

## **EMPOWERING THOUGH RESEARCH**

M.Sc., Ph.D. and Diploma Programmes

Centre for Interdisciplinary Research

**D. Y. Patil Education Society,  
Institution Deemed to be University, Kolhapur**

(Deemed to be University Declared u/s 3 of the UGC Act 1956 vide  
Notification No. F.9-26/2004-U.3 dt. 01-09-2005 of the GOI)

# **PROSPECTUS 2019-20**



from left: **1)** Prof. Weng Peng Ping (Taiwan)      **5)** Prof. Devanand B. Shinde  
**2)** Prof. J. H. Kim (South Korea)      **6)** Prof. P. B. Behere  
**3)** Prof. J. J. Shim (South Korea)      **7)** Prof. C. D. Lokhande  
**4)** Rudolf Houlaz (Germany)



from left: **1)** Dr. V. V. Bhosale      **4)** Dr. P. V. Diwan  
**2)** Prof. C. D. Lokhande      **5)** Prof. S. H. Pawar  
**3)** Prof. P. B. Behere

## CENTRE FOR INTERDISCIPLINARY RESEARCH

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## Empowering through Research

### 1. PREAMBLE

In order to undertake the frontier level research in the field of Medical Science, the “**Centre For Interdisciplinary Research**” has been established at D. Y. Patil Education Society, Deemed to be University, Kolhapur. There are at present 71 research scholars. The Centre offers Interdisciplinary Science Research programs leading to Medical research and the Ph. D. awards. To fill up the gap between under graduate and Ph.D. programme, the University has started post graduate programmes, M. Sc. Medical Physics, M.Sc. Applied Physics and M.Sc. Stem Cells & Regenerative Medicine, M.Sc. Medical Biotechnology, M.Sc. Anatomy and M.Sc. Medical Biochemistry. The Centre has organized number of National and International conferences & workshops since its establishment. The Objects of the Centre are:

1. To make higher education more useful to society by organizing training and research programmes to produce skilled and knowledgeable manpower in the field of interdisciplinary studies with special emphasis on Medical Technology.
2. To develop a full-fledged infrastructure for undertaking R & D programmes of nanotechnology for applications in variety of fields.
3. To develop technology to fight against the cancer especially early detection of cancer by Electrochemical Impedance Analyzer and hyperthermia treatment to cure cancer.
4. To develop nanotechnology applications in artificial organs.















## **2. INNOVATIVE AND EMERGING AREAS OF RESEARCH**

- 1. Nanobiotechnology**
- 2. Nano Materials**
- 3. Cancer Nanotechnology**
- 4. Developmental & Microbial Genetics**
- 5. Medical Physics**
- 6. Stem Cell & Regenerative Medicine**
- 7. Targeted Drug Delivery**
- 8. Medical Electronics**
- 9. Energy Storage Devices**
- 10. Solar Cells**
- 11. Super Capacitors**
- 12. Water Splitting**



## 3. Ph.D./RESEARCH SUPERVISORS

(With Areas of Research)

<b>Dr. Prakash B. Behere</b> Former Vice-Chancellor		<b>Dr. Shimpa Sharma</b> Acting Vice-Chancellor	
<b>Dr. R. K. Sharma</b> Dean, Medical College		<b>Prof. C.D.Lokhande</b> Research Director & Dean CIR	
<b>Prof. (Dr.) S.H. Pawar</b> Medical Physics and Material Science		<b>Dr. M. G. Joshi,</b> Stem Cell & Regenerative Medicine	
<b>Dr. Mrs. P. N. Pawaskar</b> Nuclear Physics and NanoMedicine		<b>Dr. Mrs. Indumathi Somasundaram</b> Stem Cell & Regenerative Medicine	
<b>Dr.Arvind Gulbake,</b> Pharmaceutical Sciences		<b>Dr.Manisha Phadatare,</b> Physics	
<b>Dr. Raghvendra A. Bohara,</b> Biochemistry		<b>Dr. Umakant Patil</b> Physics	
<b>Dr. J.L.Gunjkar</b> Physics		<b>Dr. Ashvini Jadhav</b> Biotechnology	

### 4. MEMORANDUM OF UNDERSTANDING (MOUs) and COLLABORATIONS

#### MEMORANDUM OF UNDERSTANDING (MOUs) and COLLABORATIONS WITH

- 1) Kolhapur Cancer Centre, Kolhapur (2013)
- 2) Shri Siddhivinayak Ganapati Cancer Hospital, Miraj (2015)
- 3) REGIONAL MEDICAL RESEARCH CENTRE (INDIAN COUNCIL OF MEDICAL RESEARCH) BELAGAVI (Karnataka) (2015)
- 4) Yeungnam University, South Korea (2017)
- 5) Chonnam National University, South Korea (2017)
- 6) National Dong Hwa University, Taiwan (2017)
- 7) Institute of Clean Technology, Yeungnam University, Republic of Korea (2017)
- 8) National Centre for Cell Science, Pune (2017)
- 9) Tara Industries, Kolhapur (2017)
- 10) Kolhapur Oxygen , Kolhapur (2017)
- 11) Solisto Pharma, Sagar, M.P., India (2017)
- 12) Department of Biochemistry, Shivji University, Kolhapur (2018)
- 13) Donguuk University, South Korea (2018)
- 14) DBF Dayanand College of Arts and Science, Solapur (2018)
- 15) Stemgenn Therapeutics, Greater Kailash, New Delhi (2018)
- 16) Bharati Vidyapeeth College of Pharmacy, Kolhapur (2018)
- 17) Material Characterization Laboratory, Department of New Materials Science and Engineering, Yonsei University, Seoul, Korea (2018)
- 18) Cambridge Institute of Technology, Bangaluru (2018)
- 19) Mid Sweden University, Sweden (2018)
- 20) University of Nigeria, Nsukka, Nigeria (2019)
- 21) Institute of Chemical Engineering Industry & Department of IT Convergence, Korea National University of Transportation, South Korea.(2019)
- 22) Korea National University of Transportation, South Korea (2019)



## 5. Research Achievements

### PUBLICATIONS

In the last five years, we have published more than 200 research articles in reputed National, International journals,

1	International publications (SCOPUS)	132
2	National Publications	117
3	Books	9
4	Book Chapters	15

### Patents

Sr. No	Title	Applicant Name	Patent No.	Date of Filling	Date of Published	Status
<b>2015</b>						
1	Synthesis of Biocompatible Nanofluids based on Ni <sub>0.5</sub> Zn <sub>0.5</sub> Fe <sub>2</sub> O <sub>4</sub> Nanoparticles for Cancer Hyperthermia therapy	M. R. Phadatare, Shivaji H.Pawar,	2251/MUM/2014	10/07/2014	27/05/2015	Published
2	Preparation of Nanofluid based on core shell ferromagnetic nanoparticles.	V. M. Khot, Shivaji H.Pawar	2252/MUM/2014	10/07/2014	24/07/2015	Published
3	Preparation of nano-polymer for the treatment of non-healing and diabetic wounds and tissue engineering application	Dr. Meghnad Joshi, Ms. Yogita Velankar Mr. Allauddin Mujawar	2253/MUM/2014	10/07/2014	24/07/2015	Published
4	Scaffolds of Umbilical cord for tissue engineering and preparation method thereof.	Sneha Khumbar, Shivaji H Pawar.	3247/MUM/2015	25/08/2015	18/09/2015	Published

## Empowering through Research

Sr. No	Title	Applicant Name	Patent No.	Date of Filling	Date of Published	Status
<b>2016</b>						
5	Extraction Method of nucleic acids using salicylic acid magnetic nanoparticles.	Arpita Tiwari, Shivaji H Pawar	4579/MUM/2015	04/12/2015	06/05/2016	Published
6	Gas sensor and method for manufacturing the same,	J. H. Kim, A. C. Lokhande, J. H. Moon, I. Y. Kim, C. D. Lokhande, J.Y.Lee,	01311120160569 97579	14/06/2016	15/06/2016	Korean Patent granted
<b>2017</b>						
7	A functionalized nanoparticle for detection and separation of microbes.	Raghvendra A. Bohara , Shivaji H. Pawar	201621009050	15/03/2016	15/09/2017	Published
8	A method of treatment of fluids with the functionalized cobalt ferrite magnetized nanoparticles.	Raghvendra A. Bohara , Shivaji H. Pawar.	201621009051	15/03/2016	15/09/2017	Published
9	A light sensitive anti-microbial nanocomposite composed of chitosan and doped metal oxide nanoparticles.	S. H. Pawar, A. V. Raut,	201621015192	02/05/2016	10/11/2017	Published
10	Antibacterial nanoparticles and method for synthesizing for same	J. H. Kim, A. C. Lokhande, D. S. Lee, I. Y. Kim, C. D. Lokhande, M. R. Sanadam	01311112017011 069975	02/02/2017	05/03/2017	Korean Patent granted
<b>2018</b>						
11	A method for producing polyoxovanadate intercalated layered copper hydroxide compound	Dr. J. L. Gunjekar, Prof. C. D. Lokhande, Dr. Saji Thomas Kochuveedu, Mr. Shrikant V. Sadavar, Mr. Navnath S. Padalkar, Dr. V. V. Bhosale.	201821018926	21/05/2018	27/05/2018	Published

## Empowering through Research

Sr. No	Title	Applicant Name	Patent No.	Date of Filling	Date of Published	Status
12	A chemical synthesis process of cobalt manganese phosphate thin films on conducting substrate	Dr. Umakant Patil, Mr. Pranav K. Katkar, Ms. Supriya J. Marje, Dr. V. V. Bhosale, Prof. C. D. Lokhande	201812018918	21/05/2018	10/08/2018	Published
13	A method of ytterbium sulphide thin coating on sold surfaces	Prof. C. D. Lokhande, Dr. R. B. Pujari, Dr. V. V. Bhosale, Mr. A. C. Lokhande	201821015970	27/04/2018	22/06/2018	Published
14	An Improved solid state device for energy storage	Prof. C. D. Lokhande, Dr. A. M. Patil, Mr. A. C. Lokhande, Dr. V. V. Bhosale	201821021727	11/06/2018	20/07/2018	Published
15	Chemically deposited large area and nanostructured samarium oxide thin films for energy storage	Prof. C. D. Lokhande, Dr. R. B. Pujari, Dr. V. V. Bhosale, Mr. V. C. Lokhande, Mr. S. B. Ubale	201821022705	18/06/2018	20/07/2018	Published
16	Cathode for water electrolysis and manufacturing method thereof.	J. H. Kim, Jin Hyeok, Mr. A.C. Lokhande, I. Y. Kim, D.S.Lee, Prof. C. D. Lokhande, P. T. Babar, Mr. V. C. Lokhande,	01311120160569 97579	30/11/2017	30/12/2017	Published Korean Patent

