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College of Commerce, Arts & Science

Kankarbagh, Patna - 800 020

(A Constituent Unit of Patliputra University, Patna)

NAAC RE-ACCREDITED 'A' Grade, with CGPA 3.10

OFFICE OF THE PRINCIPAL

Ref. : *CC/191/2022*

Date : *16.04.2022*

Endorsement from the Head of the Institution of PI

This is to certify that:

1. Institute welcomes participation of **Dr. Ayan Mukherjee, Assistant Professor** as the Principal Investigator for the project titled **Development of porous C_3O_4 / $NiCo_2O_4$ nanostructured thin film for high performance supercapacitor electrode** and that in the unforeseen event of discontinuance by the Principal Investigator, the Co-Investigator will assume the responsibility of the fruitful completion of the project with the approval of SERB.
2. The PI, **Dr. Ayan Mukherjee** is a permanent or regular employee of this Institute/University/Organization and has **27 years** of regular service left before superannuation
3. The project starts from the date on which the University/Institute/ Organization/College receives the grant from SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi.
4. The investigator will be governed by the rules and regulations of University/ Institute/ Organization /College and will be under administrative control of the University/ Institute/Organization/College for the duration of the project.
5. The grant-in-aid by the SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi will be used to meet the expenditure on the project and for the period for which the project has been sanctioned as mentioned in the sanction order.
6. No administrative or other liability will be attached to SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi at the end of the project.
7. The University/Institute/Organization/College will provide basic infrastructure and other required facilities to the investigator for undertaking the research project.
8. The University/ Institute/Organization/College will take into its books all assets created in the above project and its disposal would be at the discretion of SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi.
9. The University/ Institute/Organization/College assumes to undertake the financial and other management responsibilities of the project.

Seal of University
Institute/Organization/College
Date: 16.04.2022



The Principal
Signature
Registrar of University/Head of the Institute/
Head of organization / Principal of College
Patna- 800020





Development of porous Co_3O_4 / NiCo_2O_4 nanostructured thin film for high performance supercapacitor electrode

File Number : CRG/2022/005085

Submitted By : Dr. Ayan Mukherjee

Submission Date : 30-Apr-2022



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NAAC RE-ACCREDITED 'A' Grade, with CGPA 3.10

OFFICE OF THE PRINCIPAL

Ref:

Date: 21.11.2022

DECLARATION

1. As a Principal Investigator (PI), I understand that it is my responsibility to carry out the Collaborative Research Scheme (CRS) project work as per rules and regulations of UGC-DAE CSR.
2. The scientific program of the CRS will be carried out jointly by me and a Principal Collaborator at UGC-DAE CSR. All scientific publications resulting from the CRS, will be communicated with each other's consent. Technical and scientific assistance from UGC-DAE CSR and DAE personnel will be acknowledged, either in the acknowledgements or in authorship.
3. Financial support received from UGC-DAE CSR will be acknowledged explicitly in all publications. Please add following sentence in the acknowledgement section of the manuscript, "This work was partially/fully carried out using the facilities of UGC-DAE CSR"
4. Progress reports, extension requests, conclusion documents, etc., will be submitted by me to the UGC-DAE CSR with the consent of the Principal Collaborator.
5. Copies of the publications, thesis, etc., resulting from the CRS will be sent to UGC-DAE CSR.

Place: **PATNA**

Date: **21.11.2022**

Ayan Mukherjee *Antosh*
Signature of Principal Investigator



Signature and Seal of Head of Institution / Department

[Signature] 21.11.22
Principal
College of Commerce, Arts & Science
Patna- 800020



Chemical and Biological Sensing Via Polarity of Materials: Using Environment Friendly Lead-Free Perovskite-Phase Metal Oxide

File Number : CRG/2023/006913

Submitted By : Dr. LAXMAN SINGH

[SERB Qualified Unique Identification Document: SQUID-1984-LS-5151]

Submission Date : 19-Mar-2023

PROPOSAL DETAILS

(CRG/2023/006913)

Dr. LAXMAN SINGH

laxmanresearcher84@gmail.com

Associate Professor (Chemistry)

Siddharth University, Kapilvastu

Pachangawa, Siddharthnagar, Uttar pradesh-272202

Technical Details :

Scheme :	Core Research Grant		
Research Area :	Environmental Engineering (Engineering Sciences)		
Duration :	36 Months	Contact No :	+919910186046
Date of Birth :	15-Jul-1984		
Nationality :	INDIAN	Total Cost (INR) :	34,45,420
Is PI from National Laboratory/Research Institution ?	No		

Project Summary :

Since past few decades Lead based $PbTiO_3$, $Pb(Zr,Ti)O_3$ etc perovskites have been proven to be very important materials for variety of applications and technology. With a continuous demand for the tunable devices and very high dielectric parallel plate capacitors, perovskites A ($A=Ca, La, Pr, Dy, Gd..$) $Cu_3Ti_4O_{12}$ widely applicable towards the many applications as in electrodes of solid oxide fuel cells, metal-air batteries, gas sensors and high-performance catalysts all over the world. In the early stage of investigation of this class of ternary perovskites that their electrical properties were dependent on the processing methods, crystalline states such as powder vs. multi crystals and single crystals. In addition, it was also observed that trace of chemical impurities affected the dielectric constant and resistivity significantly. This provided the basis for chemical sensing by using this class of materials. CCTO is a very important member of this very important perovskite family show dielectric constant of the order of 10^4-10^5 . It shows ability to undergo a series of cationic exchange reactions which results into corresponding isomorphs. Colossal dielectric constant in this class of materials are associated with the presence of re-oxidized grain boundary regions on the outer surfaces of the large semiconducting grains or to a secondary phase at the grain boundaries which confirm the internal barrier layer capacitor (IBLC) mechanism present in these ceramics. Some results of impedance spectroscopy demonstrated that there are electrically heterogeneous semiconducting grains with insulating grain boundaries. It was also observed that significant transition occurs in morphologies due to impurities as well as intentional doping. Slight lead oxide doping showed even transition from nonfasted to faceted morphology and huge decrease in dielectric constant. With these goals, we used the parallel plate capacitors as chemical and biological sensors. The earlier literature indicated huge difference in the dielectric and resistivity of the exposed samples. This indicates that perovskites can be used for chemical and biological sensors at very low cost. Also, preliminary data indicates that after exposing in atmosphere, there materials can recover to original characteristics. Although we have used variety of processes for preparing this class of materials including wet (flame synthesis) and semiwet methods, results presented in this proposal are based on annealing method of compacted powder material. The perovskite nanostructured materials are having the capability to detect the very small type of molecules such as CO_2 , O_2 , NO_2 , H_2 , NH_3 , etc. The lead free perovskite having the structural formula $ACu_3Ti_4O_{12}$ are highly thermal stable, high sensitivity, high structural stability with low cost synthesis procedure will be potential candidate in sensing performance to various biological and chemical species in solution as well as solid states.

Objectives :

- o Perovskites with stoichiometry $CaCu_3Ti_4O_{12}$ (CCTO), CCATO, and PCTO along with few compositions of $A(A=Ca, La, Dy, Pr, Gd..)Cu_3Ti_4O_{12}$ will be synthesized along with miniaturization of grain size (50-100 nm).
- o 20~ 25% lower raw material cost. The economical analytical grade chemicals such as metal nitrates will be used as precursors for synthesis purpose.
- o Comparable or higher thermal and structural stability of the perovskite systems will be produced than the existing materials.
- o Investigate the effects of molecular structure and thermal stability relationships using the in-situ X-ray, Solid state NMR, XPS, TEM, IR and Raman etc. imaging tool to provide insights for designing better materials.
- o The best thermally stable structure of the perovskite materials should be supported for chemical and biological sensing.
- o One of the goals of this project is the detailed investigation of the interaction between hetero-structure of the grain-grain boundary, polarization resistance within the materials should be established.
- o The outcome of the research can be explored for filing patent and its commercialization as per the DST norms. Results obtained will be published in reputed journal in the material research field and the Ph.D. scholar (through the institute) will compile the investigation for his/her Ph.D. thesis along with M.Sc. project.

Keywords :

Chemical, biological, sensors, perovskite,

Expected Output and Outcome of the proposal :

The presented project use to develop environmentally friendly based ABO_3 perovskite materials in numerous sensors applications such as humidity, biological, chemical sensors. Chemical Sensing: Chemical sensing tests were performed using acetone of the pellets. Exposure of chemicals and biological agents: Technology challenges It is proven but it is always challenging to attain the dielectric and resistivity values needed from the state-of-the-art capacitors and our preliminary results and experience in crystal growth and materials synthesis will ensure success in this CCATO and PCTO materials. Potential Impact to Defense and country Performance Parameters: Sensitivity: Since there is a huge change in dielectric constant these sensors will be very highly sensitive compared to the existing sensors. Affordability Costs: The chemicals used in CCTO, PCTO and LCTO are very low cost. Since it can reduce the weight and volume of energy of the sensors for ground and space-based sensors by large amount Innovativeness of the effort Our innovative approach of aligning the capacitor materials in the low temperature enhances the resistivity and breakdown voltage which helps in processing materials at lower temperature than traditional methods for this novel and exciting CCTO and PCTO compound for sensors and also a side benefits for high-energy-density capacitor technology. This is a novel and innovative to achieve the goal of large area, low cost and low sensors.

Any other relevant information:

Any other relevant matter: Prof. N.B. Singh, Professor in the Chemistry and Biochemistry, and Computer Science and Electrical Engineering department of the UMBC, USA, will help in this project without no cost. He will to develop the technology for industrial application as he has almost 40 years' experience in industry. He will visit the parent institute (Department of Chemistry) Siddharth University. He will also help in to develop the sensing materials to technology for industry. Prof. N. B. Singh a Fellow of the American Society of Materials, a Fellow of Society of Optics and Photonics, a Fellow of the Optical Society of America (OSA), and a Fellow of the Royal Society of Chemistry, is internationally famous for the leadership in management and researches. Before joining the UMBC, he served 29 years in Northrop Grumman and served as Technical Director. He has 25 US patents, more than 220 journal papers and more than 250 corporate trade secrets.

Suitability of the proposed work in major national initiatives of the Government:

Innovate India

Theme of Proposed Work:

Environment

Collaboration Details for last 5 Years :

S.No.	Name	Type of Collaboration
1	Prof. Youngil Lee Professor Department of Chemistry University of Ulsan 93 Daehak-Ro Nam-gu Ulsan 44610, Korea Department of Chemistry University of Ulsan 93 Daehak-Ro Nam-gu Ulsan 44610, Korea South Korea [01-Jan-2013 to 01-Jan-2030]	We have sharing the funding of open access journal publication. Visiting professorship . I have been use the resources of his laboratory
2	Prof. N.B. Singh Professor University of Maryland, Baltimore County (UMBC) 1000 Hilltop Circle, Baltimore, MD 21250 University of Maryland, Baltimore County (UMBC) 1000 Hilltop Circle, Baltimore, MD 21250 USA [01-Jan-2018 to 02-Jan-2018]	We are sharing the research out comes in the form of publication. Participation in national and international conference etc.
3	Prof. Mikhael BECHELANY Professor Institut Européen des Membranes (IEMM, ENSCM UM CNRS UMR5635) Place Eugène Bataillon Institut Européen des Membranes (IEMM, ENSCM UM CNRS UMR5635) Place Eugène Bataillon France [01-Jan-2018 to 01-Jan-2025]	We have results out put in the form of research article

Planned Collaboration for the proposed work with any foreign scientist/ institution ?**No**

S.No.	Name	Type of Collaboration
1	Prof. N.B. Singh Professor University of Maryland, Baltimore County (UMBC) 1000 Hilltop Circle, Baltimore, MD 21250 University of Maryland, Baltimore County (UMBC) 1000 Hilltop Circle, Baltimore, MD 21250 USA	This program is joint program between Siddharth university, Patliputra University and University of Maryland, Baltimore County (UMBC). UMBC will provide data on PCTO and CCATO work in leadership of Prof. N. B. Singh of the Chemistry and Biochemistry and Computer Science and Electrical Engineering.
2	Prof. Youngil Lee Professor Department of Chemistry University of Ulsan Department of Chemistry University of Ulsan South Korea South Korea	We need some specific characterizations such as Solid State NMR to determine the detail investigation of the structure at molecular level.

SERB Project Proposal 2023

Dr. Laxman Singh (PI)

Associate Professor

Department of Chemistry,

Siddharth University, Kapilvastu, Siddharth Nagar

With

Dr. Ayan Mukherjee (Co-P.I.)

Assistant Professor,

Department of Physics,

College of Commerce, Arts & Science,

Patliputra University, Patna, Bihar-800020, India.

