Jun 12, 2023, at 12:26 PM, Dr.K.Venugopal Reddy <drkvgreddy@gmail.com> wrote:
>
> Thanks, I have received it.
>
> On Mon, Jun 12, 2023 at 12:21 PM Ramana Reddy Y <ramanareddy@ksrmce.ac.in> wrote:
> > GOOD MORNING SIR.PLS,FIND THE ATTACHMENT FILE SIR.
> > THANKYOU SIR.

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ESTD 1980

Ramana Reddy Y <ramanareddy@ksrmce.ac.in>

BOS MEETING-PHYSICS-Reg.

Subbaiah <subbaiahy@gmail.com>
To: Ramana Reddy Y <ramanareddy@ksrmce.ac.in>

Wed, Jun 14, 2023 at 1:03 PM

Dear Ramana Reddy,

The curriculum, syllabi and list of laboratories experiment for three certification courses, four open elective papers and R-20 Engg. Physics and R-20 Applied Physics are hereby approved.

Regards
Prof. Subbaiah

Dr. Y.P. Venkata Subbaiah
MSc. (Tech.); Ph.D
Associate Professor & Raman Fellow
Department of Physics
Yogi Vemana University
Kadapa - 516 005, A.P.
INDIA.
Ph. +91-8562-225403 (O)

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ESTD 1980

Ramana Reddy Y <ramanareddy@ksrmce.ac.in>

BOS MEETING-PHYSICS-Reg.

Dr.R.Padma Suvarna <padma.physics@jntua.ac.in> Thu, Jun 15, 2023 at 3:29 PM
To: Ramana Reddy Y <ramanareddy@ksrmce.ac.in>

Herewith I am approving the syllabus.
[Quoted text hidden]
--
Dr.R.Padma Suvarna
Professor
Department of Physics
JNTUA COLLEGE OF ENGINEERING
ANANTAPURAMU
Andhra Pradesh (India)