## RESEARCH PROJECTS

### 1. Projects : Completed, Ongoing and Submitted

#### a. Research Projects Completed (12)

Sr. No.	Research Project Title	Funding Agency	Principal Investigator/ Co-Investigator	Outlay (Rs in lakhs)
1	Soft Electrochemical Processing and Microwave Studies of MgB <sub>2</sub> and Ba <sub>1-x</sub> K <sub>x</sub> BiO <sub>3</sub> Superconductivity Films	CSIR, New Delhi	Prof. Dr. S. H. Pawar	10.33
2	Medical Exposure to the population around proposed Nuclear Power Plant Site at Jaitapur, due to diagnostic applications	BRNS, Mumbai	Dr. R. J. Khyalappa, Dr. Mrs. M. A. Burande	27.14
3	Studies on Establishment of Baseline Levels of Radiation & Radioactivity and Assessment of Radiation Doses Due to Natural and Fallout Radioactivity Around JNPP up to a Distance of 30 Km From Site	BRNS, Mumbai	Prof. S. H. Pawar Dr. P.N.Pawaskar	51.01
4	Baseline Survey on Epidemiological Aspects In Jaitapur Region	BRNS, Mumbai	Dr. V. S. Patil Dr. V. R. Patkar	26.39
5	Studies on Development of SmSrCoO <sub>3</sub> / BiCuVO <sub>x</sub> / Ni-SDC Planner Solid Oxide Fuel Cell	DRDO, New Delhi	Prof. Dr. S. H. Pawar	24.00
6	Soft Electronical Processing of MnAs Based Nanocomposites for Near Room Temperature Magnetic Refrigeration	DST, New Delhi	Prof. Dr. S. H. Pawar	24.59
7	Fabrication and performance studies of co-planar single chamber SmSrCoO <sub>3</sub> /BiCuVO <sub>x</sub> /Ni-SDC SOFC unit cell	DRDO, New Delhi	Prof. Dr. S. H. Pawar	4.81
8	Development of an electrochemical immunosensor using functionalized magnetic nanoparticles for detection of tumor markers	DST, New Delhi	Prof. S. H. Pawar Dr. S. A. Murchite	89.30
9	Studies on Synthesis of CoFe <sub>2</sub> O <sub>4</sub> magnetic nanoparticles using magnetotactic bacteria for biomedical applications	DST, New Delhi	Prof. S. H. Pawar Dr. Smt. S. J. Ghosh	20.78

## Empowering through Research

Sr. No.	Research Project Title	Funding Agency	Principal Investigator/ Co-Investigator	Outlay (Rs in lakhs)
10	The South Asia – Anglia Partnership – working together to collaborate, innovate and enhance internationalisation of the student experience	British Council	Prof. Dr. S. H. Pawar	38.41
11	Study of PU/PVDF Nanoscaffolds Loaded with Anti-Microbial Agents for Wound Dressing Application	UGC, New Delhi	Ms. Jagruti Meshram	10.44
12	Major histocompatibility complex class I related antigen A and B(MICA/B): biomarkers study for cancer	DST, New Delhi	Dr. M.G. Joshi	36.31

### b. Research Projects Ongoing (18)

Sr. No.	Research Project Title	Funding Agency	Principal Investigator/ Co-Investigator	Outlay (Rs in lakhs)
1.	MicroRNA profiling of human endometrium at tissue and cellular level: Identifying the microRNA regime regulating stem cell proliferation and differentiation in endometrial hyperplasia conditions	SERB, New Delhi	Dr. Indumathi Somasundaram	24.75
2.	Surface modified magnetic solid lipid nanoparticles for imaging and hyperthermia with dual drug therapy in colon cancer.	DST-SERB	Dr. Arvind Gulbake	32.84
3.	Supercapacitor with rare earth metal sulfides/graphene hybrid thin films: fabrication and performance evaluation	SERB, New Delhi	Prof. C. D. Lokhande Dr. Manisha Phadatare	37.40
4.	Free Freestanding 3D porous Graphene Foam (GF) electrodes decorated by Pseudocapacitive Materials (PCMs) for high energy and power density hybrid supercapacitors	DST-INSPIRE	Dr. Umakant M. Patil	110.00
5.	MicroRNA profiling of human endometrium at tissue and cellular level	Rajiv Gandhi scheme (Govt. of Maharashtra)	Dr. Indumathi Somasundaram	4.45



## Empowering through Research

Sr. No.	Research Project Title	Funding Agency	Principal Investigator/ Co-Investigator	Outlay (Rs in lakhs)
6.	Pillared Nanohybrids Based on 2D Inorganic Nanosheets for Highly Efficient and Stable Solar Assisted H <sub>2</sub> Production	DST-SERB (2017-2022)	Dr. Jayavant L. Gunjekar	110.00
7.	Clinical Trial on Evaluation of an Ayurvedic Formulation in Prediabetes and Diabetes Mellitus	Shivaji University, Kolhapur	Dr. Shimpa Sharma, Dr. Venugopal & Dr. Arvind Gulbake	2.00
8	Green supercapacitors for renewable energy storage - An international collaboration between Mid Sweden University, Sweden and D. Y. Patil Education Society (Deemed to be University), India.	Swedish Foundation for International Cooperation in Research and Higher Education (STINT), Sweden	PI- Dr. Manisha Phadatare Co-PI- Prof. C. D. Lokhande	12.00
9	Effect of Allopurinol and Febustat on diabetic Nephropathy in Laboratory Animal Model.	C V Raman Fellowship for Visiting Professor	Dr. Meeta A. Burande Dr. M. Abdel, Egypt	1.80
10	Development of flexible asymmetric Supercapacitor with energy density(15Whkg <sup>-1</sup> ) and power density (1,000Wkg <sup>-1</sup> ).	DST	PI-Dr. C. D. Lokhande Co-PI-Dr. U. M. Patil Co-PI-Dr. Manisha Phadatare	45.73
11	Engineering of 3D-Printed Blood Vessels	University Funded	Dr. Meghnad Joshi	5.10
12	Study the Surface Engineered Lipid Nanoparticles for Site Specific Delivery to overcome Cancer Drug Resistance Mechanism	University Funded	Dr. Arvind Gulbake	6.95
13	Angiogenic ability of Itraconazole and its reversal using endometrial stem cells using chick embryo as a model system: Its application in treating vascular diseases	University Funded	Dr. R. K. Sharma, Dr. Indumathi. S	5.00
14	Study of cobalt-zinc ferrite for cancer theranostic applications	University Funded	Dr. R. A. Bohara	4.90

## Empowering through Research

Sr. No.	Research Project Title	Funding Agency	Principal Investigator/ Co-Investigator	Outlay (Rs in lakhs)
15	Transition metal oxide based electrodes for ultrahigh energy (60 Wh/kg) targeted asymmetric supercapacitor	University Funded	Prof. C. D. Lokhande	8.10
16	Appraisal of characteristics of Lanthanum oxides for applications in bio-sensing capabilities	University Funded	Dr. P. N. Pawaskar	8.10
17	Synthesis of nickel-cobalt phosphate thin films as an electrocatalyst for non-enzymatic glucose sensing	University Funded	Dr. Umakant Patil	8.40
18	Enabling library of layered double hydroxide based hybrids for supercapacitor and bio-medical applications	University Funded	Dr. Jaywant Gunjekar	8.10

### CONFERENCES AND SEMINARS ORGANIZED

- Conference on CAD conference - AMI Conclave 2014 on 24<sup>th</sup> Aug, 2014.
- CME on “Recent advances in Oncology” on 10<sup>th</sup> January 2015.
- “Workshop on Application of Statistics in Medical Research” on 19<sup>th</sup> & 20<sup>th</sup> January 2015.
- “National Conference on Convergence of Stem Cells and Medical Nanotechnology” (CSCN-2015) on 2<sup>nd</sup> & 3<sup>rd</sup> September 2015.
- “DYPU Anveshan: Student Research Convention”- Annually Activity
- “National Conference on Emerging Trends on Nanomaterials and its Applications” (ETNA) 2<sup>nd</sup> & 3<sup>rd</sup> June 2017.
- “International Conference on Nanotechnology Addressing the Convergence of Materials Science, Biotechnology and Medical Science” (IC-NACMBM) 09<sup>th</sup>-11<sup>th</sup> November 2017
- “Symposium on Medical Biotechnology and Stem Cell technology: A New Avenue to Success”. (Friday 9<sup>th</sup> February 2018)
- National Science Day & Dnyanshodh - Annually Activity
- 5<sup>th</sup> International Conference on “Angiogenesis Research: Targated Anti-Angiogenic Therapy” -26<sup>th</sup> & 27<sup>th</sup> October 2018
- “One Day Workshop on Biodiversity Conservations and Biodiversity Act 2002”-15<sup>th</sup> Feb 2019