In Collaboration

Prof. N. B. Singh, FASM, FSPiE, FOSA and FRSC

Department of Chemistry and Biochemistry &

Department of Computer Science and Electrical Engineering

University of Maryland, Baltimore County (UMBC)

1000 Hilltop Circle, Baltimore, MD 21250

Phone: (410) 455-3427

Email: singna@umbc.edu

Subject: **Environmental Engineering**

Research Team Members: Dr. Laxman Singh, Dr. Ayan Mukherjee and Prof. N. B. Singh

**Project Title: Chemical and Biological Sensing Via Polarity of Materials:
Using Environment Friendly Lead-Free Perovskite-Phase Metal Oxide**

Principal Investigator: Dr. Laxman Singh, Siddharth University, Kapilvastu, UP,
India

Proposal to: Core Research Grant

March 2023



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OFFICE OF THE PRINCIPAL

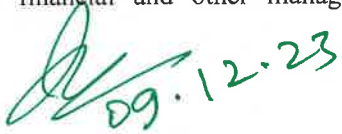
Endorsement from the Head of the Institution of Co-PI

This is to certify that:

1. Institute welcomes participation of **Dr. Ayan Mukherjee, Assistant Professor** as the Co-Principal Investigator for the project titled “**Non-precious Ferroelectric ABO₃ type Perovskite Oriented Hybrid Bifunctional Cathode Electrocatalyst for Oxygen Reduction Reaction and Oxygen Evolution Reaction (OER) for Fuel Cell and Metal Air Batteries**” and that in the unforeseen event of discontinuance by the Principal Investigator, the Co-Investigator will assume the responsibility of the fruitful completion of the project with the approval of SERB.
2. The Co-PI, **Dr. Ayan Mukherjee** is a permanent or regular employee of this Institute/University/ Organization and has **26 years** of regular service left before superannuation
3. The project starts from the date on which the University/Institute/ Organization/College receives the grant from SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi.
4. The investigator will be governed by the rules and regulations of University/ Institute/ Organization /College and will be under administrative control of the University/ Institute/Organization/College for the duration of the project.
5. The grant-in-aid by the SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi will be used to meet the expenditure on the project and for the period for which the project has been sanctioned as mentioned in the sanction order.
6. No administrative or other liability will be attached to SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi at the end of the project.
7. The University/Institute/Organization/College will provide basic infrastructure and other required facilities to the investigator for undertaking the research project.
8. The University/ Institute/Organization/College will take into its books all assets created in the above project and its disposal would be at the discretion of SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi.
9. The University/ Institute/Organization/College assumes to undertake the financial and other management responsibilities of the project.

Seal of University
Institute/Organization/College
Date: 09.12.2023




09.12.23

Signature

Principal of College
Principal
College of Commerce, Arts & Science
Patna-20



Investigation of Electronic and Magnetic Properties of Double Perovskites for Supercapacitor Applications and Green Energy Generation

File Number : SUR/2022/005594

Submitted By : Dr. Santosh Kumar

[SERB Qualified Unique Identification Document: SQUID-1969-SK-4249]

Submission Date : 07-Oct-2022

PROPOSAL DETAILS

(SUR/2022/005594)

Dr. Santosh Kumar

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Associate Professor (Physics)

College of Commerce, Arts and Science

Opposite rajendra nagar terminal, kankarbagh main rd, Patna,

Bihar-800020

[College (Public)]

Technical Details :

Scheme : State University Research Excellence (SERB SURE)
Research Area : Condensed Matter Physics and Materials Science (Physical Sciences)
Duration : 36 Months **Contact No :** +918340549450
Date of Birth : 05-Dec-1969
Nationality : INDIAN **Total Cost (INR) :** 29,96,000

Project Summary :

Recently green energy generation and energy storage have attracted immense attention of the researchers as a societal concern. The excessive use of fossil fuels over the past several years has created a critical global environmental pollution and an acute energy crisis. The modern electronic devices have necessitated a demand for energy storage systems possessing high energy as well as high power density simultaneously. Batteries and fuel cells have high energy density but low power density, whereas capacitors have high power density but low energy density. Supercapacitor is a promising candidate to bridge the gap between the capacitors and batteries. The concomitant high energy and power density, quick charge/discharge process, and outstanding cyclic stability make supercapacitors a promising and suitable candidate for the next generation energy storage devices. Nanomaterials, especially one dimensional nanostructures can greatly optimize the electrode properties because of the increased effective surface area and short ion transfer pathways. Functional transition-metal oxides demonstrate high specific capacitance and fast and excellent reversible faradaic reaction. Multiferroic materials exhibit more than one ferroic order. In particular, materials, in which Ferromagnetic and ferroelectric orders coexist, attracting a lot of attention in fundamental physics and chemistry. Potential technological applications, such as, nonvolatile memories and sensors, have invigorated the research in the field of the ferromagnetic and ferroelectric materials. In these materials non-collinear spiral magnetic structures induce ferroelectric spontaneous polarization and changes in dielectric properties under applied magnetic fields. Perovskite oxides having structure ABO₃, are the most studied compounds during recent years owing to their synthetic variability, compositional flexibility and intriguing properties apart from their applications in electronic and magnetic devices. Recent enthusiasm in the field of multiferroics, double perovskites (DP) has arisen over general perovskites due to its wide range of controllable properties. The double perovskites with the chemical formula R₂M'MO₆ (R=rare earth, M'/M=transition metal) are a composite of two different ternary perovskites RM'O₃ and RMO₃ arranged in a three-dimensional (3D) checkerboard pattern. Double perovskites are being extensively used as solar cell materials nowadays, but the research in this field is still in its nascent stage. Despite several theoretical and experimental works, the correlations between magnetic orderings and ferroelectric polarization in these compounds have not been fully understood thus far and further research is required. To the best of our knowledge, no such material has still been synthesized by electrodeposition. The field of double perovskite multiferroics is growing at a rapid pace and use of those multifunctional materials is already an extremely active field.

Objectives :

- Preparation of several new multiferroics double perovskite materials. The focus will be to prepare multiferroics having low leakage current and strong magnetoelectric coupling at room temperature.
- Characterization for the structural evolution, morphology and particle size distribution of these compounds will be done by x-ray diffraction, FESEM, AFM, transmission electron microscope, scanning electron microscope, Raman spectrometer, FTIR spectrometer , etc.
- Ferroelectric, dielectric, and conductive behavior will be studied in the wide temperature and frequency ranges using an impedance analyzer.
- Investigation of magnetic properties of these materials will be done using SQUID magnetometer.
- Investigation of the effect of strain, defects, grain boundary etc. on the electric polarization, magnetization and magnetoelectric coupling behaviour will also be done.
- Detailed study of correlation between deposition parameter and supercapacitor storage performance will be done, especially dependence of supercapacitor performance with film thickness will be investigated.
- Low cost supercapacitor will be designed by using tin based double perovskites materials. The device will be designed and investigated properly to get excellent electrochemical performance. The performance of the fabricated supercapacitor will be analysed for future study.

Keywords :

Supercapacitors, Double Perovskites, Multiferroics, Solar Cell, Optoelectronics

Expected Output and Outcome of the proposal :

The field of double perovskite multiferroics is growing in a rapid pace and use of those multifunctional materials is already an extremely active field. There are both challenges and opportunities in this field. Physicists have to understand the mechanism that provide large, robust, and coupled magnetization and polarization, combined with large magnetic susceptibilities at low electric or magnetic fields, all at room temperature. The goal of our investigation is to improve our understanding of the properties of the prepared tin based double perovskites and perovskite/double perovskite based solar cells by analyzing the electronic and magnetic properties along with structural one. This research will create a new class of multiferroic materials with controllable properties with good impact on environment. We will study the details of magnetic and electronic properties which may discover a regime and pave path for a further advancement in future research in this field. If we succeed in our work then performance of supercapacitor can be enhanced in future as well as the efficiency of perovskite based solar cells can most likely be enhanced. Development of devices with selective parameter can give better understanding of the performance. Patent and research publications will be aimed to highlight the outcomes and findings of the proposed research work.

Any other relevant information:

We have a research collaboration with UGC-DAE Consortium for Scientific Research, Indore. The contact scientist at the institute is Dr. Ramjanay Choudhary, Scientist G.

Suitability of the proposed work in major national initiatives of the Government:

Make in India, Innovate India


Theme of Proposed Work:

Energy, Environment

Collaboration Details for last 5 Years :

Planned Collaboration for the proposed work with any foreign scientist/ institution ?

No

SNo.	CO-PI Details
1	 <p>Ayan Mukherjee ayanmukherjee88@gmail.com ASSISTANT PROFESSOR(PHYSICS)</p> <p>College of Commerce, Arts and Science Opposite Rajendra Nagar Terminal, Kankarbagh Main Rd, BIHAR, PATNA <i>College (Public)</i> D.O.B : 23 Sep, 1984</p>

1. Origin of the Proposal

Recently green energy generation and energy storage have attracted immense attention of the researchers as a societal concern. The excessive use of the fossil fuels over past several years has created a critical global environmental pollution and an acute energy crisis. In the modern world, the ever increasing use of portable electronic devices such as smart mobile phones, notebook, computer, laptops and hybrid electrical vehicles etc necessitates a demand for energy storage systems possessing high energy as well as power density simultaneously. Batteries and fuel cells have high energy density but low power density, whereas capacitors have high power density but low energy density. Supercapacitor (SC) is a promising candidate to bridge the gap between the capacitors and batteries. The concomitant high energy and power density, quick charge/discharge process, and outstanding cyclic stability[1-6] make supercapacitors a promising and suitable candidate for the next generation energy storage devices. We know that the efficiency of the storage devices depends upon the structure and property of the component material. Nanomaterials with various shape, size and morphology, such as, hollow nano-architectures and one dimensional (1D) nanostructures can greatly optimize the electrode properties because of the increased effective surface area and short ion transfer pathways [7]. In general, redox active transition-metal oxides (TMOs) such as RuO_2 , Fe_2O_3 , ZnO , TiO_2 , NiO , MnO_2 , SnO_2 , CuO , Co_3O_4 , WO_4 , V_2O_5 etc. [7] have demonstrated high specific capacitance and fast and excellent reversible faradic reaction. Multiferroic oxide materials play crucial role in digital electronic materials industries such as memory devices, actuators, transducers, spintronic devices, magnetic data storage media, sensors and logic devices etc. Multiferroic materials exhibit more than one ferroic order. In particular, materials, in which ferromagnetic and ferroelectric orders coexist, attract a lot of attention in fundamental physics and chemistry [8-10]. Potential technological applications, such as, nonvolatile memories and sensors, have invigorated the generate research in the field of the ferromagnetic and ferroelectric materials [8-10]. In multiferroic materials, large spontaneous polarization was observed at room temperature. The magnetic property originates from a residual moment of a spin canting of the antiferro-magnetically ordered spin structure below the antiferromagnetic Néel temperature ($T_N = 643 \text{ K}$).

Recent discoveries of strong interplay between magnetism and ferroelectricity in those materials have also stimulated a lot of interest in strong coupling between ferroelectric and ferromagnetic order parameters. In these compounds (non-)collinear spiral magnetic structures induce ferroelectric spontaneous polarization [11] and the significant changes in dielectric properties under applied magnetic fields were observed.

Perovskite oxides, a broad class of compounds with ABO_3 structure are one of the most studied families of compounds in recent years owing greatly to their synthetic variability, compositional flexibility and their intriguing properties apart from their applications in electronic and magnetic devices. Recent enthusiasm in the field of multiferroics, double perovskites (DP) has arisen over general perovskites due to its wide range of controllable properties. The double perovskites with the chemical formula $R_2M'M''O_6$ (R=rare earth, M'/M'' =transition metal) are a composite of two different ternary perovskites $RM'O_3$ and $RM''O_3$ arranged in a three-dimensional (3D) checkerboard pattern. Despite, several theoretical and experimental works, the correlations between magnetic orderings and ferroelectric polarization in these compounds have not been fully understood thus far and further research is required. The remarkable supercapacitance property of metal oxides has driven our interest to study their complex oxide, double perovskite which is a newly emerged multiferroic material.

As far as the double perovskites are concerned, they are being extensively used as a solar cell materials nowadays. In 2009, Miyasaka [12, 13] had first incorporated perovskite structures into solar cells. In 2012, Henry Snaith and Mike Lee [14] developed solid state hole transporter. In 2013, Burschka [15] achieved 15% efficiency in perovskite solar cells by using two step solution processing technique. In 2014, researchers at KRICT [16] achieved 20% efficiency from perovskite solar cells. In 2018, researchers at Chinese Academy of Science [17] achieved an efficiency of 23.3% from perovskite solar cells. The efficiency of solar cells has increased from 3.8% in 2009 to 23.3% in 2018 due to incorporation of perovskite structures in solar cells. But the researches in perovskite/double perovskite based solar cells are still in its nascent stage and a wide scope is there to carry forward the research in this field which fascinated us for the present proposal.