## 6. Fellows in Centre for Interdisciplinary Research

Name of Research fellows	Duration of Fellowship	Funding agency
Dr. Saji Thomos ( <i>Research Associate</i> )	03 months	DYPES
Dr. Umakant Patil ( <i>Inspire Fellow</i> )	05 Years	SERB-DST
Dr. Jayavant Gunjekar ( <i>Ramanujan Fellow</i> )	05 Years	SERB-DST
Mr. Nayeem Mulla ( <i>SRF</i> )	05 Years	CSIR-UGC
Mr. Shivaji Kasthe ( <i>SRF</i> )	05 Years	CSIR-UGC
Mr. Abhinandan Patil ( <i>SRF</i> )	05 Years	DST-Inspire
Ms. Apurva Birajdar ( <i>JRF</i> )	03 Years	SERB-DST
Ms. Jagurati Mashram ( <i>SRF</i> )	05 Years	UGC-RGNF
Ms. Marje Supriya ( <i>JRF</i> )	03 Years	SERB-DST
Mr. Katkar Pranav ( <i>JRF</i> )	03 Years	SERB-DST
Mr. Padalkar Navnath ( <i>JRF</i> )	03 Years	SERB-DST
Mr. Sadavar Shrikant ( <i>JRF</i> )	03 Years	SERB-DST
Mr. Rahul Pujari ( <i>JRF</i> )	03 Years	SERB-DST
Mr. Ubale Shivaji ( <i>JRF</i> )	03 Years	SERB-DST
Mr. Malvekar Dhanaji ( <i>JRF</i> )	03 Years	SERB-DST
Ms. Poonam Bedge ( <i>JRF</i> )	03 Years	SERB-DST
Mr. Satyajeet Harugale ( <i>JRF</i> )	03 Years	SERB-DST
Ms. Priyanka Hilage ( <i>JRF</i> )	03 Years	DYPES
Ms. Taihaseen Momin ( <i>JRF</i> )	03 Years	DYPES
Ms. Swapnali Jagdale ( <i>JRF</i> )	03 Years	DYPES
Ms. Pooja Patil ( <i>JRF</i> )	03 Years	DYPES
Ms. Trupti Ghogare ( <i>JRF</i> )	03 Years	DYPES
Mr. Satish Jadhav ( <i>JRF</i> )	03 Years	DYPES
Mr. Sachin Pujari ( <i>JRF</i> )	03 Years	DYPES
Ms. Rohini Shinde ( <i>JRF</i> )	03 Years	DYPES
Mr. Kishor Tardalkar ( <i>JRF</i> )	03 Years	DYPES

## 7. AWARDS AND APPRECIATIONS

### ❖ Ph.D. Awardees with Title of Thesis

1. **A.B.Salunkhe**, Studies on synthesis of  $\text{Co}_{1-x}\text{Mn}_x\text{Fe}_2\text{O}_4$  nanoparticles by chemical route for Biomedical Applications, 2012.
2. **V. M.Khot**, Synthesis of Magnesium Ferrite Nanoparticles and Studies on their Induction Heating for Biomedical Applications, 2014.
3. **M.R.Phadatare**, Studies on synthesis of  $\text{Ni}_{1-x}\text{Zn}_x\text{Fe}_2\text{O}_4$  nanoparticles and their nanofluids for hyperthermia therapy applications, 2014.
4. **N.D.Thorat**, Studies on Preparation and Properties of Superparamagnetic LSMO Nanoparticles for Hyperthermia Application, 2014.
5. **Seema Dhawal**, Environmental High Energy Radiation Studies in South Konkan, 2014.
6. **Prajakta Shete**, Functionalization of Iron Oxide Nanoparticles with Chitosan and Acrypol Cancer for Cancer Hyperthermia Therapy Application, 2014.
7. **Sachin Otari**, Studies on Biological Synthesis of Silver Nanoparticles for Biomedical Applications, 2014.
8. **Hemraj Yadav**, Antibacterial Studies with Metal-Doped  $\text{TiO}_2$  Nanoparticles, 2014.
9. **Vidya Karande**, Studies on microbial synthesis of  $\text{CoFe}_2\text{O}_4$  magnetic nanoparticles for biomedical application, 2015.
10. **Swati Jadhav**, Studies on synthesis and surface functionalization of LSMO Nanoparticles for biomedical Application, 2015.
11. **Dipali Nikam**, Effect of Surface Coating on  $\text{Ni}_{1-x}\text{Zn}_x\text{Fe}_2\text{O}_4$  Nanoparticles for Biomedical Application, 2015.
12. **Satvekar Rajashri Kundlik**, "Studies on Development and Performance of Silica Nanocomposite Based Enzyme Nanobiosensors", 2015.
13. **Sonali Rohiwal**, Synthesis and Characterization of Albumin/Dextran Nanoparticles, their Conjugate and Attachment with Mesenchymal Stem Cells Derived from Human Umbilical Cord for Biomedical Application, 2015.
14. **Rakesh Patil**, Inorganic-organic core-shell structures with iron oxide nanoparticles for biomedical applications, 2016.
15. **Raghvendra Bohara**, Studies on Functionalised Monodisperse Cobalt Ferrite ( $\text{CoFe}_2\text{O}_4$ ) Nanoparticles for Biomedical Applications, 2016.
16. **Arpita Pandey Tiwari**, Interaction of DNA with functionalized iron oxide nanoparticles for biomedical applications, 2016
17. **Abhinav Vasant Raut**, Synthesis and Characterization of Chitosan/ $\text{TiO}_2$  based 3D Porous Nanocomposites as Extracellular Matrix for Wound Healing, 2018.
18. **Sneha G. Kumbhar**, Synthesis and Characterization of Chitosan-Alginate Scaffolds and Seeding Mesenchymal Stem Cells for Biomedical Applications, 2018.
19. **Valmiki B. Koli**, Studies on Photocatalytic  $\text{TiO}_2$ -MWCNTs Nanocomposites for Antibacterial Application, 2018.
20. **Jagruti Meshram**, Studies on polymer composites loaded with ZnO nanoparticles as anti-microbial agents for wound dressing application, 2019.



### ❖ Achievements

1. Vice-Chancellor's Life Time Achievement Award to Prof. S. H. Pawar by World Management Congress and Commonwealth of Distance Education Summit, Delhi
2. Two Research Papers were featured in "Top 20 Articles, in the Domain of Article 23138108,
  - I. "Induction heating studies of dextran coated  $\text{MgFe}_2\text{O}_4$  nanoparticles for magnetic hyperthermia. Khot VM, Salunkhe AB, Thorat ND, Ningthoujam RS, Pawar S H. Dalton Trans; 2013 Jan 28;42(4):1249-58.
  - II. "Functionalization of  $\text{La}_{0.7}\text{Sr}_{0.3}\text{MnO}_3$  nanoparticles with polymer: studies on enhanced hyperthermia and biocompatibility properties for biomedical applications. Thorat ND, Khot VM. Salunkhe AB, Ningthoujam RS, Pawar SH. Colloids Surf B Biointerfaces; 2013 Apr 1;104:40-7
3. Mr. Hemraj Yadav, Ph.D. Scholar has secured 1st Rank in Avishkar 2013-14 organised by Shivaji University, Kolhapur on 23rd December, 2013
4. Prof. S. H. Pawar has been honored by "Swami Vivekananda National Award-2015" organized by Ywa Samuha Wardha for contribution in higher education system.
5. Prof. (Dr.) S. H. Pawar, Vice-Chancellor, has been Sanctioned Financial Assistance for participating in Mini-Micro-Nano-Dosimetry and Innovation Technologies in Radiation Oncology in Hobart, Tasmania.
6. Dr. Sachin Kadam has been awarded with distinguish Scientist Award by Society for Bioinformatics and Biological Sciences, India for year 2015.
7. Dr. Indumathi Somasundaram, has been awarded with "Young Scientist" in International Regenerative Medicine Conclave held at Chandigarh on 12<sup>th</sup> & 13<sup>th</sup> May 2018.
8. A Special issue of the journal of solid state electrochemistry 21(2017) was released by Springer publication house, Germany on the occasion of 60<sup>th</sup> birthday of Prof. C. D. Lokhande
9. Prof. C. D. Lokhande is nominated by the Govt. of India as a nominee of the president of India in the Court of Banaras Hindu University (2017-2020)
10. Dr. Manisha Phadatare is selected as Post Doctoral Researcher at Mid Sweden University, Sundsvall, Sweden (July 2017-December 2018)
11. Dr. Arvind Gulbake is nominated on Committee for the purpose of control and Supervision of Experiments on Animals (**CPCSEA**), Ministry of Environment, Forest and Climate Change, New Delhi.
12. Dr. Arvind Gulbake is nominated as *Assistant Editor*, International Journal of Applied Pharmaceutics (Scopus & Elsevier).
13. Dr. Arvind Gulbake is nominated as *Member Editorial Board*, Journal of Liposome Research, Taylor & Francis Group.
14. Miss. Pooja Patil qualified as Radiation Safety Officer (RSO), Conducted by BARC.
15. Dr. Raghvendra Bohara nominated by Elsevier Science and Technology books as a Book Proposal Reviewer for Elsevier.
16. Dr. Raghvendra Bohara got award of DST Young Scientist faculty International Travel Grant Scheme, MRSC, France, July 11-14, 2017

## Empowering through Research

17. Dr. Raghvendra Bohara awarded of Irish Postdoctoral Fellows NUIG, Galway, 2017.
18. Dr. Jaywant Gunjkar is nominated for INYAS/INSA membership for 5 years, 2018.
19. Dr. Jaywant Gunjkar is nominated for Young Associate Maharashtra Academy of Sciences, 2018.
20. Dr. Umakant Patil is nominated for Young Associate Maharashtra Academy of Sciences, 2018.
21. Mr. Abhinandan Patil participated in Start up program Govt. of Maharashtra 2018-19 and awarded with Start up Hero of Maharashtra State, 2018.
22. Mr. Deepak Sawant participated in Start up program Govt of Maharashtra 2018-19 and awarded with 1st Prize in Innovation in Health Care, 2018.
23. Ms. Priyanka Patil participated in Start up program Govt of Maharashtra 2018-19 and awarded with 2<sup>nd</sup> Prize -Innovation in Health Care, 2018.
24. Prof. C. D. Lokhande Chief Guest for Convocation Ceremony of Night College of Arts and Commerce, Kolhapur, 2019.
25. Prof. C. D. Lokhande appointed as Scientific Advisor, Patent Office, Government of India, 2019.
26. Ms. Shital Kale selected for SERB Overseas Visiting Doctoral Fellowship – Research training for Indian Ph.D. Scholars, 2019.

## 8. RESEARCH FACILITIES AVAILABLE AT CENTRE



Impedance analyzer



Planetary ball mill



Oven



Particle size Analyzer



Double distillation plant



TLD Reader



Programmable high temperature furnace



Autoclave

## Empowering through Research



Electrochemical work station



Laminar airflow



Shaking Incubator



Gamma ray Survey meter



Microplate reader



Digital Microscope



X-ray Diffractometer



Zeta Potential



## Empowering through Research



**Auto Titrator**



**Successive Ionic Layer Adsorption And Reaction Instrument (SILAR)**



**Magnetic Nanoparticle Hyperthermia**



**UV Visible Spectrophotometer**



**Pocket Dosimeter**



**Survey Meter**



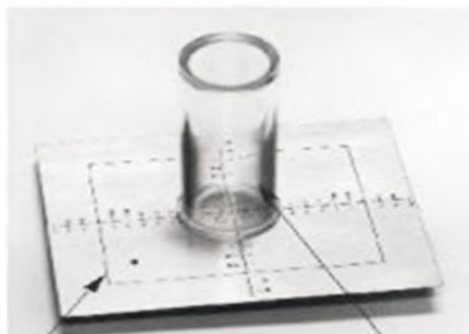
## Empowering through Research



CO<sub>2</sub> Incubator



Deep Freeze



Collimator Test Tool

Beam Alignment Test



QA KIT

## Empowering through Research



**Elisa Reader**



**Elisa Washer**



**Nikon Ti-S Inverted Epifluorescence Microscope with Phase Contrast**



**Cooling Centrifuge**



**Olympus Inverted Compound Microscope**



**Incubator**



**Orbital Shaker**



**Invitrogen Western Blotting Assembly**

## Empowering through Research



**Freeze Dryer**



**Stereomicroscope**



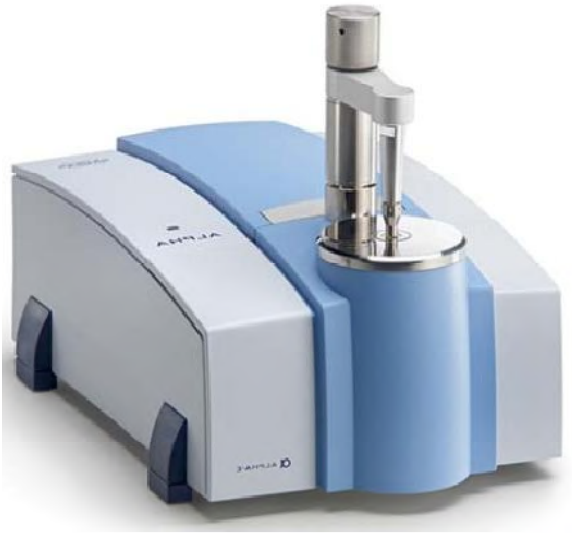
**Analytical Balance**



## Empowering through Research



**Centrifuge**



**FTIR-Bruker ALPHA**



**RT- PCR ( Step one Plus)**

## 9. Ph.D. PROGRAMME

### RULES AND REGULATIONS FOR ADMISSION TO THE DEGREE OF DOCTOR OF PHILOSOPHY

**R.1.** A candidate seeking admission to the Ph.D. Degree course shall apply to the Registrar in the prescribed application form for admission starting from 1<sup>st</sup> July of every academic year.

**R.2. ELIGIBILITY**

For admission to the Ph. D programme in a subject in any faculty, the applicant shall fulfill the following conditions:

- a) Candidates having minimum of 55% marks for open category and 50% for SC/ST category at Post-Graduate examination.
- b) Candidates having postgraduate degree declared passed in faculties where there is no provision of grade/class.

**R.3. PROCEDURE FOR ADMISSION**

- a) The University shall admit doctoral students through an Entrance Test conducted at the level of University. Those students who qualify UGC/CSIR (JRF) Examination/SLET/GATE/teacher fellowship holder or have passed M.Phil. programme need not appear for Ph.D. Entrance Test.
- b) It shall be followed by an interview to be organized by the School/Department/Institution/University as the case may be.
- c) At the time of interview, doctoral candidates are expected to discuss their research interest/area.
- d) Only the predetermined number of students may be admitted to Ph.D. programme
- e) The University may decide separate terms and conditions for those students who qualify UGC/CSIR (JRF) Examination/SLET/GATE/teacher fellowship holder or have passed M. Phil Programme for Ph.D. Entrance Test.
- f) While granting admission to students to Ph.D. Programmes, the Department will pay due attention to the National/State Reservatory Policy.

**R.4. ALLOCATION OF SUPERVISOR**

The allocation of the supervisors for selected students shall be decided by the Department in a formal manner depending on the number of student per faculty member, the available



## Empowering through Research

specialization among the faculty supervisors, and the research interest of the student as indicated during interview by the student.

The allotment/allocation of supervisor shall not be left to the individual student or teacher.

- R.5.** The registration of candidates for Ph.D. degree shall be considered as provisional till the candidate successfully completes the pre-Ph.D. theory course work.
- R.6.** Candidate who registers as a student for Ph.D. will have to attend the pre-Ph.D. theory course regularly. These candidates will fill up the form for admission to Pre - Ph. D. theory examination and pay the examination fees. The candidate shall have to complete the pre-Ph.D. theory course work before submission of Ph.D. thesis.
- R.7.** Candidate can apply for admission to the Ph.D. programme in the prescribed application form and shall submit to the University;
- a) Twelve copies of proposal/synopsis as indicated in the Annexure-I
  - b) A copy of statement of marks (basic degree and P.G.Degree, NET/SET/ GATE /J.R.F etc.)
  - c) Migration/Transfer Certificate if necessary.
  - d) The registration form duly filled in and signed alongwith registration fees as mentioned in R.7 will be forwarded to the Registrar through the Head of the University Department/Principal/Director of Recognized Institution.
  - e) Authenticated copy of professional experience alongwith copies of the published research work in the proposed area wherever necessary.
  - f) Sponsorship letter from the Institution or Company wherever necessary
- R.8.** A candidate may work under any recognized research guide of the University, except relatives such as husband / wife / daughter / son / brother / sister, who shall indicate on the application form his/her, willingness to guide the student.
- R.9. Guidance by Two Guides :**
- a) A candidate may be allowed to register his name under the guidance of two recognized guides one of which will be the main guide and the other will be the co-guide belonging to the same Department or different Departments of the University / recognized Institutions/ affiliated Colleges provided that:

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- i. The subject matter of the research is concerned with two different specializations of the same subject and the same Department.
  - ii. The subject matter of the research is of interdisciplinary nature concerning two different departments in the University.
  - iii. The subject matter of the research is of interdisciplinary nature or is concerned with use of research facilities and equipments in the University Departments or the recognized research institute or college.
- b) Both guides will have equal status.
- c) A candidate has to submit progress report every six months and submitted to the University through Research Guide.
- R.10.** After submission of a research proposal/synopsis by a student duly signed by a student and the guide for registration to the Ph.D. degree course, the student along with his guide should be called before a Scrutiny Committee for oral presentation. The Scrutiny Committee should consists of the Head, Two experts belonging to the same specialization nominated by the Head, Guide of the research student. The Head of the Department will be the Chairman of the Scrutiny Committee. The Scrutiny Committee will go into the details of the proposal and will instruct the student to submit the proposal or improve the proposal or resubmit the proposal for the consideration of the Research and Recognition Committee. The quorum for the Scrutiny Committee shall be three members. In case of the resubmission of the proposal, specific written instructions be given to the concerned candidate. The resubmitted proposal will be forwarded by the Chairman of the Scrutiny Committee along with his remarks to the University office. All applications scrutinized by the Scrutiny committee with its recommendations shall be placed before Research and Recognition Committee for its final decision.
- R.11.** Fee Structure As prescribed by the University authorities from time to time
- R.12. SIZE, STYLE AND BINDING**

A candidate submitting Ph.D. thesis for the University Degree is required to follow the rules noted below regarding the size, style and binding of thesis, except in special case in which the Guide or Head of Institute recommends that it will not be possible to comply with the

requirements of these rules giving reasons. The copies shall be bound in accordance with the following specifications:

- a) Size of the paper should be A-4, (25 cms X 20 cm.) except for drawings, graphs, photographs and maps on which no restriction is placed. A margin of 3.5 cms be left on the left hand side and bound in a standardized form.
- b) DEGREE, YEAR and NAME of Student and Guide and short title should be printed neatly and legibly on the front cover as indicated in Annexure -II
- c) A thesis which consists of a collection of pamphlets of accepted/published papers or a single pamphlet must be bound in a similar cover.
- d) The thesis should be typed on both sides of the page in single spacing.
- e) The thesis shall be submitted in the form of loose papers and in computer readable form (soft Copy) enabling the candidate to incorporate changes after updating the data, if suggested by the Scrutiny Committee. In addition to the hard copies, final approved thesis shall be submitted in C.D. or Computer readable form and the University shall make it available on the Web.

The Ph.D. thesis should embody:-

- a) Results of the research stating whether the work is based on the discovery of new facts by the candidate or of new relations of facts observed by others and how the work contributes to the general advancement of knowledge.
- b) The candidate shall indicate the sources from which his/her information has been derived and the extent to which his/her work is based on the work of others and shall indicate which portion or portions of his/her thesis he/she claims to be original.

### **R.13. RULES OF SUBMISSION**

- a) Upon satisfactory completion of course work and research methodology, which shall form part & parcel of Ph.D. Scholar shall undertake research work and produce a draft thesis after completion of two years.
- b) Prior to submission of the thesis, the student shall make pre-Ph.D. presentation in the Department that may be open to all faculty members and research students, for getting feedback and comments, which may be suitably incorporated into the draft thesis under the advice of the supervisor.

- c) Ph.D. candidates shall publish two research paper in a referred journal before the submission of the thesis/monograph for adjudication, and produce evidence for the same in the form of acceptance letter or the reprint.
- d) A candidate shall make a presentation of his / her thesis before Scrutiny Committee at least two months prior to submission of the thesis. The research student shall incorporate suggestions made by the committee and only then the thesis shall be submitted. (As per the norms suggested by UGC time to time).
- e) A candidate may submit his thesis any time during the year, after the completion of minimum prescribed period of two years and completion of Pre - Ph. D theory course work. A candidate shall submit to the university twenty copies of synopsis and five copies, typewritten or Xeroxed by both side of the thesis with necessary fees along with soft and hard copy (CD read only). The procedure for appointment of examiners will be undertaken soon after the candidate submit his/her synopsis and pays the necessary deposit.

### **R.14. APPOINTMENT OF REFEREES**

The Research and Recognition Committee in the subject concerned shall suggest the names of eight experts. The teacher, who has guided the candidates work, shall be the internal referee. Appointment of the referees shall be made by the competent authorities preferably by random selection from pre-existing pool of names generated for each subject with various specializations by the Committee. There shall be two referees, one from the State, One from Outside the State of Maharashtra. The internal and external referees should submit their evaluation reports within one month of the receipt of the thesis in the prescribed proforma along with a detailed report.