It is a well established fact the the process parameters of material synthesis play an important role in the structural and the morphological evolution of material which ultimately tunes the material property. We propose to synthesize several new multiferroic double perovskite materials by Chemical method, Sol-Gel Citrate technique and Electrodeposition method for their application as the storage devices like supercapacitors and generation of green energy (Solar Cell).The fundamental physics behind the multiferroics double perovskites, mainly in nano regime, is rich and fascinating to be exploited.

To the best of our knowledge, no such material has still been synthesized by electrodeposition. We propose to optimize the efficiency of perovskite/double perovskite solar cells just by changing the halide groups in the same material structure.

References:

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2. Review of status of Research and Development in the subject

2.1. International Status:

The researches for developing supercapacitors initially gained momentum in the United States, Japan, Russia, Switzerland, South Korea, France and other European and American countries.

The industrialisation of super capacitors began in 1980s. Nowadays, companies such as Panasonic, NEC, EPCOS, Maxwell and NESS are very active in the research of super capacitors. Supercapacitors have attracted worldwide attention since they have been introduced in the market. The compound annual growth rate of the supercapacitor market has been estimated to be 39%.

Research is going on worldwide to increase the energy density of supercapacitors, improve the storage capacity and microminiaturisation.

As of today, Perovskite solar cells based on organometal halides represent an emerging photovoltaic technology world wide.

Miyasaka et al applied 3D Perovskite $\text{CH}_3\text{NH}_3\text{PbX}_3$ (X=Br,I) as an inorganic sensitizer in dye sensitized solar cells in 2009.

They demonstrated a power conversion efficiency (PCE) of 3.1% for X=Br, and 3.8% for X=I.

Park et al reported PCE of 6.5% using $\text{CH}_3\text{NH}_3\text{PbI}_3$. At a given TiO_2 film thickness of about 3.6 micrometer, $\text{CH}_3\text{NH}_3\text{PbI}_3$ Perovskite showed an absorption coefficient that was 10 times greater than that of the conventional ruthenium based molecular dye.

They again reported long term stable Perovskite solar cells with PCE as high as 9.7%. Snaith et al proposed a non sensitization type Perovskite solar cell in which the mixed Halide Perovskite $\text{CH}_3\text{NH}_3\text{PbI}_{3-x}\text{Cl}_x$ coated Al_2O_3 film demonstrated PCE of 10.9%.

Perovskite solar cell technology was supposed to be the one of the biggest scientific breakthroughs of 2013 by the editors of Science and Nature.

Hence, the international scientific community is still discovering novel storage devices and searching for great breakthroughs in fabricating Perovskite based solar cells.

2.2. National Status:

The urge for developing concomitant High energy density as well as high power density storage devices and the acute scenario of environmental pollution due to excessive use of fossil fuels, have invigorated researches in India for developing supercapacitors and green energy sources. Several research institutions of the country are working to develop low-cost supercapacitive devices as well as the new generation solar cells having high efficiency. A team of scientists has developed a low-cost supercapacitor device with excellent capacity retention using a novel electrode material which can pave the way for the next generation of high power high energy storage devices. The team comprises scientists from the international advanced research Centre for powder metallurgy and new materials (ARCI) in collaboration with the Indian Institute of technology, Hyderabad. ARCI is an autonomous body of the Department of science and technology. The team developed a facile, scalable and cost-effective electrochemical route to synthesize electrodes made of nickel cobaltite (NiCo_2O_4) Containing nano sheet structures incorporated with oxygen vacancies as an active material for hybrid supercapacitors. These electrodes have excellent electrochemical performance. These hybrid supercapacitors combine the features of both the conventional double layer supercapacitors and batteries and act as high power High energy storage devices. The research team has also fabricated a symmetric supercapacitor device using porous carbon and NiCo_2O_4 electrodes. The new super capacitor exhibited excellent capacity retention and stability. The device could power devices like an LED lamp and a DC fan. In April 2020 scientists at the institute of Nano Science and technology had developed a new material for supercapacitor or pseudocapacitors, which can store electrical energy by electron charge transfer. This material can be used as an alternative to batteries as it offers a low-cost, highly scalable energy storage solution. In January 2020, The IISER, Pune in Collaboration with SPEL technologies, Pune had jointly developed technology for fabricating functionalized graphene at lower cost.

Similarly, several other research institutes of the country are working in this field and also fabricating Perovskite based high efficiency solar cells.

Despite the plenty of research work going on in these fields, The field is still supposed to be in its nascent stage and several mechanisms are still not well understood. It is challenging to design pseudocapacitor devices with redox metal oxide materials with high porosity, high capacitance and long cycle life. So avenues of research are still open.

2.3. Importance of the proposed project in the context of current status

The field of double perovskite multiferroics is growing in a rapid pace and use of those multifunctional materials is already an extremely active field. There are both challenges and opportunities in this field.

Physicists have to understand the mechanism that provide large, robust, and coupled magnetization and polarization, combined with large magnetic susceptibilities at low electric or magnetic fields, all at room temperature. The goal of our investigation is to improve our understanding of the properties of the prepared tin based double perovskites and perovskite/double perovskite based solar cells by analyzing the electronic and magnetic properties along with structural one. This research will create a new class of multiferroic materials with controllable properties with good impact on environment. We will study the details

of magnetic and electronic properties which may discover a regime and pave path for a further advancement in future research in this field. If we succeed in our work then performance of supercapacitor can be enhanced in future as well as the efficiency of perovskite based solar cells can most likely be enhanced. Development of devices with selective parameter can give better understanding of the performance. Patent and research publications will be aimed to highlight the outcomes and findings of the proposed research work.

2.4. If the project is location specific, basis for selection of location be highlighted:

No, The project is not location specific.

3. Work Plan

3.1. Methodology:

1. Preparation of several new multiferroics double perovskite materials. The focus will be to prepare multiferroics having low leakage current and strong magnetoelectric coupling at room temperature.

a) The above materials will be prepared using chemical method.

b) The above double perovskite compounds will be also prepared in sol-gel citrate technique and also by the method of two electrode electrodeposition and a comparative study of the different properties of the materials prepared by different methods will be performed.

c) We will also try to deposit thin film layer of those double perovskites and compare them with nanoparticles.

2. Characterization for the structural evolution, morphology and particle size distribution of these compounds will be done by x-ray diffraction, FESEM, AFM, transmission electron microscope, scanning electron microscope, Raman spectrometer, FTIR spectrometer , etc.

3. Ferroelectric, dielectric, and conductive behavior will be studied in the wide temperature and frequency ranges using an impedance analyzer.

4. Investigation of magnetic properties of these materials will be done using SQUID magnetometer.

5. Investigation of the effect of strain, defects, grain boundary etc. on the electric polarization, magnetization and magnetoelectric coupling behaviour will also be done.

6. Cyclic Voltammetry (CV) and Galvanostatic charge discharge (GCD) will be measured to investigate the electrochemical performance. We will try to increase the capacity retention as well as decrease the capacitance loss. Impedance spectra will be measured by LCR meter to study the ionic conductivity and specific resistance of the electrode material.

7. Detailed study of correlation between deposition parameter and supercapacitor storage performance will be done, especially dependence of supercapacitor performance with film thickness will be investigated.

8. Low cost supercapacitor will be designed by using tin based double perovskites materials. The device will be designed and investigated properly to get excellent electrochemical performance. The performance of the fabricated supercapacitor will be analysed for future study.

9. We shall try to use the synthesized materials to incorporate them for solar cell applications and enhance the efficiency of the solar cell by manipulating the halide groups. We shall also compare the efficiency of the perovskite solar cells which have been synthesized by different methods.

3.2. Time Schedule of activities giving milestones

0-3 Months	A. Literature Review/ Survey
4-12 months	B. Procurement of chemical and other consumables. C. Synthesis of Different Double Perovskite materials for their application in supercapacitors and solar cells. D. XRD, RAMAN, FTIR, SEM measurements for structural characterization.
13- 24 Months	E. Characterization through AFM, TEM, VSM F. Design and fabrication of supercapacitor devices using the optimized materials G. Measurement of Impedance, cyclic voltammetry (CV) and galvanostatic charge-discharge (GCD). H. Study of storage capacity of the fabricated device.
25-36 Months	I. Analysis of the devices. J. Testing of the developed devices. K. Publication and Patent Submission

Work Elements	First Year	Second Year	Third Year
A	—		
B	_____		
C	_____		
D	_____		

E	_____
F	_____
G	_____
H	_____
I	_____
J	_____
K	_____

3.3. Suggested Plan of action for utilization of research outcome expected from the project.

The field of double perovskite multiferroics is growing in a rapid pace and use of those multifunctional materials is already an extremely active field. There are both challenges and opportunities in this field.

Physicists have to understand the mechanism that provide large, robust, and coupled magnetization and polarization, combined with large magnetic susceptibilities at low electric or magnetic fields, all at room temperature. The goal of our investigation is to improve our understanding of the properties of the prepared tin based double perovskites and perovskite/double perovskite based solar cells by analyzing the electronic and magnetic properties along with structural one. This research will create a new class of multiferroic materials with controllable properties with good impact on environment. We will study the details of magnetic and electronic properties which may discover a regime and pave path for a further advancement in future research in this field. If we succeed in our work then performance of supercapacitor can be enhanced in future as well as the efficiency of perovskite based solar cells can most likely be enhanced. Development of devices with selective parameters can give better understanding of the performance. Patent and research publications will be aimed to highlight the outcomes and findings of the proposed research work.

3.4. Environmental impact assessment and risk analysis.

All the consumables used will be non-toxic which is good for our environment.

4. Expertise:

4.1. Expertise available with the investigators in executing the project:

Principal Investigator has expertise in thin film deposition, synthesis by electrodeposition techniques etc. The principal investigator started research career as a theoretical physicist and worked on electron impact ionization / excitation cross section of atoms/ ions. Later on the principal investigator shifted to experimental side and worked on ZnO based Dilute Magnetic

Semi-Conducting Systems. The principal investigator possess expertise in analysing XRD data, Mossbauer spectroscopy, analysis XPS data, analyzing RAMAN, FTIR, SEM, TEM data.

The Co-Principal Investigator has expertise in thin film deposition, characterization and application of them in gas sensing, energy storage etc. He started his research in metal sulphide based thin film and further worked in metal oxide-based film for electrochemical and electrical analysis. The Co-PI has more than 8 years of research experience. He is an expert in electrical properties analysis. He is specially working on nontoxic low-cost material for energy storage.

Since the beginning of research career the co-principal investigator has been working on thin film based gas sensors. At the very beginning of research career, he worked on InP thin films prepared by sputtering and diamond and boron doped diamond thin films by dc plasma deposition.

4.2. Summary of roles/responsibilities for all Investigators:

S.No	Name of the Investigators	Roles/Responsibilities
1	Dr. Santosh Kumar (PI)	Characterizations, Analysis of data, mentorship, Publications, Administrative work
2.	Dr. Ayan Mukherjee (Co-PI)	Material synthesis, characterization, analysis, report writing, publication,

4.3. Key publications published by the Investigators pertaining to the theme of the proposal during the last 5 years

1. Spin-polarized room temperature ferromagnetism in co-doped ZnO synthesized by electrodeposition, **Santosh Kumar**, R Kumar, R Kumar, P Vaibhav, RK Singh, N Kumar, RK Singh, Chinese Journal of Physics 73, 622-633, 2021

DOI: <https://doi.org/10.1016/j.cjph.2021.08.012>

2. Defect Induced Room Temperature Ferromagnetism and Enhanced Photocatalytic Activity in Ni-doped ZnO synthesized by Electrodeposition, Deepika, Raju Kumar, Ritesh Kumar, Kamdeo Prasad Yadav, Pratyush Vaibhav, **Seema Sharma**, Rakesh Kumar Singh, **Santosh Kumar**, 2020 *Chinese Phys.B*

DOI: <https://doi.org/10.1088/1674-1056/ab9c0c>

3. He⁺ Impact Double Ionization of Noble Gases, **Santosh Kumar**, Geetanjali, L.K. Jha, Bulletin of Pure and Applied Science, Vol 39(D) No. 1, 2020, Page 80-90

DOI: <http://dx.doi.org/10.5958/2320-3218.2020.00011.1>

4. Structural and Magnetic Properties of Second Row Transition Metal Doped Iron Oxide Nanoparticles, **Santosh Kumar**, Manthan, ISSN-0974-6331 18, 17-31, 2018

5. Synthesis of Transition Metal Doped ZnO Nanoparticles for Its use as an Adsorbent for WasteWater Treatment, **Santosh Kumar**, Manthan, ISSN-0974-6331 17, 18-29, 2017.