### **R.15. OPEN DEFENCE**

There shall be a *viva-voce* with Open Defence System. The University shall send sufficient copies of synopsis to concerned department to circulate the faculty and shall put one copy on the entire notice boards well in advance at least one week before the *viva-voce*. The Open Defence system shall be conducted only after receiving favorable reports from the referees. Within one month from the receipt of the positive reports, one of the External Referees nominated by the Vice - Chancellor and the Internal Referee shall conduct the

Open Defence of the candidate and submit their reports jointly through the Chairperson of Open Defense. The Head of the Department or the Dean of the concerned faculty or the senior teacher in the subject concerned nominated by the Vice - Chancellor shall act as a Chairperson for the open defence. The other external referee may send questions in writing to the referees attending the *viva - voce* to seek clarification on any point in the thesis. However, queries raised by the external referees in their reports be placed before the open defence. Any interested person can attend and ask any related queries. But decision of the internal and referee will be final.

### **R.16. DECLARATION OF RESULT**

On the final approval of the Vice-Chancellor, the Controller of Examination shall declare the result.

- R.17.** In case of any controversy, the rules and regulations prescribed by the U.G.C. or any other similar competent authority shall supersede.

**Pre-Ph.D. Course work**  
**Choice based credit system (CBCS)**  
**(Medical Sciences)**  
**(Introduced from June, 2016 onwards)**

The candidates registered for Ph. D degree are required to complete pre- Ph.D. course consisting of following three papers during the first year of registration. Paper I and Paper II are compulsory papers and candidate may select paper III from the paper III (A-J) as per his/her research topic/area. Total course work is of 12 credits.

### **Pre- Ph. D structure-**

**PAPER I: Research Methodology and Computer basics (4 credits)**

**PAPER II: Recent Topics in Medical Science (4 credits)**

The candidate may select one of the following papers as Paper III:

#### **Group of Paper III (Elective)**

PAPER III (A): Hospital Waste Disposal Management (4 credits)

PAPER III (B): Stem Cells and Regenerative (4 credits)

PAPER III (C): Advances in Physiology (4 credits)

PAPER III (D): Basic Environmental Studies (4 credits)

PAPER III (E): Advances in Microbiology (4 credits)

PAPER III (F): Topic in Biochemistry (4 credits)

PAPER III (G): Topic in DNA Nanobiosensor (4 credits)

PAPER III (H): Nanotechnology for Hospital Waste Treatment (4 credits)

PAPER III (I): Advances in Medical Science (4 credits)

PAPER III (J): Advance in Pharmacology (4 credits)

Paper III (K) Advances In Anatomy (4 credits)

Paper III (L): Pharmaceutical Sciences (Advance Pharmaceutics (4 credits)

Paper III (M): Advanced Topics in Radiation Therapy (4 credits)

Paper III (N): Deposition of Films and Their Applications (4 credits)

Paper III (O): Advances in Psychiatry (4 credits)

#### **1.0 Course information**

- As per the University Grants Commission (Minimum Standards and Procedure for Award of M.Phil./Ph.D. Degrees) Regulations, 2016, following are the Credit, Requirements, number, duration, syllabus, minimum standards for completion of the Course Work:
- The credit assigned to the Ph.D. course work shall be a minimum of 08 credits and a maximum of 16 credits.



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- The course work shall be treated as prerequisite for Ph.D. preparation. A minimum of four credits shall be assigned to one or more courses on Research Methodology which could cover are; as such as quantitative methods, computer applications, research ethics and review of published research in the relevant field, training, field work, etc. Other courses shall be advanced level courses preparing the students for Ph.D. degree.
- All courses prescribed for Ph.D. course work shall be in conformity with the credit hour instructional requirement and shall specify content, instructional and assessment methods. They shall be duly approved by the authorized academic bodies.
- The Department where the scholar pursues his/her research shall prescribe the course(s) to him/her based on the recommendations of the Research Advisory Committee, the research scholar.
- All candidates admitted to the Ph.D. programs shall be required to complete the course work prescribed by the Department during the initial one or two semesters.
- Candidates already holding M. Phil. degree and admitted to the Ph.D. program, or those who have already completed the course work in M.Phil. and have been permitted to proceed to the Ph.D. in integrated course, may be exempted by the Department from the Ph.D. course work. All other candidates admitted to the Ph.D. program shall be required to complete the Ph.D. course work prescribed by the Department.
- Grades in the course work, including research methodology courses shall be finalized after a Combined assessment by the Research Advisory Committee and the Department and the final grades shall be communicated to the Institution/College.

### 2.0 Scheme of Examination and Passing:

1. This course will have 100% external (University written examination of 3 hours duration for each course paper). All external examinations will be held at the end of course work and will be conducted by the University as per the existing norms.
2. Each question paper will be of 100 marks.
3. Each question paper will consists of six questions of 25 marks each and student should answer any four questions out of six questions.

### 3.0 Standard point scale for grading:

Grade	Marks	Grade Points
<b>O</b>	70 & above	<b>7</b>
<b>A</b>	60-69.99	<b>6</b>
<b>B</b>	55-59.99	<b>5</b>
<b>C</b>	50-54.99	<b>4</b>
<b>D</b>	45-49.99	<b>3</b>
<b>E</b>	40-44.99	<b>2</b>
<b>F (Fail)</b>	39.99 & below	<b>1</b>

A Ph.D. scholar has to obtain a minimum of 55% of marks or its equivalent grade in the UGC7-point scale (or an equivalent grade/CGPA in a point scale wherever grading system is followed) in the course work in order to be eligible to continue in the program and submit the thesis.

## **10. M.Sc. PROGRAMMES**

### **M. Sc. MEDICAL PHYSICS**

(Approved by Atomic Energy Regulatory Board, Mumbai)

#### **ABOUT THE DEPARTMENT**

The Department of Medical Physics under the umbrella of Center for Interdisciplinary Research offers M.Sc. and Ph.D. programs in Medical physics specialized in radiation technology applied to cancer therapy since 2011 in collaboration with Kolhapur Cancer Centre and Shri Sidhdivinayak Ganapati Cancer Hospital, Miraj. The purpose of medical physics program is to promote the application of physics to medicine and biology towards application in health care particularly in radiation cancer therapy, encourage R & D in medical physics and related fields and develop manpower.

We have well-established laboratory coupled with sophisticated hi-tech instruments like TLD reader, X-ray diffractometer, Diagnostic QA kit, Pocket Dosimeter, Portable Radiation Survey meter, Geiger Muller counting system with radioactive source kit, Lead and Aluminum absorber sheets etc. The faculties from the department of medical physics of the university, Kolhapur Cancer Centre, D. Y. Patil Hospital and Shri Sidhdivinayak Ganapati Cancer Hospital, Miraj conduct the theoretical as well as practicals of the medical physics students at the university as well as hospitals.

#### **About the course**

M. Sc. Medical Physics course is basically a two years course which is approved by Atomic Energy Regulatory Board (AERB), Government of India. M. Sc. Medical Physics course, being a specialization course designed to train the young pool of PG students as qualified medical physicist and radiation safety officers (RSO) in the field of cancer radiation therapy. Medical physics is one of the fastest growing areas of employment for physicists. They play a crucial role in radiology, radiation therapy and nuclear medicine. These fields use very sophisticated and expensive equipment and medical physicists are responsible for much of its plan, execution, testing and quality assurance.

The M.Sc. medical physics students are getting the exposures from the various cancer hospitals

## Empowering through Research

during practical and their M.Sc. Project work. Our students are exposed to field training in various cancer hospitals all over India. After completion of 2 years course, students undergo one year internship according to AERB regulations in order to work as a Medical Physicists in the hospital.

### **Vision Mission and Goal:**

**Vision:** "To offer diverse Medical Physics program to establish and maintain the standards of the students of Medical Physics in the disciplines of Diagnostic Imaging, Radiation Oncology and Nuclear Medicine".

**Mission:** To promote professional growth by offering state-of-the-art postgraduate program in Medical Physics in India and abroad.

### **Goals:**

- The goal of the course is to cultivate an educational environment which provides the full spectrum of learning opportunities in clinical medical physics, radiation oncology and radiobiology.
- The curriculum is flexible and designed to enable a student to optimize their learning experience throughout their two years program.
- It is an expectation that upon the completion of the program a student will be an outstanding "Radiation Oncology Physicist" capable of making an immediate impact in either an academic or community practice setting.

### **Career Opportunities:**

- The students have tremendous opportunities to work as a clinical medical physicist in various leading hospitals all over India with attractive salary packages.
- The students have opportunities to work as an Assistant Professor where there are courses of M.Sc. Medical Physics.
- The students can work as a Scientist in the Research institutes.
- The students can also work as dosimetrists in various companies providing radiation measuring devices.
- The students also have opportunities to pursue higher studies in India and abroad in related field.

### Eligibility Criteria:

B.Sc. Physics with aggregate 60%.

### Course Structure & Distribution of Credits.

M.Sc. Medical Physics Program consists of total 16 theory courses, total 4 practical lab courses spread over 4 semesters. 16 theory courses and 4 practical lab courses and one project will be common and compulsory to all the students. Each theory course will be of 4 (four) credits, a practical lab course will be of 4 (four) credits and a project will be of 8 (eight) credits. A student earns 24 (twenty four) credits per semester and total 96 (ninety six) credits in 4 semesters. The course structure is as follows,

### COURSE CURRICULUM

Semester-I	Paper I	Paper-II	Paper-III	Paper-IV
	Mathematical Physics (MP101)	Solid State Physics (MP102)	Electronics And Instrumentation (MP 103)	Classical And Quantum Mechanics (MP 104)
	Paper-V	Paper-VI	Paper-VII	Paper-VIII
Semester-II	Electrodynamics (MP201)	Nuclear Physics (MP 202)	Radiation Physics & Radiation (MP 203)	Anatomy And Physiology (MP 204)
	Paper-IX	Paper-X	Paper-XI	Paper-XII
Semester-III	Radiation Detectors And Instrumentation (MP 301)	Radiation Dosimetry And Standardization (MP 302)	Clinical And Radiation Biology (MP 303)	Medical Imaging (MP 304)
	Paper-XIII	Paper-XIV	Paper-XV	Paper-XVI
Semester-IV	Nuclear Medicine And Internal Dosimetry (MP 401)	Radiation Therapy - Teletherapy (MP 302)	Radiation Therapy- Brachytherapy (MP 303)	Radiation Safety (MP 404)

### One Year – Residency Training

On successful completion of M. Sc. Medical physics course, all students are required to undergo **one year** internship at AERB recognized institutes. This is a mandatory requirement for becoming qualified medical physicists and appearing in the RSO examination.

### Practical Lab courses

Semester-I	Lab course 1	Group A	Group B
Semester-II	Lab course 2	Group A	Group B
Semester-III	Lab course 3	Practical	Project
Semester-IV	Lab course 4	Practical	Project

### **M.Sc. APPLIED PHYSICS (MEDICAL)**

In recent years, along with the Physics, its application in biomedical field becomes one of the most important and forefront fields. The application of Physics to life/ medical science has opened entire new branch of Physics in biomedical applications. The branch holds the promise of many breakthroughs that may possibly change the course of future medical advances and our insight. It has been observed that properties such as electronic structure, reactivity, conductivity, melting temperature, optical properties and mechanical properties change as the particles become smaller than a critical size. This dependence of property on size allows for the engineering of nanostructures with varied properties with applications in producing stronger and lighter materials for advanced drug delivery system, tailor-made therapy in pharmaceuticals, piezoelectric materials for wound healing, magnetic materials for hyperthermia, the focused impedance spectroscopy for diagnosis, Materials for Implant Applications, Biomedical Instrumentation, Biosensors, Medical Imaging Techniques, development of multifunctional nanoparticles for cancer therapy, magnetic resonance imaging, DNA transfection, and enzyme immobilization, etc are few of the prominent thrust areas of Applied Physics in Medical applications.

Masters Program in Applied Physics (Medical) will provide students to understand the current concepts and prospect of world of Medical Instrumentation for diagnosis, Nanoscience with hands-on experience for treatment of various diseases. The course structure and the syllabi has been tailor made with the aim to enable the student acquire a holistic and inter-disciplinary view of the subjects and their inter-relationship along with the application of the knowledge gained in one course on another. This Program would prepare the students for research in application of Physics in biomedical field and also open more job opportunities in various fields.

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### **Vision Mission and Goal:**

**Vision:** To be a world-class centre of academics and research in applied physics specifically in Medical by pursuing interdisciplinary ties for the benefit of nation and masses at large.

**Mission:** To promote academic growth by offering state-of-the-art postgraduate program in the field of Applied Physics specifically in Medical.

### **Goals:**

- To develop overall excellence in student that meet international standard.
- To enable the interdisciplinary research through the Physical sciences, Medical Sciences, Chemical sciences and Engineering discipline.
- To develop state-of-art resource centre in Applied Physics (Medical) and education hub.
- To provide solutions for industry through technology transfer and contribute to social as well as country economic growth

### **Career Opportunities:**

- Academics such as Assistant Professor (in Graduate college/University after SET/NET/Ph.D.), Lecturer in Engineering College, Polytechnic college etc.
- They are eligible for giving the SET/NET/GATE examination based on which they can apply for Ph.D. position as well as after qualifying SET/NET examination, they will be eligible for getting Assistant Professor position in Graduate college/University.
- Students will be eligible for getting Junior Research Fellowships (JRF) on different research projects.
- There are various permanent positions in Research and Development (R&D) sections of the Central government.
- Along with this, there are various positions in Central government jobs after M.Sc. Physics.
- After completion of M.Sc. Applied Physics (Medical), students will be eligible for doing further Diploma in Radiation Physics (conducted by Atomic Energy Regulatory Board). After completion of which, they are eligible to work as Medical Physicist (as well as Radiological Safety Officer) in Cancer Hospitals.
- Students have career opportunities in electronics and manufacturing companies and Students.
- Students are eligible to pursue Higher Degree in the field of Physics.



### Course Structure & Distribution of Credits.

M.Sc. Applied Physics (Medical) Program is Choice Based Credit System (CBCS) based and consists of total 16 theory courses and total four practical lab courses spread over 4 semesters and one research project. For first two semesters, eight theory courses and two practical lab courses will be common and compulsory to all the students. For third and fourth semesters, three theory papers and one practical lab course are compulsory to all the students. For remaining one theory paper, student can select one theory paper from groups of elective papers of these semesters.

Each theory course will be of four credits, a practical lab course will be of four credits and a project will be of eight credits. A student earns 24 (twenty four) credits per semester and total 96 (ninety six) credits in 4 semesters.

**Eligibility:** Graduation from Physics

The course structure is as follows

#### Theory Courses

	<b>Paper I</b>	<b>Paper II</b>	<b>Paper III</b>	<b>Paper IV</b>
<b>Semester I</b>	Mathematical Physics (MAP101) (Compulsory)	Solid State Physics (MAP102) (Compulsory)	Electronics And Instrumentation (MAP103) (Compulsory)	Classical And Quantum Mechanics (MAP104) (Compulsory)
	<b>Paper V</b>	<b>Paper VI</b>	<b>Paper VII</b>	<b>Paper VIII</b>
<b>Semester II</b>	Electrodynamics (MAP201) (Compulsory)	Nuclear Physics (MAP202) (Compulsory)	Radiation Physics & Radiation Generators (MAP203) (Compulsory)	Anatomy And Physiology (MAP204) (Compulsory)
	<b>Paper IX</b>	<b>Paper X</b>	<b>Paper XI</b>	<b>Paper XII Elective</b>
<b>Semester III</b>	Thermodynamic and Statistical Mechanics (MAP301) (Compulsory)	Experimental Techniques (MAP302) (Compulsory)	Nanoscience and Nanobiotechnology (MAP303) (Compulsory)	Biomedical Instrumentation (MAP304A) Or Radiation Detectors And Instrumentation (MAP304B)
	<b>Paper XIII</b>	<b>Paper XIV</b>	<b>Paper XV</b>	<b>Paper XVI Elective</b>
<b>Semester IV</b>	Atomic and Molecular Physics (MAP401) (Compulsory)	Materials for Implant Applications (MAP402) (Compulsory)	Bio-materials and Biosensors (MAP403) (Compulsory)	Medical and Optical Imaging Techniques (MAP404A) Or Radiation Safety (MAP404B)

## Empowering through Research

### Practical Lab courses

Semester-I	Lab course 1	Group A	Group B
Semester-II	Lab course 2	Group A	Group B
Semester-III	Lab course 3	Group A	Research Project
Semester-IV	Lab course 4	Group A	Research Project

### M.Sc. STEM CELL AND REGENERATIVE MEDICINE

#### Department of Stem Cell and Regenerative Medicine

Stem cell technology has opened the doors of unabated technological advancement in science by acting as a connecting link to other branches of science such as embryology, cell and molecular biology, bioinformatics, tissue engineering etc, forming an interdisciplinary field. D.Y.Patil Education Society (Deemed to be University) is the only University in Maharashtra which offers specialized M.Sc. & Post Graduate Diploma programme in Stem Cell & Regenerative Medicine. The department is continuously engaged in innovative research & teaching. The department is well versed with the state of the art facility including Tissue culture facility, Fluorescent microscope, ELISA, Western blotting, CO<sub>2</sub> Incubator, Cooling centrifuge, RT-PCR and many more. All our Alumni are well settled either with jobs in Stem Cell Industry/Pharmaceutical Industry/Cord Blood Banking/University/Hospitals/pursuing Ph.D. abroad or India. From academic year 2017, we have started a new programme on M.Sc. in Medical Biotechnology for aspiring students of Biotechnology and Life sciences. Department has various on-going research projects funded by various Govt. agencies more than 4 crore.

#### Vision, Mission and Goal:

##### Mission

- The mission of the course is to impart in-depth knowledge on different types of stem cells and its in-vitro and in-vivo applications, scope and hope of stem cells and so on effectively.
- To advance the fundamental knowledge of stem cells and their differentiation pathways, understand how stem cells interact with tissues and organ systems of the body, and develop stem cell-based research and therapies to treat human diseases and injuries.
- To develop an Interdisciplinary course works with a strong base for success in life.

## Empowering through Research

### **Vision and Goal**

- To cultivate a broad range of interdisciplinary stem cell research (i.e., basic and translational stem cell biology research)
- To train future leaders for education, research and delivery of novel therapies using stem cells.
- To serve as a best teaching and educational center for stem cell biology and regenerative medicine.
- Develop experimental models for use of stem cells to alter physiological and developmental characteristics of tissues and organ systems involved in disease processes.
- To seek a leadership role in basic and translational stem cell research through developing innovative, multidisciplinary collaborative approaches.

### **Career Opportunities:**

- Extensive theoretical and practical knowledge on Stem cells and Regenerative medicine in a short period of time
- Wide Job opportunities in industries, companies, Universities and other laboratories
- Increases the opportunities to pursue higher studies in foreign countries
- The course prepares students for leadership in the critically important and dynamic industries of stem cells, biotechnology and pharmaceuticals.
- They can go as lecturers/Asst professors in colleges of biotechnology, pharmacology, microbiology, and other biomedical sciences.
- They could get a vast idea about the research and development in this field, planning for their future research
- They could get jobs in hospitals where stem cell clinical trials are on.

### **Eligibility: (M.Sc. and P.G. Diploma in SCRM, M.Sc. in Medical Biotechnology)**

B.Sc. and M.Sc. in Biology, Microbiology, Biochemistry, Biotechnology and any related Life science programmes with 50% marks or MBBS, BDS, BAMS, BHMS, B. Pharm or B.E./ B. Tech. Biotechnology from a recognized University. Students appearing for final year bachelor programme are also eligible to apply subject to securing qualification score as above.