6. Structural and Magnetization Studies of Alloy of Immiscible Metals prepared by Electrochemical Method, **Santosh Kumar**, Natural Science Today, ISSN-0972-1908 33 (33), 93-100, 2017.

7. Effect of Al and Fe doping in ZnO on Magnetic and Magneto-transport properties , **Santosh Kumar**, Deepika, Malvika Tripathi, Pratyush Vaibhav, Aman Kumar, Ritesh Kumar, R.J Choudhary, D.M. Phase, **Journal of Magnetism and Magnetic Materials**, **419(2016) 68-73**

DOI: <https://doi.org/10.1016/j.jmmm.2016.06.007>

8. Study of Structural Evolution and Room Temperature Ferromagnetism Induced in Electrodeposited ZnO Thin Film due to Cobalt Doping, **Santosh Kumar**, Natural Science Today, ISSN-0972-1908 26 (26), 80-90, 2016.

9. “Influence of dipping cycle on SILAR synthesized NiO thin film for improved electrochemical performance” - M. R. Das, A. Roy, S. Mpelane, A. Mukherjee, P. Mitra and S. Das, *Electrochimica Acta* 273 (2018) 105-114. Available online 6 April 2018. <https://doi.org/10.1016/j.electacta.2018.04.024> [Elsevier: 0925-8388; 2018 Impact Factor: 5.383]

10. “Studies on Multifunctional Properties of SILAR Synthesized CuO Thin Films for Enhanced Supercapacitor, Photocatalytic and Ethanol Sensing Applications” – Mahima Ranjan Das, Ayan Mukherjee, Payel Maiti, Sachindranath Das & Partha Mitra, *Journal of*

Electronic Materials 48 (5) (2019) 2718-2730. DOI 10.1007/s11664-019-06940-1 [Springer; ISSN 0361-5235]

11. “SILAR-synthesized CdO thin films for improved supercapacitive, photocatalytic and LPG-sensing performance”-Mahima Ranjan Das and · Partha Mitra, Chemical Papers 73 (7) (2019) 1605–1619. [Springer; ISSN: 2585-7290] Published online: 15 February 2019 <https://doi.org/10.1007/s11696-019-00712-1>

12. “Structural, optical and ac electrical characterization of CBD synthesized NiO thin films: Influence of thickness” - M.R. Das, A. Mukherjee, P. Mitra, Physica E 93 (2017) 243–251. [Elsevier: ISSN: 1386-9477; 1386-9477; 2017 Impact Factor: 2.399] Available online 23 June 2017 <http://dx.doi.org/10.1016/j.physe.2017.06.018>

5. List of Projects submitted/implemented by the Principal Investigator

- 5.1. Completed a minor research project as principal investigator in collaboration with IIT-Kanpur on Mechano-synthesis of Iron based alloys, Sanctioned by UGC vide sanction letter no. PSB-009/05-06 dated 21st March 2006 for a period of two years.
- 5.2. Minor research project on ZnO based DMS System sanctioned by UGC vide sanction letter no PSB15/12-13ERO Dated 5/2/2013 serial no-214038.
- 5.3. Completed a major research project on Use of Magnetic Nano-particles for water treatment sanctioned by UGC-DAE Consortium for scientific research , Indore under CRS bearing No - CSR -IC-MSRSR-12/CRS-220/2017-18/1301, Dated 31st March, 2018.

6. List of facilities being extended by parent institution(s) for the project implementation.

6.1. Infrastructural Facilities

S.No	Infrastructural Facility	Yes/No/Not required Full or
------	--------------------------	-----------------------------

		sharing basis
1.	Workshop Facility	YES
2.	Water & Electricity	YES
3.	Laboratory Space/ Furniture	YES
4.	Power Generator	YES
5.	AC Room or AC	YES
6.	Telecommunication including e-mail & fax	YES
7.	Transportation	NO
8.	Administrative/ Secretarial support	YES
9.	Information facilities like Internet/ Library	YES
10.	Computational facilities	YES
11.	Animal/ Glass House	Not Required
12.	Any other special facility being provided	As Per requirement

6.2 Equipment available with the Institute/ Group/ Department/Other Institutes for the project:

Equipment available with	Generic Name of Equipment	Model, Make & year of purchase	Remarks including accessories available and current usage of equipment
PI & his group	Cyclic Voltammetry	-	Used for Electro ElectroChemical analysis
	Electrodeposition Set-up	Indigenous (Local) [2017]	Used for thin film deposition
	Furnace with	Indigenous (Local)	Used for sample

	temperature programmer	[2007]	preparation
PI's Collaborator	UV-vis spectrophotometer (UV-1800).	Schimadzu (2010)	Used for thin film optical properties measurement
	X-ray diffractometer	Bruker (D8 advance) 2015	Used for structural characterization of thin films and powders
	TEM, SEM, FTIR and XPS	-	Used for Magnetic and Structural Characterization

Budget Details

Institution wise Budget Breakup :

Budget Head	College of Commerce, Arts and Science	Total
Research Personnel	11,16,000	11,16,000
Consumables	2,50,000	2,50,000
Travel	60,000	60,000
Equipment	13,00,000	13,00,000
Contingencies	1,50,000	1,50,000
Other cost	60,000	60,000
Overhead	60,000	60,000
Total	29,96,000	29,96,000

Institute Name : *College of Commerce, Arts and Science*

Year Wise Budget Summary (Amount in INR) :

Budget Head	Year-1	Year-2	Year-3	Total
Research Personnel	3,72,000	3,72,000	3,72,000	11,16,000
Consumables	1,50,000	50,000	50,000	2,50,000
Travel	20,000	20,000	20,000	60,000
Equipments	13,00,000	0	0	13,00,000
Contingencies	50,000	50,000	50,000	1,50,000
Other cost	20,000	20,000	20,000	60,000
Overhead	20,000	20,000	20,000	60,000
Grand Total	19,32,000	5,32,000	5,32,000	29,96,000

Research Personnel Budget Detail (Amount in INR) :

Designation	Year-1	Year-2	Year-3	Total
Research Associate-I <i>A research associate will be required to work in the project for material synthesis, Tour and Travels etc because the principal investigator and co-PI both being regular teachers have huge teaching loads.</i>	3,72,000	3,72,000	3,72,000	11,16,000

Consumable Budget Detail (Amount in INR) :

Justification	Year-1	Year-2	Year-3	Total
<i>To complete the assignment, several chemicals and labware are necessary. The chemicals must be of analytical grade, which is expensive. We will also employ CNT for our task, which is rather expensive depending on its quality. Consumables will be of high quality in order to achieve higher production.</i>	1,50,000	50,000	50,000	2,50,000

Travel Budget Detail (Amount in INR) :

Justification (Inland Travel)	Year-1	Year-2	Year-3	Total
<i>Travel expenses included travel to sample measurement facilities located outside of the parent institution. Travel to seminars/workshops is also provided.</i>	20,000	20,000	20,000	60,000

Equipment Budget Detail (Amount in INR) :

Generic Name ,Model No. , (Make)/ Justification	Quantity	Spare time	Estimated Cost
Spin Coater (Apex) <i>To develop films of Perovskite materials.</i>	1	30 %	2,80,000
Electrometer 6514 model 6514 (Keithley) <i>This instrument covers all measurement and analysis software used in electrochemical properties analysis and to some extent the measurement of dielectric properties.</i>	1	30 %	10,20,000

Contingency Budget Detail (Amount in INR) :

Justification	Year-1	Year-2	Year-3	Total
<i>The contingent amount is made up of expenses that can be classified into one of several categories. It will be spent on books, photocopying, printing, data storage, and so on.</i>	50,000	50,000	50,000	1,50,000

Overhead Budget Detail (Amount in INR) :

Justification	Year-1	Year-2	Year-3	Total
<i>Overhead cost will be as per the rule. This will be for the parent Institute.</i>	20,000	20,000	20,000	60,000

Other Budget Detail (Amount in INR) :

Description/Justification	Year-1	Year-2	Year-3	Total
Measurement and analysis cost TEM and BET measurements will be done from outside the parent institute which required some cost.	20,000	20,000	20,000	60,000

Undertaking by the Principal Investigator

To

The Secretary
SERB, New Delhi

Sir

I _____
herby certify that the research proposal titled _____
_____ submitted for possible
funding by SERB, New Delhi is my original idea and has not been copied/taken verbatim
from anyone or from any other sources. I further certify that this proposal has been checked
for plagiarism through a plagiarism detection tool i.e. _____
approved by the Institute and the contents are original and not copied/taken from any one or
many other sources. I am aware of the UGCs Regulations on prevention of Plagiarism i.e.
University Grant Commission (Promotion of Academic Integrity and Prevention of
Plagiarism in Higher Educational Institutions) Regulation, 2018. I also declare that there are
no plagiarism charges established or pending against me in the last five years. If the funding
agency notices any plagiarism or any other discrepancies in the above proposal of mine, I
would abide by whatsoever action taken against me by SERB, as deemed necessary.

Signature of PI with date

Name / designation



Phone : 0612-2350136 (O)
E_mail : principalcocaspatna@gmail.com
Website : www.cocaspatna.ac.in

College of Commerce, Arts & Science

Kankarbagh, Patna – 800 020
(A Constituent Unit of Patliputra University, Patna-20)
NAAC RE-ACCREDITED 'A' Grade, with CGPA 3.10

OFFICE OF THE PRINCIPAL

Ref:-

Date:-.....

Endorsement from the Head of the Institution of PI

This is to certify that:

1. Institute welcomes participation of **Dr. Santosh Kumar, Associate Professor** as the Principal Investigator for the project titled **Investigation of Electronic and Magnetic Properties of Double Perovskites for Supercapacitor Applications and Green Energy Generation** and that in the unforeseen event of discontinuance by the Principal Investigator, the Co-Investigator will assume the responsibility of the fruitful completion of the project with the approval of SERB.
2. The PI, **Dr. Santosh Kumar** is a permanent or regular employee of this Institute/University/Organization and has **12 years** of regular service left before superannuation
3. The project starts from the date on which the University/Institute/ Organization/College receives the grant from SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi.
4. The investigator will be governed by the rules and regulations of University/ Institute/Organization/College and will be under administrative control of the University/ Institute/Organization/College for the duration of the project.
5. The grant-in-aid by the SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi will be used to meet the expenditure on the project and for the period for which the project has been sanctioned as mentioned in the sanction order.
6. No administrative or other liability will be attached to SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi at the end of the project.
7. The University/Institute/Organization/College will provide basic infrastructure and other required facilities to the investigator for undertaking the research project.
8. The University/ Institute/Organization/College will take into its books all assets created in the above project and its disposal would be at the discretion of SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi.
9. The University/ Institute/Organization/College assumes to undertake the financial and other management responsibilities of the project.

Seal of University Signature
Institute/Organization/College
Date: 29.09.2022

Principal
College of Commerce, Arts & Science
Patna- 800020

Principal of College

[Handwritten Signature]
29.09.22



Phone : 0612-2350136 (O)
E_mail : principalcocaspatna@gmail.com
Website : www.cocaspatna.ac.in

College of Commerce, Arts & Science

Kankarbagh, Patna – 800 020
(A Constituent Unit of Patliputra University, Patna-20)
NAAC RE-ACCREDITED 'A' Grade, with CGPA 3.10

OFFICE OF THE PRINCIPAL

Ref:-

Date:-.....

Endorsement from the Head of the Institution of Co-PI

This is to certify that:

1. Institute welcomes participation of **Dr. Ayan Mukherjee, Assistant Professor** as the Co-Principal Investigator for the project titled **Investigation of Electronic and Magnetic Properties of Double Perovskites for Supercapacitor Applications and Green Energy Generation** and that in the unforeseen event of discontinuance by the Principal Investigator, the Co-Investigator will assume the responsibility of the fruitful completion of the project with the approval of SERB.
2. The Co-PI, **Dr. Ayan Mukherjee** is a permanent or regular employee of this Institute/University/Organization and has **27 years** of regular service left before superannuation
3. The project starts from the date on which the University/Institute/ Organization/College receives the grant from SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi.
4. The investigator will be governed by the rules and regulations of University/ Institute/Organization/College and will be under administrative control of the University/ Institute/Organization/College for the duration of the project.
5. The grant-in-aid by the SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi will be used to meet the expenditure on the project and for the period for which the project has been sanctioned as mentioned in the sanction order.
6. No administrative or other liability will be attached to SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi at the end of the project.
7. The University/Institute/Organization/College will provide basic infrastructure and other required facilities to the investigator for undertaking the research project.
8. The University/ Institute/Organization/College will take into its books all assets created in the above project and its disposal would be at the discretion of SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi.
9. The University/ Institute/Organization/College assumes to undertake the financial and other management responsibilities of the project.

Seal of University Signature
Institute/Organization/College
Date: 29.09.2022


Principal of College

Principal
College of Commerce, Arts & Science
Patna-800020

Undertaking by the Principal Investigator

To

The Secretary
SERB, New Delhi

Sir

I **Dr. Santosh Kumar, Associate Professor, Department of Physics, College of Commerce, Arts & Science, Patna-20** hereby certify that the research proposal titled “ **Investigation of Electronic and Magnetic Properties of Double Perovskites for Supercapacitor Applications and Green Energy Generation**” submitted for possible funding by SERB, New Delhi is my original idea and has not been copied/taken verbatim from anyone or from any other sources. I further certify that this proposal has been checked for plagiarism through a plagiarism detection tool i.e. **Urkund** approved by the Institute and the contents are original and not copied/taken from any one or many other sources. I am aware of the UGCs Regulations on prevention of Plagiarism i.e. University Grant Commission (Promotion of Academic Integrity and Prevention of Plagiarism in Higher Educational Institutions) Regulation, 2018. I also declare that there are no plagiarism charges established or pending against me in the last five years. If the funding agency notices any plagiarism or any other discrepancies in the above proposal of mine, I would abide by whatsoever action taken against me by SERB, as deemed necessary.



07/10/2022

Signature of PI with date

Name / designation

Dr. Santosh Kumar
Associate Professor

FILE NO. SSY/2022/001114
SCIENCE & ENGINEERING RESEARCH BOARD(SERB)
(a statutory body of the Department of Science & Technology, government of India)

Science and Engineering Research Board
3rd & 4th Floor, Block II
Technology Bhavan, New Mehrauli Road
New Delhi - 110016

Dated: 15 February, 2023

ORDER

Subject: Financial assistance for the organizing International Conference on "International Conference on Material Processing and Applications 2023 (ICOMPA 2023) " by Dr. Santosh Kumar , College Of Commerce, Arts And Science , Opposite Rajendra Nagar Terminal, Kankarbagh Main Rd, Patna, Bihar-800020 being held from 01-Mar-2023 to 03-Mar-2023 (3 days).

Sanction of **Science and Engineering Research Board (SERB)** is hereby accorded to the above mentioned project at a total cost of **Rs. 400000/- (Rs. Four Lakh Only)** to College Of Commerce, Arts And Science , Opposite Rajendra Nagar Terminal, Kankarbagh Main Rd, Patna, Bihar-800020 during the financial year 2022-2023 to meet the expenses related to TA/DA to Young and Senior Indian Scientists, Pre-conference printing in connection with the above event.

2. The amount of **Rs. 400000/- (Rs. Four Lakh Only)** will be drawn by Under Secretary, SERB and disbursed by the means of Cheque or Electronic Fund Transfer (NEFT/RTGS) as beneficiary's Bank Details given below.

PFMS Unique Code	BRPA00004803
Account Name	COCAS RESEARCH FUND
Account Number	5325395084
Bank Name & Branch	CENTRAL BANK OF INDIA COLL OF COMMERCE PATNA EXT CTR (03757), College of Commerce, Patna: 800020.
IFSC/RTGS Code	CBIN0283757
Email id of A/C Holder	ayan@cocaspatna.ac.in
Email id of PI	santosh.phy@cocaspatna.ac.in

to **PRINCIPAL, College Of Commerce, Arts And Science, Opposite Rajendra Nagar Terminal, Kankarbagh Main Rd**

3. The expenditure involved is debitable to **Fund for Science & Engineering Research (FSER)**
This release is being made under Seminar/Symposia. (Internal Committee). General

4. The Sanction has been issued with the approval of competent authority under delegated powers and vide sanction number to College Of Commerce, Arts And Science, Opposite Rajendra Nagar Terminal, Kankarbagh Main Rd with the approval of the competent authority under delegated powers on **10 February, 2023** and vide Diary No. **SERB/F/10651/2022-2023** dated **15 February, 2023**

5. As per Rule 211(1) of GFRs, the accounts of the Grantee Institution shall be open to inspection by the sanctioning authority/audit whenever the institute is called upon to do so.

6. It is **mandatory** that the grantee institution is required to submit to this office, audited Statement of Income-Expenditure, Utilization Certificate (in duplicate as per prescribed format) and brief report of above event (max. 04 pages) within three months after the date of completion. .

7. The balance amount, if any, may be returned through DD in favor of "Fund for Science & Engineering Research" payable at New Delhi.

8. The Organization/Institute/University should ensure that the technical support/financial assistance provided to them by the Science and Engineering Research Board, a statutory body of the Department of Science and Technology (DST), Government of India should invariably be highlighted/acknowledged in their media releases as well as in bold letters in the opening paragraphs of their Annual Report.

9. In addition, the investigator / host Institute must also acknowledge the support provided to them in all publications, patents and any other output emanating out of the project/program funded by the Science and Engineering Research Board, a statutory body of the Department of Science and Technology (DST), Government of India.

10. The logo of SERB is to be displayed on all Conferences / Seminars / Symposium material being used for the event.


(Dr. Sukumar Dey)

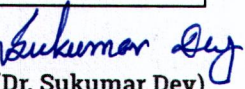
Scientist C

seminar.symposia@serb.gov.in

To,
Under Secretary
SERB, New Delhi

Copy forwarded for information and necessary action to: -

1.	The Principal Director of Audit, A.G.C.R. Building, IIIrd Floor I.P. Estate, Delhi-110002
2.	Sanction Folder, SERB, New Delhi.
3.	File Copy
4.	Dr. Santosh Kumar Physics College of Commerce, Arts and Science, Opposite rajendra nagar terminal, kankarbagh main rd, Patna, Bihar-800020 Email: santosh.phy@cocaspatna.ac.in Mobile: 918340549450 (Start date of the project may be intimated by name to the undersigned. For guidance, terms & Conditions etc. Please visit www.serb.gov.in .)
5.	PRINCIPAL, College Of Commerce, Arts And Science, Opposite Rajendra Nagar Terminal, Kankarbagh Main Rd (Receipt of Grant may be intimated by name to the undersigned)


(Dr. Sukumar Dey)

Scientist C

seminar.symposia@serb.gov.in

Event Details	Convener Details
International Conference on Material Processing and Applications 2023 (ICOMPA 2023) (Conference) 01-Mar-2023 to 03-Mar-2023 (3 Days) Geographical Coverage : International Broad Area : Physical Sciences https://cocaspatna.ac.in/icompa/ College of Commerce, Arts & Science, Patna (A Constituent Unit of Patliputra University, Patna) Opposite Rajendra Nagar Terminal, Kankarbagh Main Road, Patna, Bihar - 800020	Dr. Santosh Kumar Associate Professor, Physics santosh.phy@cocaspatna.ac.in Date of Birth : 05-Dec-1969 Contact No. : +918340549450 Nationality : INDIAN College of Commerce, Arts and Science College (Public) Opposite rajendra nagar terminal, kankarbagh main rd, Patna, Bihar-800020

Drapan Portal ID : Not Available

Objective :

• ICOMPA-2023 is a three-day international conference on materials processing and their applications in different aspects of life such as energy storage, bio-materials, electronic devices, sensors etc. • The primary focus of the conference is to create, encourage, nurture and sustain a research atmosphere in the Colleges and Universities of Bihar. With the intent to create an ambiance and motivation for research and give exposure to the science fraternity of the state for high ended contemporary research in the field of functional materials, the young and senior researchers/academicians from different parts of the globe will be brought under one roof to share and discuss their ideas. Hence, this conference is ultimately intended to promote the establishment of business and/or research relations among global partners for future collaborations. •The conference will be conducted in hybrid mode in order to facilitate high-quality discussions. • ICOMPA-2023 aims to share and discuss the ideas and knowledge of both theoretical and practical importance regarding new trends and approaches of materials synthesis, probable applications, and, proficiencies in material sciences.

Keywords :

Energy storage, Glass-ceramic, Surface engineering, Functional Materials, Sensors, Nanomaterials.

Brief information of last three events organised by your department :

NA

Is this Seminar/Symposia held annually? :

No

Any other relevant matter :

SCIENTIFIC SOCIAL RESPONSIBILITY: Being a leading institution of higher education, it is our ethical obligation and responsibility to create a proper research environment, able human resources, and a strong linkage between science and society. ICOMPA-2023 is a step forward in this direction.

Broad Details of Estimated Expenditure :

S.No.	Budget Description	Total Expenditure (INR)	Funding Required from SERB (INR)
1	Domestic Travel (Young and Senior Scientists)	2,80,000	2,80,000
2	Pre-conference printing	3,20,000	3,20,000
	Grand Total (INR)	6,00,000	6,00,000

RTGS Details

Name of Account Holder : COCAS RESEARCH FUND
Email ID : ayan@cocaspatna.ac.in
Designation : PRINCIPAL
Account Number : 5325395084
Bank Name : CENTRAL BANK OF INDIA
Branch Name and Address : COLL OF COMMERCE PATNA EXT CTR (03757), College of Commerce, Patna: 800020.
IFSC Code : CBIN0283757
Comments : Not Available

Theme of Proposed Work :

1. Energy
2. Materials

Suitability of the proposed work in the major national initiatives of the Government :

1. Make in India
2. Make in India
3. Innovate India
4. Innovate India
5. Make in India
6. Innovate India
7. Make in India
8. Innovate India

**Other Technical Details (Financial Assistance
to Seminar/Symposia)**

Name of the event- **International Conference on Material Processing and Applications 2023
(ICOMPA 2023)**

Broad details of estimated expenditure:(In Rupees)

a) TA/DA for Young Scientists (Indian)	= 60000.00
b) TA/DA for Senior Scientists (Indian)	= 220000.00
c) Pre-conference printing (Announcements, abstracts, etc.)	= 320000.00
d) Publication of Proceedings	= 430000.00
e) Stationery	= 120000.00
f) Secretarial Assistance	= 20000.00
g) Local Hospitality	= 380000.00
h) Misc.	= 70000.00
Total= 16,20,000.00	

2. Financial assistance required from SERB for the proposed event:

a) Domestic Travel for Young and Senior Scientists (Indian Only)	= 280000.00
b) Contingencies (Stationary items, Working, Tea/Lunch, Audio-Visuals etc.)	= 40000.00
c) Pre-Conference Printing (Announcements, abstracts etc.)	= 320000.00
Total= 6,40,000.00	

3. Details of income:

A. Revenue:

a) Registration fees	= 240000.00
b) Advertisement Charges	= 100000.00
c) Sponsorships	= 250000.00

B. Contribution by organizing Society/Institute= 350000.00

C. Support from other funding agencies:

	Agency Name	Amount Requested (`)	Amount Committed (`)	Amount Received (`)
a)	NA	NA	NA	NA
b)	NA	NA	NA	NA
c)	NA	NA	NA	NA
d)	NA	NA	NA	NA
	Total(C)	(a+b+c+d)	(a+b+c+d)	(a+b+c+d)
	GrandTotal	(A+B+C)	(A+B+C)	(A+B+C)

4. Details of previous grant received by convener from SERB in past:

S. No.	Sanction order No.	Date	Name of Activity (Seminar /Conference/Workshopped.)	Amount Sanctioned (`)	UC Furnished to SERB(Y/N) (If Y attach UC copy)
1.	NA	NA	NA	NA	NA
2.	NA	NA	NA	NA	NA

5. Details of previous grant received by organizing Institute/University/College/Society from SERB in past:

S.No .	Sanction order No.	Date	Name of Event (Seminar /Conference /Workshop etc.)	Amount Sanctioned (`)	UC Furnished to SERB(Y/N) (If Y, attach UC copy)
1 .	NA	NA	NA	NA	NA
2 .	NA	NA	NA	NA	NA

6. Details of participation in the event:

A. Foreign Delegates (Nos.): 5

B. Indian Delegates (Nos.): 200 (Probable)

a) Young Scientists(<35years): 6

b) Senior Scientists: 11

7. List of participants (Confirmed): Portal just opened (Probable 200 candidates)

S.No.	Name of Participant	Affiliated Department and Institute (With full address)	Email Id	Contact No (Office & Mobile)

****Note:*** To avoid any failure for consideration of submitted application, please do not make any changes in the prescribed format of this document.