## COURSE CURRICULUM of Stem Cell & Regenerative Medicine

### SEMESTER-I

Theory Papers	Theory marks	Internal marks	Total marks
(Paper I) SC.1.1.1 Molecular Cell Biology	80	20	100
(Paper II) SC.1.1.2 Immunology	80	20	100
(Paper III) SC.1.1.3 Biochemistry	80	20	100
(Paper IV) SC.1.1.4 Developmental Biology, Anatomy and Histology	80	20	100
<b>Practical</b>	<b>Marks</b>		
(Practical I) SC.1.1.P.1 Molecular Cell Biology and Developmental Biology	80	-	80
(Practical II) SC.1.1.P.2 Biochemistry, Anatomy and Histology	80	-	80
(Practical III) SC.1.1.P.3 Industry visit and report	40	-	40
<b>Total</b>	<b>520</b>	<b>80</b>	<b>600</b>

### SEMESTER-II

Theory Papers	Theory marks	Internal marks	Total marks
(Paper V) SC.1.2.1 Cell Physiology & Metabolism	80	20	100
(Paper VI) SC.1.2.2 Biomedical Instrumentation	80	20	100
(Paper VII) SC.1.2.3 Biomaterials, Medical Nanobiotechnology & Tissue Engineering	80	20	100
(Paper VIII) SC.1.2.4 Animal Models, Biostatistics & Bioinformatics	80	20	100
<b>Practical</b>	<b>Marks</b>		
(Practical IV) SC.1.2.P.4 Cell Physiology, Metabolism and Biomedical Instrumentation	80	-	80
(Practical V) SC.1.2.P.5 Biomaterials, Medical Nanobiotechnology & Tissue Engineering, Animal Models, Biostatistics & Bioinformatics	80	-	80
(Practical VI) SC.1.2.P.6 Industry visit and report	40		40
<b>Total</b>	<b>520</b>	<b>80</b>	<b>600</b>

### SEMESTER-III

Theory Papers	Theory marks	Internal marks	Total marks
(Paper IX) SC 2.3.1 Stem Cell Biology	80	20	100
(Paper X) SC 2.3.2 Disease & Applications of Stem Cells	80	20	100
(Paper XI) SC 2.3.3 Cell & tissue banking and cryopreservation	80	20	100
(Paper XIIA) 2.3.4 Clinical research, Bioethics and regulatory affairs	80	20	100
(Paper XI1B) 2.3.4 Molecular Diagnostics and Therapeutics			
<b>Practical</b>	<b>Marks</b>		
(Practical VII) SC 2.3.P.7 Stem Cell Biology, Diseases and Application of Stem Cells	80	-	80
(Practical VIII) SC 2.3.P.8 Stem Cell Banking & Cryopreservation, Clinical Research, Bioethics, Regulatory affairs	80	-	80
(Practical IX) SC 2.3.P.9 Industry visit and report	40	-	40
<b>Total</b>	<b>520</b>	<b>80</b>	<b>600</b>

## Empowering through Research

### SEMESTER-IV

Theory Papers	Theory marks	Internal marks	Total marks
(Paper XIII) SC.2.4.1 Research Methodology	80	20	100
(Paper XIV) SC.2.4.2 Entrepreneurship & Management	80	20	100
Project and Practical			
4.3 Project	350	-	350
Practical-10 Industrial visit and report	50	-	50
<b>Total</b>	<b>560</b>	<b>40</b>	<b>600</b>

### M.Sc. Medical Biotechnology

#### SEMESTER-I

Theory Papers	Theory marks	Internal marks	Total marks
(Paper I) MB.1.1.1 Molecular Cell Biology	80	20	100
(Paper II) MB.1.1.2 Immunology	80	20	100
(Paper III) MB.1.1.3 Biochemistry	80	20	100
(Paper IV) MB.1.1.4 Developmental Biology, Anatomy and Histology	80	20	100
Practical	Marks		
(Practical I) MB.1.1.P.1 Molecular Cell Biology and Developmental Biology	80	-	80
(Practical II) MB.1.1.P.2 Biochemistry, Anatomy and Histology	80	-	80
(Practical III) MB.1.1.P.3 Industry visit and report	40	-	40
<b>Total</b>	<b>520</b>	<b>80</b>	<b>600</b>

#### SEMESTER-II

Theory Papers	Theory marks	Internal marks	Total marks
(Paper V) MB.1.2.1 Cell Physiology & Metabolism	80	20	100
(Paper VI) MB.1.2.2 Biomedical Instrumentation	80	20	100
(Paper VII) MB.1.2.3 Biomaterials, Medical Nanobiotechnology & Tissue Engineering	80	20	100
(Paper VIII) MB.1.2.4 Animal Models Biostatistics & Bioinformatics	80	20	100
Practical	Marks		
(Practical IV) MB.1.2.P.4 Cell Physiology, Metabolism and Biomedical Instrumentation	80	-	80
(Practical V) MB.1.2.P.5 Biomaterials, Medical Nanobiotechnology & Tissue Engineering, Animal Models, Biostatistics & Bioinformatics	80	-	80
(Practical VI) MB.1.2.P.6 Industry visit and report	40		40
<b>Total</b>	<b>520</b>	<b>80</b>	<b>600</b>



## Empowering through Research

### SEMESTER-III

Theory Papers	Theory marks	Internal marks	Total marks
(Paper IX) MB.2.3.1 Enzymology and Enzyme Technology	80	20	100
(Paper X) MB.2.3.2 Applied and Industrial Biotechnology	80	20	100
(Paper XI) MB.2.3.3 Molecular Diagnostics and Therapeutics	80	20	100
(Paper XIIA) MB.2.3.3 Stem Cell Biology			
(Paper XIIB) MB.2.3.4 Medical Microbiology and Human Genetics	80	20	100
<b>Practical</b>	<b>Marks</b>		
(Practical VII) MB.2.3.P.7 Enzymology and Industrial Biotechnology	80	-	80
(Practical VIII) MB.2.3.P.8 Medical Microbiology and Genetics	80	-	80
(Practical IX) MB.2.3.P.9 Industry visit and report	40	-	40
<b>Total</b>	<b>520</b>	<b>80</b>	<b>600</b>

### SEMESTER-IV

Theory Papers	Theory marks	Internal marks	Total marks
(Paper XIII) MB.2.4.1 Research Methodology	80	20	100
(Paper XIV) MB.2.4.2 Entrepreneurship & Management	80	20	100
<b>Project and Practical</b>			
(Practical X) MB.2.4.P.10 Major Project	350	-	350
(Practical XI) MB.2.4.P.11 Industrial visit and report	50	-	50
<b>Total</b>	<b>560</b>	<b>40</b>	<b>600</b>

### **M.Sc. Anatomy** ❖ **COURSE CURRICULUM**

#### **SYLLABUS FOR M.Sc. ANATOMY**

**A. Goal:** To prepare the postgraduate student to become an exemplary teacher and a research scientist par excellence. To achieve this goal, the postgraduate student in **M.Sc. Anatomy** should be given an overall exposure to the subject, teaching methodologies and a sound grounding in research technologies.

**Eligibility:** As per the guidelines of Medical Council of India.

**Duration:** 3 years

**Desirable qualities:** The student should have an aptitude for teaching and reasonable command over spoken and written English language

**B. Learning objectives:** To achieve this goal, the following objectives must be fulfilled.

**I. Cognitive domain:** At the end of three years of postgraduate training the student should be able to

1. Describe the gross anatomy of the human body and correlate the knowledge of structure and function.
2. Describe the microanatomy including cytology of various structures of the human body and compare the knowledge of microstructure with function and interpret it accordingly.
3. Interpret the anatomical basis of symptoms and signs of clinical conditions, diagnostic procedures and treatment modalities.
4. Describe the developmental aspects of human body and interpret the developmental basis of various congenital anomalies.
5. Describe the neuroanatomy in its entirety and interpret the neuroanatomical basis of various clinical conditions.
6. Explain various aspects of genetics and describe genetic basis of disorders and principles of genetics counseling.
7. Explain and interpret radiological anatomy and sectional anatomy of the human body as studied by various imaging techniques.
8. Comprehend surface and living anatomy of the human body.
9. Relate forensic anatomy to the study with medicolegal aspects of bone in particular.
10. Explain the general principles of Anatomy Act and Transplant of Human Organ Act.

## Empowering through Research

11. Explain the process of embalming.
12. Comprehend ethical aspects of biomedical research.
13. Comprehend the basis of disposal of biomedical waste.
14. Comprehend horizontal integration of various subdivisions of anatomy with relevant physiology and biochemistry.

### **II. Psychomotor domain:** At the end of the training, the student should be able to

1. Dissect and demonstrate various parts of adult human body
2. Demonstrate surface landmarks and living anatomy pertaining to muscle power, testing of nerves and palpating vessels.
3. Dissect and demonstrate various parts of a fetus .
4. Prepare tissue blocks ,perform H&E staining and is able to explain the principles of the following special stains -silver nitrate, periodic acid Schiff, osmic acid, Masson trichome, Verhoeff and Orcein stains .
5. Prepare and deliver lectures on various topics of human anatomy using audiovisual aids.
6. Operate computers so as to prepare documents, tables, charts and projection slides.
7. Identify research topics; carry out research and prepare a dissertation on a topic.
8. Present paper / poster in conferences.
9. Set undergraduate theory question paper, evaluate students and able to compute results including internal assessment marks.

### **III. Affective domain:** At the end training the students should be able to

1. Co-operate with and react and respond in a cordial manner in his /her interaction with peers, superiors and subordinates.
2. Project a cheerful persona to the students.
3. Inspire the students to reach greater heights.
4. Arouse an element of curiosity and wonder in the minds of students.
5. Maintain a log book (Appendix - I).
6. Develop a healthy personality and a liking and respect for the subject.

### **M.Sc. Medical Biochemistry** **COURSE CURRICULUM** **(Under the Faculty of Medicine)**

**Goal :**

The broad goal of teaching & training of postgraduate students in Medical Biochemistry is to make them understand the scientific basis of the life processes at the molecular level and to orient them towards the applications of the knowledge acquired in solving clinical problems.

**Scope :**

M.Sc. (Medical) Biochemistry will be an intensive three years post-graduate degree course primarily for graduates in the biological sciences which should facilitate them for teaching and research in health education sciences. At the end of his/her training, the student shall be able to take up a career in health teaching institutions as a faculty for Medical and allied courses or in diagnostic laboratory or in research.

**Eligibility :**

M.B.B.S./B.Sc. with Chemistry/Biology/Zoology/Biochemistry/Biotechnology/BAMS/BHMS, B.Pharm, B.Sc. from a recognized university, provided further that candidates seeking admission to M.Sc.(Medical) Biochemistry must have passed H.Sc. examination with Biology as one of the subjects.

**Duration of the course :**

The total duration of the course will be THREE years or six academic terms including orientation in Anatomy & Physiology in the I<sup>st</sup> & II<sup>nd</sup> terms.