*****Annexure No.(If any):***



Phone : 0612-2350136 (O)
E_mail : principalcocaspatna@gmail.com
Website : www.cocaspatna.ac.in

College of Commerce, Arts & Science

Kankarbagh, Patna – 800 020

(A Constituent Unit of Patliputra University, Patna-20)

NAAC RE-ACCREDITED 'A' Grade, with CGPA 3.10

OFFICE OF THE PRINCIPAL

Ref.- Gen/423/2022

Date:-19.12.2022



To

The Incharge

Symposia and Travel Grants Unit , CSIR - HRDC, New Delhi - 12

Subject: Proposal for financial support for organising an international conference on materials processing and applications

Sir,

Our college is organising an international conference on materials processing and applications (ICOMPA)- 2023 from 01 - 03 March, 2023. Five invited speakers from abroad and 11 invited speakers from different reputed research institutions of India have confirmed their participation. Apart from them about 200 young researchers working in the field of materials are likely to participate in the said conference.

The budget and request for financial support is attached herewith .

I humbly request you to kindly consider our request for supporting the proposed conference ICOMPA-2023.

With kind regards.


19.12.22

Prof. (Dr.) Indrajit Prasad Roy

Principal

College of Commerce, Arts & Science
Patna- 800020



COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH
HUMAN RESOURCE DEVELOPMENT GROUP
CSIR COMPLEX, OPP INSTITUTE OF HOTEL MANAGEMENT
LIBRARY AVENUE, PUSA, NEW DELHI- 110012, INDIA
Email: tgsms[at]csirhrdg[dot]res[dot]in
Phone: 011-25841037

Symposia Grant Scheme for Organising Scientific Events (Symposia/
Seminars / Conferences/ workshops, etc. within India)
SUMMARY SHEET (TO BE FILLED IN BY THE ORGANIZERS)

1. Name of the Society/Academic Institution/Research Organization under whose auspices the Scientific Event (Symposium/Seminar/Conference/Workshop/others) is proposed to be organized: **College of Commerce, Arts & Science Patna, Patliputra University, Patna, India.**
2. a) Full title of the Scientific Activity: **International Conference on Materials Processing and Applications - 2023 (ICOMPA).**
- b) Nature of the Scientific Event: Regional National International
3. Venue **College of Commerce, Arts & Science Patna- 800020** City : Patna
4. Dates (DD/MM/YY): From 01/03/2023 to 03/03/2023
5. Name and affiliation of the organizers
 - a) Chairperson: **Prof. (Dr.) Indrijit Prasad Roy, Principal, College of Commerce, Arts & Science, Patna**
 - b) Organizing Secretary: **Dr. Ayan Mukherjee, Department of Physics, College of Commerce, Arts & Science Patna**
6. **No. of delegates expected:** Nos. 200
2. **Anticipated expenditure (Total) :** Rs. 1700000
8. **Expected income from all sources :** Rs. 810000
- Grant requested from CSIR:** Rs. 400000
10. **Attachments with the Application (Mandatory):**
 - a. **Application proforma no CSIR/SYM/19/MAIN complete in all respects, duly signed by authorised signatory with the official seal**
 - b. **Authority letter from the Society/Academic Institution/Research Organization for organizing the scientific activity.**
 - c. **Copy of the Audited Statement of expenditure/Utilisation certificate of the last grant received from CSIR, if any:**
 - d. **Brochure of the proposed scientific activity**

Signature of Organizing Secretary

Ayan Mukherjee
19/12/22

TO BE FILLED BY CSIR COMMITTEE EXPERT

Observations: _____

Recommendation of Expert : Regret/Deferred/Approved Rs _____

Signature of Expert _____



COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH
HUMAN RESOURCE DEVELOPMENT GROUP
CSIR COMPLEX, OPP INSTITUTE OF HOTEL MANAGEMENT
LIBRARY AVENUE, PUSA, NEW DELHI- 110012, INDIA
Email: tgsm[at]csirhrdg[dot]res[dot]in
Phone:0112584107

**Symposia Grant Scheme for Organising Scientific Events (Symposia/
Seminars / Conferences/ workshops, etc. within India**

MAIN APPLICATION - (TO BE FILLED IN BY THE ORGANIZERS)

1. a) Name of the Organization under whose auspices, the Scientific Event is proposed to be organised: **College of Commerce, Arts & Science, Patliputra University, Patna, India.**
b) Nature of the organization (Pl tick mark \checkmark):

S. No.	Institution/scientific organization	Mark \checkmark
i.	Govt. Organization	
ii.	Central University	
iii.	State University	\checkmark
iv.	Deemed University	
v.	State Govt College	
vi.	Private College	
vii.	Autonomous Body	
viii.	Research Institute	
ix.	Professional Body	
x.	Registered Society	
xi.	Public Sector Undertaking	
xii.	Others (Pl Specify) _____	

2. a) Full title of the Event: International Conference on Materials Processing and Applications - 2023 (ICOMPA).

- b) Major discipline the Scientific Event Falls under (Pl tick mark \checkmark as applicable):

Chemical Sciences Life Sciences Engineering Mathematical Sciences
 \checkmark Physical Sciences Earth Environment, Ocean and Atmospheric Sciences Medical
Sciences Multi-disciplinary IT/ITES/Information Sciences

- c) Venue of the Event: Address : **College of Commerce, Arts & Science, Patna**
City- **PATNA** State **BIHAR** Pin **800020**

- d)

Date of the Event (DD/MM/YY): From 01 / 03 / 2023 to 03 / 03 / 2023

e) Organizers (Name and affiliation)

Chairperson: **Dr. Santosh Kumar, Associate Professor, Department of Physics, College of Commerce, Arts & Science Patna**

Organizing Secretary: **Dr. Ayan Mukherjee, College of Commerce, Arts & Science, Patna**

f) Complete Address of the contact person for all Communications:

Name: **Dr. Santosh Kumar**

MALE FEMALE

Designation: **Associate Professor**

Name of the Institute/Society: **College of Commerce, Arts & Science. Patna.**

Address: **Opposite Rajendranagar Terminal,**
City: **Patna** State: **Bihar** Pin: **800020**

Contact Number with STD Code:
Mobile NO. 8340549450

e-mail: santosh.phy@cocaspatna.ac.in

3. When was an activity on the similar topic organized by you last: N.A.

4. a) Main theme of the Scientific Activity (Attach separate sheet, if required):

ICOMPA 2023 provides an enabling platform for the physicists working in the field of functional materials and energy storage devices as well as the Electronics, Metallurgy, and Materials Science Engineering experts to exchange novel ideas and explore opportunities for comprehensive research in different kinds of materials and their applications. This conference is intended to promote the establishment of academics and research relations among global partners for future collaborations. The primary focus of the conference is to create, encourage, nurture and sustain a research atmosphere in the Colleges and Universities of Bihar

b) Details on the scientific program and technical sessions (Attached)

The technical programs include keynote address, invited lectures, contributed papers, oral/poster presentations, and open discussions. ICOMPA 2023 features technical sessions focused on recent and future aspects of materials and their applications. Detailed schedule is attached herewith.

Separate sheet attached

5. a) Relevance in the national context (Attach separate sheet, if required):

Materials can undoubtedly be supposed to be the building blocks of human civilization. Everyone will unconditionally agree that materials influence every walk of life in one way or the other. Right from the dawn of civilization, the impact of materials on living creatures has been so immense that several civilization eras have been named after materials such as the stone age, chalcolithic age, bronze age etc. Metals evolved from being used as hunting tools to household utensils to building materials throughout the history of human civilization. In the last 20 years, there has been a revolution in the area of materials research and engineering. People are rediscovering to engineer materials for their use in different fields ranging from ceramics and synthetic polymers to semiconductors and optical fibres. Thus the study of material science is very important to meet the social, health and other needs of humans. Material science is an interdisciplinary perspective of science which brings together diverse branches such as physics, chemistry, biology, engineering etc and reinvents the interwoven interplay of several tools in science, technology, and mathematics to find the solution to the need of contemporary society. By organising ICOMPA-2023, the College of Commerce, Arts and Science Patna is putting one small effort to develop a strong materials research group in Bihar by bringing all well-known researchers across the globe under one roof.

ICOMPA-2023 aims to share and discuss the ideas and knowledge of both theoretical and practical importance regarding new trends and approaches of materials synthesis, probable applications and, proficiencies in material sciences.

b) How will the activity help in the promotion of science (Attach separate sheet, if required)

Being a leader institution of higher education, it is our ethical obligation and responsibility to create proper research environment, able human resources and a strong linkage between science and society. ICOMPA-

2023 is a step forward in this direction. This conference will help participants to exchange information regarding emerging technological innovations, entrepreneurship, share experiences and research results pertaining to different materials and their applications. It will also provide platform for the young generation to show case their talents through creative pursuits for inspired researches for solving growing demands and aspirations of the society in unlocking and harnessing new vistas of knowledge and innovative ideas directed towards societal progress and amelioration.

6. a) Indicate which of the CSIR laboratories/institutions are engaged in the main theme of the scientific activity: N.A.

	Name of the CSIR Laboratory	Theme Area/Technical Session
i.		
:		

b) Indicate if any CSIR Scientists are expected to participate:

	Name of the scientist	Laboratory/Institution
i.		
ii.		

7. Authority letter from organization permitting Organizers to hold the Event enclosed? Yes/No.
Yes

8. a) Details of Participation:

Total delegates	
National	<u>200</u> Nos
International	<u>05</u> Nos

Young Scientists	
Ph.D.Students/ Res. fellows	<u>50</u> Nos
Post Docs	<u>15</u> Nos

b) Principal speakers (Keynote/Plenary and Invited)

Sr. No.	Name & Designation	Affiliated Department and Institute (With full address)	Email Id (Official)
1.	Prof. Animesh Jha Professor	Applied Material Science, University of Leeds, UK, England	A.Jha@leeds.ac.uk
2.	Prof. Girish Kale Professor	School of Chemical & Process Engineering, University of Leeds, UK, England	G.M.Kale@leeds.ac.uk
3.	Prof. H. C. Verma Retd. Professor	Emeritus Professor of Physics, IIT Kanpur	hcvermaed@gmail.com/ hcverma@iitk.ac.in
4.	Dr. R. J. Choudhary Scientist-G	UGC-DAE, CSR Indore, India	ramjanay@gmail.com

5.	Prof. Hari Srikanth Distinguished University Professor	Department of Physics, University of South Florida, USA	sharihar@usf.edu
6.	Prof. Sudhir Ranjan Professor	Rice University, USA	ransud@gmail.com
7.	Prof. N. K. Pandey Professor & Head	Head of Department, Lucknow University	profnarendrapandey137@gmail.com
8.	Dr. Chandan Kumar Assistant Professor	Centre for Nano Science and Engineering (CeNSE), Indian Institute of Science (IISc)	kchandan@iisc.ac.in
9.	Prof. Biplab Sanyal Professor	Department of Physics and Astronomy, Uppsala University, Sweden	biplab.sanyal@physics.uu.se
10.	Prof. S. C. Ogale Director	Formerly at IISER Pune & University of Pune Director, Research Institute for Sustainable Energy (RISE), TCG- CREST, Kolkata	satishogale@iiserpune.ac.in
11.	Prof. Avinash C. Pandey Director	Director, Inter University Accelerator Centre, GOI, New Delhi	get_avinash@yahoo.com/ acpandey@iuac.res.in
12.	Prof. Awalendra K. Thakur Professor	Department of Physics, Indian Institute of Technology, Patna	akt@iitp.ac.in
13.	Dr. Ramendra Sundar Dey Scientist D	Scientist D, INST- Mohali, Punjab	rsdey@inst.ac.in
14.	Prof. Manabendra Mukherjee Retd. Professor	Retired Professor of Surface Science and Material Characterization, Saha Institute of Nuclear Physics, Kolkata	manabendra.mukherjee@saha.ac.in / manabsinp@gmail.com
15.	Dr. Manoranjan Kar Associate Professor	Department of Physics, Indian Institute of Technology, Patna	mano@iitp.ac.in
16.	Dr. Ashok Bera Assistant Professor	Department of Physics, Indian Institute of Technology, Jammu	Ashok.bera@iitjammu.ac.in

9. Details of Young Scientist sessions, if any Oral Poster (Tick as applicable):

10. Indicate How many delegates will be offered support (Approx. Nos.):

Travel Registration Local Hospitality

11. Anticipated expenditure under the following heads:

S No.		Amount (Rs)
i.	Travel support	
	a. Senior scientists:	2,20,000
	b. Young Scientists :	60,000
ii.	Registration Fee Waiver	
	a. Senior scientists:	40,000
	b. Young Scientists :	20,000
iii.	Promotion (web site, brochures, stationary, proceedings)	8,70,000
iv.	Secretarial assistance	40,000
v.	Local Hospitality	4,50,000
	TOTAL	17,00,000

12. Anticipated income:

S No	Details	Amount (Rs)
i.	Registration fee	2,20,000
ii.	Scientific Exhibition	50,000
iii.	Grant from the organizing society/Institution/organisation	3,50,000
iv.	Sponsorship	1,40,000
v.	Any other Source	50,000
	TOTAL	8,10,000

13. Estimated Head-wise Grant requested from CSIR:

S. No.	Budget Head	Amount (Rs)
i	Travel expenses for	
	a. Senior scientists:	50,000
	b. Young Scientists :	30,000
Ii	Registration Fee Waiver	
	a. Senior scientists:	40,000
	b. Young Scientists :	20,000
Iii	Promotion (web site, brochures, Stationery, proceedings)	90,000
Iv	Secretarial assistance	20,000
v	Local Hospitality	1,50,000
	TOTAL	4,00,000

14. Details of other R&D Organizations/agencies approached for sponsoring the proposed activity:

S. No.	Name of the agency/ R&D organization	Grant requested	Grant received	Grant expected
i.	SCIENCE & ENGINEERING RESEARCH BOARD (SERB)	6,00,000	N.A.	5,00,000
ii.				
iii.				

15. a) Have you received any grant from CSIR during the last 3 years. If yes, give details: NO

S. No.	Amount (Rs)	CSIR Grant No	Conference Title and period	Whether audited statement of expenditure/UC has been submitted?
i.				
ii.				

b) Copy of the audited statement of expenditure/utilization certificate of the LAST GRANT RECEIVED FROM THE CSIR must be enclosed. (Current application will be considered only if the above documents on all previous grants have been received by the CSIR HRDG)

16. State the name of the Authority (Director, registrar, Dean or any other designated authority) of society/Institution/organization to whom the grant can be released. (Please note that the grant cannot be released to an individual's Account): **PRINCIPAL, College of Commerce, Arts & Science, Patliputra University, Patna, India**

17. Any other information, which you may like to add:

In not more than 200 words

We further declare that the information furnished above is correct and that we have submitted all UCs/Audited statement of expenditure for the support availed from CSIR under this Scheme in the past.

18. Signatures with Seal:

Organising Secretary:

Chairperson of Organising Committee

Head of the Institution / Organisation

Signature Ayan Mukherjee

Signature Santosh

Principal
College of Commerce, Arts & Science
Patna- 800020

Name: Dr. Ayan Mukherjee
Mob No. 8372098447
Email ayan@cocaspтна.ac.in

Name: Dr. Santosh Kumar
Mob 8340549450
Email ID Santosh.phy@cocaspтна.ac.in

Name Prof. Indrajit Prasad Roy
Mob No. 8083860929
Email ID principal@cocaspтна.ac.in

Seal / Stamp



Seal / Stamp



Seal / Stamp



Program Schedule

Name of the event- **International Conference on Electronic Materials and Applications - 2022**
(ICEMA-2022)

Topics

T1 – Energy
T2 –Glass Ceramic
T3 – Surface Engineering
T4 – Functional Materials
T5 – Sensors

DATE: 01.03.2023 to 03.03.2023.

Program Schedule

Registration: 08:00 to 10:30

Tea: 10:30-11.00 am

Conference Inauguration – 11.00 am - 12.30 pm

Date	Session	Type of presentation	Topics	Time
Day 1	Morning	Inauguration Ceremony		11.00 am -12.30 p.m.
		Chair: Prof. R. K. Singh, Vice-Chancellor, Patliputra University, Patna, India		
		Keynote Address		12.30 pm-01.30 pm
		Chair: Prof. Indrajit Prasad Roy, Principal, COCAS, Patna, India		
	Afternoon	Chair: Prof. H.C. Verma, Retired Professor, Department of Physics, IIT, Kanpur and Prof. Rajmani Prasad Sinha, Former V.C., LNMU, Darbhanga		
		Invited Talk		02.30 – 03.15pm
		Oral Presentation		03.15-03.30 pm
		Oral Presentation		3:30 – 3:45pm
		Oral Presentation		3:45 – 4:00pm
		Oral Presentation		4:00 - 4:15pm

		Poster Presentation		4:15 – 5:15pm
Day 2	Morning	Chair: - Prof. Vijay A Singh, Retired Professor of Physics, HBCSE, Mumbai and Dr. Santosh Kumar, Department of Physics, College of Commerce Arts and Science, Patna		
		Invited Talk	T3 &T4 Parallel session	9:00 – 9:45am
		Invited Talk		9:45 – 10:30am
		Oral Presentation		10:30 – 10:45am
		Oral Presentation		10:45 – 11:00am
		Oral Presentation		11:00 – 11:15am
		Invited Talk		T5
		Oral Presentation		12.00 - 12.15
		Oral Presentation		12.15 -12.30
		Oral Presentation		12.30 - 12.45
		Poster presentation		12.45 - 1.45
	Afternoon	Chair: Dr. Arun Kumar, Retired Professor, Department of Physics, A. N. College, Patna		
		Invited Talk	T3, T4, T5	2:45 –3.30pm
Plenary talk, Award session for Best Poster and Best Oral presentation, Feedback and Valedictory session		4.00 – 5.00pm		



Ref:

Date: 15-05-2023

Sanction Order

To,
The Registrar/Principal/Financial Authority,
Through Dr. AYAN MUKHERJEE
COLLEGE OF COMMERCE, ARTS & SCIENCE, PATLIPUTRA UNIVERSITY

Subject: Collaborative Research Scheme(CRS) Project of UGC-DAE CSR entitle " by Dr. AYAN MUKHERJEE.

Dear Madam/Sir,

In continuation to our sanction letter the CRS project submitted to UGC-DAE CSR by **Dr. AYAN MUKHERJEE** of your institution has been approved by the competent authority. The principal collaborator from UGC-DAE CSR is **Dr. Ram Janay Choudhary**.The details of the remittance are given below:

Student fellowship(@ ₹14,000/- pm+HRA)	Consumable	Contingency	Total Amount	Date of remittance	PFMS Ref. No.
₹0	₹30,000	₹15,000	₹45000	0000-00-00	C032392284800
<i>No overheads are available under this scheme</i>					

This project has been approved as per the guidelines given below:

1. This is a Collaborative Research Scheme (CRS) of UGC-DAE CSR. In view of the complex and involved nature of the experiments, any publication emerging under the project must be of collaborative in nature with due consents from the scientists at UGC-DAE CSR and/or DAE centres, and in consultation with the Principal Collaborator/Coordinator. Following phrase must be included in the acknowledgement: "This work was partially/fully carried out using the facilities of UGC-DAE CSR. The authors acknowledge the financial support from UGC-DAE CSR through a Collaborative Research Scheme (CRS) project number ."
2. This project is sanctioned for **one year** but it may be extended on yearly basis subject to a total period of three years.
3. In case the CRS project has been approved without student fellowship, it will not be possible to grant student fellowship in subsequent years as well.
4. The PI must '**Apply for an Experiment Time**' through our online user portal <https://csruserportal.com/> for utilization of each experimental facility each time.
5. The project will be reviewed at the end of each year to consider sanction and financial allocation for the succeeding year.

6. The release of grants for the subsequent years can be made only upon receipt of funds from UGC towards the scheme. A separate sanction order will be issued for the subsequent years.

7. At the end of the financial year (i.e. by March 31) the PI should submit:

- (i) Utilization Certificate in the format provided at our website for the amount spent and
- (ii) A Statement of Expenditure duly signed by the Registrar/Principal/competent financial authority of your university/institution to the Centre-Director of respective Centre. The release of funds for the subsequent year(s) can only be made after receiving the above documents.

8. The UGC-DAE CSR will be able to reimburse the travel expenses to Project Investigators as per rules, limited to 2nd AC train fare visiting a centre on project work. However, the student participant is permitted for a sleeper class train fare by the shortest route and is as per prevailing norms of UGC-DAE CSR.

Rules for selection of a CRS project fellow

The CRS project fellow (if approved) should be made by an open selection procedure as per UGC guidelines. The recruitment procedure should be completed within 3 months after the release of the sanction order. The details for recruitment are given below:

#	Designation	Remuneration	Qualifications
1	CRS Project Fellow (Junior) -I	₹14,000 + HRA	M.Sc. (not earlier than 3 years) with a minimum of 55% marks in the concerned subject (for Science) M.E. / M. Tech. (not earlier than 3 years) 1st Class (for Engineering)
2	CRS Project Fellow (Senior)-I	₹16,000 + HRA	After completion of 2 years as a CRS Project Fellow (Junior) -I + at least one research paper in a reputed SCI journal + assessment of the student by a 3 member expert committee approved by the Centre-Director
3	CRS Project Fellow (Junior)-II	₹31,000 + HRA	Same as (1) + valid JEST/GATE/NET-JRF/Lectureship/UGC-CSIR NET JRF/Lectureship + Ph.D. registration of the student under the supervision of the PI at the University where PI's institute is affiliated
4	CRS Project Fellow (Senior)-II	₹35,000 + HRA	After completion of 2 years as a CRS Project Fellow (Junior)-II + at least one research paper in a reputed SCI journal + assessment of the student by a 3 member expert committee approved by the Centre-Director

1. All recruitment should be authorized by a selection committee as per rules of University/Institution in which the PI is working. The advertisement should be widely circulated electronically and a copy should be sent to the Principal Collaborator.

2. For appointing a student in the CRS project, the interview panel must be approved by the Centre-Director of the respective Centre. The PI should inform the interview schedule as least 2 weeks in advance. The entire process should be conducted in an online/hybrid mode.

3. A UGC-DAR CSR nominee along with Principal Collaborator is needed for all interviews and upgradations.

4. For all appointments, it has to be mentioned that it is on purely temporary basis and will co-terminate with the CRS project. Leave rules for the appointed fellow will be as per the host institution of PI.

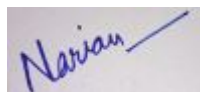
5. Appointment of student in the project is not permitted in the second or third year of the project.

6. While appointing as well as upgrading, a copy of relevant documents including CV along with educational qualification documents (incl. NET/GATE, etc.), minutes of the selection committee/upgradation committee, appointment letter, joining report etc. must be send to the Centre-Director of the respective Centre.

7. The student appointed under this project should spend a substantial amount of time at UGC-DAE CSR.

8. Contingency fund to be utilized for computational work, purchase of stationary and other consumables pertaining to the concerned project. No grant is allocated for any capital equipment/asset.

Copy to: Through User Portal to: Director, concerned Centre-Director, User Office, Dr. AYAN MUKHERJEE, Dr. Ram Janay Choudhary, AO for information.



Narian Kr.Lengay
Administrative Officer-I
(UGC-DAE CSR)



CRS/2022-23/1189

Chosen Centre: Indore

Project details	
Project title:	Biomaterial template derived metal doped NiCo2O4 nanostructure for improved supercapacitor electrode.
Type of Project:	In-house facilities of Indore Centre
Name(s) of Principal Collaborator from UGC-DAE CSR:	Dr. Ram Janay Choudhary
Is there an ongoing CRS project of UGC-DAE CSR as a PI?	No
Financial support required from UGC-DAE CSR?	Yes
Require Fellowship for a Student?	Yes
Consumable (MAX 50,000/- PER YEAR):	50000
contingency (MAX 15,000/- PER YEAR):	15000
Do you have any ongoing/submitted project with SERB/UGC/CSIR/BRNS or other funding agencies?	No
Personal Information	
Name of the Principal Investigator (PI):	AYAN MUKHERJEE
Date of Birth:	1984-09-23
Designation:	ASSISTANT PROFESSOR
Affiliation:	COLLEGE OF COMMERCE,ARTS & SCIENCE
Official E-mail address:	ayan@cocaspatna.ac.in
Postal address:	DEPT. OF PHYSICS, COLLEGE OF COMMERCE, ARTS & SCIENCE, OPPOSITE RAJENDRA NAGAR TERMINAL, PATNA-800020
Co-Principal Investigator	
Name of the Principal Investigator (PI):	SANTOSH KUMAR
Date of Birth:	1969-12-05
Designation:	ASSOCIATE PROFESSOR
Affiliation:	COLLEGE OF COMMERCE,ARTS & SCIENCE
Official E-mail address:	santosh.phy@cocaspatna.ac.in
Postal address:	DEPT. OF PHYSICS, COLLEGE OF COMMERCE, ARTS & SCIENCE, OPPOSITE RAJENDRA NAGAR TERMINAL, PATNA-800020
Bank Details	
Beneficiary Name	COC U.G.C. FUND
Account Number	1646244527
Bank Name	CENTRAL BANK OF INDIA
IFSC Code	CBIN0283757
Branch Name	COLL OF COMMERCE PATNA EXT CTR
Finance Authorities	
Account Officer's Name	DR. INDRAJIT PRASAD ROY

Account Officer's Email

principal@cocaspatna.ac.in

Title of Project: Biomaterial template derived metal doped NiCo₂O₄ nanostructure for improved supercapacitor electrode.