**Period of training :**

1. The period of training for M.Sc. Medical Biochemistry shall be of three years, that is, six academic terms after registration as a post graduate student.
2. M.Sc. Medical Biochemistry students shall attend all Lectures/Tutorials/and Practical's along with Ist M.B.B.S. students in the 1st year of M.Sc.Medical course. Orientation shall be given to these students in Anatomy and Physiology.
3. Candidates joining M.Sc. Medical Biochemistry course shall work as on his full time P.G. students during the training period. He/she will be given full time responsibility, assignments & participation in all facets of the educational process.
4. P.G. students shall maintain a record book/log book of the work carried out by them & will be checked & assessed by his/her P.G. teacher & H.O.D.
5. P.G. students shall work in central laboratory & would carry out routine, emergency & special investigations during training period.
6. P.G. students shall participate in all P.G. activities viz. Seminars, Group discussions, Journal club, etc.
7. P.G. students will be required to participate in the teaching & training programmes of U.G. students.
8. The candidate presenting himself for the M.Sc.(Medical)examination for the first time shall submit a dissertation based on his own work under the guidance & direction of his P.G. teacher. No candidate

## Empowering through Research

will be allowed to appear for theory examination unless the dissertation is approved by all the referees who will also be the examiners for the theory and practical examination.

9. Training in basics of medical statistics & bioinformatics, medical ethics shall be imparted to the P.G. students.
10. P.G. students will be granted a term provided they put minimum 80% attendance during the academic term.

### Course content :

1. The course will consist of a orientation programme in the first two academic terms mainly in Anatomy, Physiology & Basic Biochemistry. At the end of first year the student will take up a college level examination in all the three subjects mentioned above. This examination will be a 'Qualifying Examination' for appearing in the final M.Sc.(Medical) examination & passing in this examination will be mandatory for eligibility to take on final examination.
2. The second & third year will be devoted at the Department of Biochemistry and Will be involved in seminars, journal club and practical classes in the Department of Biochemistry.
3. After the registration as a P.G. student for M. Sc. Medical Biochemistry the student will select a topic for dissertation related to a topic in the subject, series of clinical cases, records, laboratory study, discussion on a specific thing in consultation with & under the advice and guidance of his P.G. teacher. The subject of dissertation along with synopsis (about 200 words) signed by P.G. teacher, H.O.D., & Head of the institution will be submitted to the university. The protocol committee as well as the ethical committee of the institution must approve the topic of dissertation. The completed dissertation will be submitted to the university in the 5th term, that is, 6 months before the date of final examination.
4. At the end of sixth term, after fulfillment of the necessary conditions, the candidate will take on final examination leading to the degree M.Sc.(Medical) Biochemistry. The final examination will consist of Theory, Practical and Viva-voce on whole of the theory syllabus including dissertation.

### Pattern of examination :

#### A : THEORY EXAMINATION –

The theory examination will be of 400 marks consisting of four papers of 100 marks & 3 hours duration each.

Paper I : General Biochemistry and Instrumentation including Historical Aspects

Paper II : Metabolism including Nutrition

Paper III : Clinical Biochemistry

Paper IV : Molecular Biology, Biotechnology & Recent Advances in Clinical Biochemistry

Each paper will have four questions of 25 marks each.

### **B : PRACTICAL EXAMINATION AND GRAND VIVA –**

Practical examination will carry a total of 400 marks. It will be conducted

Over a period of three days. The distribution of marks will be as follows-

Exercise I – Separation technique in Biochemistry	: 50 marks
Exercise II – Isolation and characterization	: 50 marks
Exercise III – Enzyme assay	: 50 marks
Exercise IV – Routine investigation	: 50 marks
Exercise V – Special investigation	: 50 marks
Exercise VI – Identification of unknown	: 30 marks
Exercise VII – Spot identification with comments	: 20 marks
Exercise VIII – Journals	: 30 marks
Exercise IX – Grand viva covering all topics including Dissertation	: 70 marks

### **Standard of Passing :**

Minimum marks for passing will be 50% separately in Theory and Practicals including Grand Viva.

The class will be declared as follows:

Pass class – Candidates passing the university examination in more than one attempt

Second class – Candidates passing examination in first attempt & securing more than 50% but less than 65% marks

First class – Candidates passing examination in first attempt & securing more than 65% but less than 75% marks

Distinction – Candidates passing examination in first attempt & securing more than 75% marks

### **Laboratory Journals :**

Student should maintain three Laboratory Journals viz. U.G. experiments, Routine clinical investigations and Special investigations separately for the practical's done during the course and submit at the time of University examination after duly certified by the Head of the Department.



### **Clinical Biochemistry Laboratory Posting :**

Every P.G. student in Biochemistry shall be posted to clinical Biochemistry laboratory where clinical investigations of the attached Hospital are done. Student will be trained in collection & preservation of samples, carrying out investigations, interpretation, reporting of the results and maintenance of records of investigations.

### Post Graduate Diploma in Stem Cell and Regenerative Medicine

#### **Post Graduate Diploma in Stem cell and Regenerative Medicine:**

With a bright future seen in the upcoming field of stem cell and regenerative medicine, we introduced a regular/weekend P.G. Diploma in stem cell and regenerative medicine, for giving most potential benefits in student's career by adding light to the existing career in a cost-effective manner. The vision of the programme is to impart in-depth knowledge on different types of stem cells and their in-vitro and in-vivo applications, in a short period of time.

#### **Vision, Mission and Goal:**

##### **Mission**

The mission of the course is to impart in-depth knowledge on different types of stem cells and its in-vitro and in-vivo applications, scope and hope of stem cells and so on in a short period of time effectively. Besides, the syllabus is set in such a way, students gets well equipped with not only stem cells but also other interdisciplinary subjects with a strong base for success in life.

##### **Vision and Goal**

- To cultivate a broad range of interdisciplinary stem cell research (i.e., basic and translational stem cell biology research)
- To train future leaders for education, research and delivery of novel therapies using stem cells.
- Develop experimental models for use of stem cells to alter physiological and developmental characteristics of tissues and organ systems involved in disease processes.
- To seek a leadership role in basic and translational stem cell research through developing innovative, multidisciplinary collaborative approaches.

##### **Career Opportunities:**

- Additional qualification helps to built a strong career path
- Extensive theoretical and practical knowledge on Stem cells and Regenerative medicine in a short period of time
- Exposure to sophisticated instruments
- Wide Job opportunities in industries, companies, universities and other laboratories
- Increases the opportunities to pursue higher studies in foreign countries

### Eligibility:

B.Sc. and M.Sc. in Biology, Microbiology, Biochemistry, Biotechnology and any related Life science programmes with 50% marks or MBBS, BDS, BAMS, BHMS, B. Pharm or B.E./ B. Tech. Biotechnology from a recognized University. Students appearing for final year bachelor programme are also eligible to apply subject to securing qualification score as above.

### Syllabus

Theory Papers	Theory paper marks	Internal marks	Total marks
(Paper I) PGDSCRM 1: Molecular Cell Biology	80	20	100
(Paper II) PGDSCRM 2: Developmental Biology	80	20	100
(Paper III) PGDSCRM 3: Embryonic and adult stem cells	80	20	100
(Paper IV) PGDSCRM 4: Disease and applications of stem cells	80	20	100
Practicals	Marks		
(Practical I) PGDSCRM P-1 Molecular cell biology and developmental biology	100	-	100
(Practical II) PGDSCRM P- 2 Stem cell technology	100	-	100
<b>Total</b>			<b>600</b>

## Empowering through Research

## 11. APPLICATION FORM

To,  
The Registrar,  
D. Y. Patil Education Society,  
Deemed to be University  
Kolhapur - 416 006.

PASSPORT SIZE  
PHOTO

Sir,

I hereby apply for admission to the M.Sc./Ph.D. degree or Diploma course in ..... (Subject) of the D.Y.Patil Education Society, Deemed to be University, Kolhapur.

- Mention your preference for following M.Sc. courses:

	Preference		Preference
1 a) Medical Physics	<input type="checkbox"/>	2 a) Stem Cell & Regenerative Medicine	<input type="checkbox"/>
b) Applied Physics (Medical)	<input type="checkbox"/>	b) Medical Biotechnology	<input type="checkbox"/>

1. Name in full in Block Letters: Shri./Smt.....  
(Exact as per 12<sup>th</sup>/Degree Certificate) .....

2. Date of Birth: .....

3. Nationality: ..... Caste & Category.....

4. Address for Communication: .....

.....  
.....

Mobile No..... E-mail

ID:.....

5. Permanent Address: .....

.....

Details of fee Payment : Rs.1000/-

a. Cash Receipt /D.D. No. : .....

b. Date of Issue:.....

c. Name of Bank:.....

(DD in the favour of "The Registrar, D. Y. Patil Education Society Deemed University, Kolhapur" payable at Kolhapur)

## Empowering through Research

6. Up-to-date details of Academic achievements(beginning with last degree)

(Attested copies of mark lists are to be enclosed)

Name of the College / Institute	Name of the Board University	Examination	Year	Roll / Seat No.	Class and Percentage	Subject Offered

7. Details of the following Exams, if applicable :

Sr. No.	Examination Passed	Year of Passing	Grade
1	NET-JRF		
2	GATE/GPAT		
3	ICMR- JRF		
4	SLET		
5	Other		



**DECLARATION**

1. I, ....., hereby declare that all statements made in this application are true, complete and correct to the best of my knowledge and belief and in the event of any of the information being found false or incorrect or any ineligibility being detected before or after the test, my candidature is liable to be cancelled and appropriate action may be initiated against me.
2. I, further declare that I fulfill all conditions of eligibility regarding educational qualification prescribed for taking this Diploma/M.Sc./Ph.D. Entrance Examination.  
I have enclosed the attested copies of the Qualifying Degree Certificates & Statement of Marks.  
I have noted that if my application is found to be incomplete / defective / ineligible, it will be summarily rejected and no correspondence will be entertained in this regard.

**Date :**

**Place :**

**(Signature of applicant)**

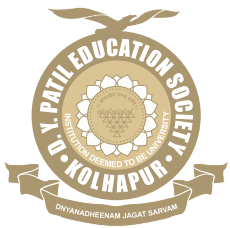


**National Science Day**  
Dnyanshodh 2018



**5th International Conference on Angiogenesis 2018**  
Chief Guest- Prof. Marcel Blot-Chbaud

# D. Y. Patil Hospital & Research Centre



## Centre for Interdisciplinary Research

**D. Y. Patil Education Society,  
Institution Deemed to be University, Kolhapur**

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Website: [www.dypatilunikop.org](http://www.dypatilunikop.org)