Introduction: The demand of green energy is increasing in rapid pace. The striking challenge for most renewable energy system is its storage capacity. High energy and high-power density are the major criteria for a decent storage device. So, intensive research for efficient energy storage system is in high demand. Currently supercapacitors have attracted significant attention as a novel energy storage system due to their ultra-high charge and discharge rate, outstanding stability, long life cycle, smart size and extremely high-power density. Thus, development of cost-effective improved supercapacitor electrodes is of prime interest.

Nickel cobaltite (NiCo₂O₄), with high electrochemical activity, large specific capacitance, and rich sources, has become a new class of energy storage material for electrochemical supercapacitor electrode, which facilitates to relieve the pressure of energy crisis and environmental pollution. But severe nanoparticle aggregation and tremendous interfacial resistance can limit its practical applications. Also, the electrochemical performance of electrode materials is highly dependent on their fabrication process, nanoscale structure, electronic configuration, pore volume, surface area and crystallinity. So, doping the material can reveal some solutions.

Aim of the project is to develop an excellent supercapacitor electrode material using cost effective biomaterial template. The main plan is to use bio-waste materials in developing supercapacitor electrode which in turn will maintain the environmental sustainability. The new electrode with unique porous morphology will be capable of delivering energy storage capacity higher than state of the art, and for longer cycle life.

Objectives: The main objectives of this project are

- Synthesis of metal doped NiCo₂O₄ porous nanostructure using low-cost biomaterial template.
- Characterization of the samples using x-ray diffraction (XRD), transmission electron microscope (TEM), scanning electron microscope (SEM), Dynamic Light Scattering, UV-Vis spectrophotometer, Raman spectrometer, FTIR spectrometer etc. Magnetic properties will also be analyzed for better knowledge acquisition.
- Cyclic Voltammetry (CV) and Galvanostatic charge discharge (GCD) will be used to investigate the electrochemical performance. We will try to increase capacity retention as well as decrease the capacitance loss. Impedance spectra will be measured by LCR meter to study the ionic conductivity and specific resistance of the electrode material.
- Details study on dependence of electrochemical performance of electrode materials on their fabrication process, doping, nanoscale structure, particle size, surface area, pore volume and crystallinity will be investigated. As changes in electronic configuration affects the supercapacitance properties, so we will study the properties like electronic band gap, ionic state, spin polarization etc. in details and will try to connect the role of changes in electronic structure with the enhanced supercapacitive properties.
- Prototype of supercapacitor electrode will be designed for improved supercapacitor.

Novelty of the proposal: The novelty of the proposal lies on the use of low-cost biomaterial template to get a specified structure which will increase the porosity of the electrode material hence the material will show better electrochemical properties. The use of bio waste material will further help us in attaining environmental sustainability. Also doping with metal like Ni, Zn, etc. to increase the conductivity which will solve the problem of tremendous interfacial resistance for nickel cobaltite-based electrodes. The work will help to fabricate low-cost, eco-friendly electrode material.

Methodology: First of all, NiCo₂O₄ will be synthesized by hydrothermal process. Low-cost biomaterial template such as industrial cotton, rice husk, etc. will be used to obtain different shapes for better porosity which

is important for supercapacitor electrodes. Metal (Ni, Zn, etc.) doping will be done to limit the interfacial resistance. We required 6 months for material synthesis. We will try to adopt eco-friendly green process in sample synthesis. The obtained samples will be calcinated to attain proper phase. The samples will be characterized by XRD, TEM, SEM, Dynamic Light Scattering, UV-Vis spectrophotometer, Raman spectrometer, FTIR spectrometer. The magnetic characterization will also be done. It seems that it will require about next 12 months for those characterization. The dielectric and electrical properties will be measured using impedance spectroscopy and current – voltage measurements. The cyclic voltammetry (CV) and galvanostatic charge-discharge (GCD) electrochemical measurements of the fabricated supercapacitor electrode will be carried out using electrochemical measurement set up at different scan rates at room temperature. The extensive GCD and CV measurement will be completed with next 6 months. The performance of the electrode material will be tested on basis of various parameters. The developed materials will be used to design and fabricate improved supercapacitors. The last 12 months will be used to analyze the data and made them published. If any significant outcomes were obtained then we will also plan for filling utility patent.

Possible Outcomes:

- ❖ Low-cost, highly porous supercapacitor electrode will be fabricated which can be implemented at future energy storage devices with reduced dimension and weight. We will try to deposit thin film electrodes as it is suitable for device design.
- ❖ Advance characterization of the electrode material will be useful to understand the dependence of electrochemical performance on different parameters. Development of devices with selective parameter can give better understanding of the performance.
- ❖ Patent and research publications will be aimed to highlight the developments of the proposed research work.

Characterization facilities required from UGC-DAE-CSR centers:

- (a) Selected structural and morphological properties (XRD, SEM, TEM, Raman Spectroscopy), (b) Optical properties (UV-Vis spectroscopy, PL spectroscopy), (c) Magnetic properties (SQUID-VSM), (d) Electronic properties (XPS).



Phone : 0612-2350136 (O)
E_mail : principalcocaspatna@gmail.com
Website : www.cocaspatna.ac.in

College of Commerce, Arts & Science

Kankarbagh, Patna – 800 020

(A Constituent Unit of Patliputra University, Patna-20)

NAAC RE-ACCREDITED 'A' Grade, with CGPA 3.10

OFFICE OF THE PRINCIPAL

Ref:

Date: 21.11.2022

DECLARATION

1. As a Principal Investigator (PI), I understand that it is my responsibility to carry out the Collaborative Research Scheme (CRS) project work as per rules and regulations of UGC-DAE CSR.
2. The scientific program of the CRS will be carried out jointly by me and a Principal Collaborator at UGC-DAE CSR. All scientific publications resulting from the CRS, will be communicated with each other's consent. Technical and scientific assistance from UGC-DAE CSR and DAE personnel will be acknowledged, either in the acknowledgements or in authorship.
3. Financial support received from UGC-DAE CSR will be acknowledged explicitly in all publications. Please add following sentence in the acknowledgement section of the manuscript, **"This work was partially/fully carried out using the facilities of UGC-DAE CSR"**
4. Progress reports, extension requests, conclusion documents, etc., will be submitted by me to the UGC-DAE CSR with the consent of the Principal Collaborator.
5. Copies of the publications, thesis, etc., resulting from the CRS will be sent to UGC-DAE CSR.

Place: **PATNA**

Date: **21.11.2022**

Ayan Mukherjee *Antosh*
Signature of Principal Investigator



Signature and Seal of Head of Institution / Department

[Signature] 21.11.22
Principal
College of Commerce, Arts & Science
Patna- 800020

BANK DETAILS

NAME OF ACCOUNT: COC U.G.C. FUND

A/C/ NO: 1646244527

BRANCH NAME: COLL OF COMMERCE PATNA EXT CTR BRANCH (03757)

IFSC: CBIN0283757



SERB-Notification

1 message

<SERB_Administrator@serbonline.in>
To: serbinfo1@gmail.com

Tue, 11 Oct 2022 at 15:58



Science and Engineering Research Board

(Statutory Body Established Through an Act of Parliament : SERB Act 2008)
Department of Science and Technology, Government of India

SCIENCE & ENGINEERING RESEARCH BOARD (SERB)

(Statutory Body Established Through an Act of Parliament : SERB Act 2008)

Science and Engineering Research Board
3rd & 4th Floor, Block II
Technology Bhavan, New Mehrauli Road
New Delhi - 110016

File Number: TAR/2022/000179

Dated: 11-Oct-2022

Subject: Project titled "Synthesis of nano-metal/metal oxide framework via cross coupling reactions for biomedical applications".

Dear Dr. Dimple KUMARI,

Kindly refer to the above-mentioned proposal for consideration of funding under the scheme **Teachers Associateship for Research Excellence (TARE)**. The proposal was examined by the peer committee, and we regret to inform you that the proposal was not found suitable for funding.

This project describes the synthesis of various metal nanoparticles and their surface functionalization with chemical molecule having free functional group like hydroxyl, azide, ester etc, which will be used as precursors for their conjugation. Further these free functional groups will undergo conjugation with small organic biomolecules by metal catalyzed C-C, C-N, C-O and C-S coupling reactions which are powerful tools and have been extensively re-investigated in the past few years. With increasing demands of environmentally friendly and costeffective alternatives to the commonly used palladium and nickel catalysts several alternative metals have been evaluated. Among these, Copper catalysis is utilized in Ullmann reactions, Diels-Alder reactions, ring expansions, Castro- Sevens coupling, Kharasch-Sosnovsky reaction and Huisgen 1,3-dipolar cycloaddition. These organic reactions have tremendous utility and are used for conjugation of nanoparticles. However, these methodologies need to be much explored in Nanoscience for their potential applications. Scheme design is not in well manner and cannot be implemented.

We thank you for showing interest in our scheme, and we will be happy to consider new proposal from you in future.

Yours sincerely,

(Dr. Arvind Chaudhary)

Scientist D

Dr. Dimple KUMARI

Chemistry

College Of Commerce, Arts And Science , Opposite Rajendra Nagar Terminal, Kankarbagh Main Rd, Patna, Bihar-800020

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Tue, 18 Oct 2022 at 12:00



Science and Engineering Research Board

(Statutory Body Established Through an Act of Parliament : SERB Act 2008)
Department of Science and Technology, Government of India

प्रिय Dimple KUMARI,

आपका प्रस्ताव प्रारंभिक जांच के लिए प्रस्तुत कर दिया गया है। कृपया भविष्य में किए जाने वाले पत्राचार में परियोजना की फाइल संख्या SPG/2022/001499 (POWER Screening Committee for Chemical Sciences) का उल्लेख करें। उपर्युक्त परियोजना से उद्भूत सभी अनुसंधान पत्राचार में उल्लेख किया जाना चाहिए।

सादर

एसईआरबी पोर्टल टीम

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Website : www.cocaspatna.ac.in

College of Commerce, Arts & Science

Kankarbagh, Patna – 800 020
(A Constituent Unit of Patliputra University, Patna)
NAAC RE-ACCREDITED 'A' Grade, with CGPA 3.10

OFFICE OF THE PRINCIPAL

Endorsement from the Head of the Institution of PI

This is to certify that:

1. Institute welcomes participation of **Dr. Vidya Yadav, Assistant Professor** as the Principal Investigator for the project titled “Assessing the Effect of Physical Activity Behaviour and Sedentary Lifestyle on Adult Health: Through the Lens of Built Environment” and that in the unforeseen event of discontinuance by the Principal Investigator, the Co-Investigator will assume the responsibility of the fruitful completion of the project with the approval of SERB.
2. The PI, **Dr. Vidya Yadav** is a permanent or regular employee of this Institute/University/ Organization and has **30 years** of regular service left before superannuation
3. The project starts from the date on which the University/Institute/ Organization/College receives the grant from **SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi.**
4. The investigator will be governed by the rules and regulations of University/ Institute/ Organization /College and will be under administrative control of the University/ Institute/Organization/College for the duration of the project.
5. The grant-in-aid by the **SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi** will be used to meet the expenditure on the project and for the period for which the project has been sanctioned as mentioned in the sanction order.
6. No administrative or other liability will be attached to **SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi** at the end of the project.
7. The University/Institute/Organization/College will provide basic infrastructure and other required facilities to the investigator for undertaking the research project.
8. The University/ Institute/Organization/College will take into its books all assets created in the above project and its disposal would be at the discretion of **SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi.**
9. The University/ Institute/Organization/College assumes to undertake the financial and other management responsibilities of the project.

Seal of
University
Institute/Organization/College
Date: 14.03.2023



Signature

Registrar of University/Head of the Institute
Head of organization / Principal

14-03-23
Principal
College of Commerce, Arts & Science
Patna - 800020



INDIAN COUNCIL OF SOCIAL SCIENCE RESEARCH

Application for Special Call 2023-24 – Collaborative Study

Research theme as per ICSSR list	Deendayal Antyodaya Yojana	
I. Personal Information		
1. Name of the Applicant	Dr. Vidya Yadav	
2. Address for Communication :	Department of Geography, College of Commerce, Arts & Science, Patna 7303585203 vidyayadav1821@gmail.com Bihar 800020	
3. Permanent Address :	Same as Communication Address	
4. Date of Birth (DD/MM/YYYY) :	12/01/1988, Age: 34 years 8	
5. Employer Details :	Designation: Name of organisation: College of Commerce, Arts and Science, Patna Address: College of Commerce, Arts and Science, Patna Constituent Unit of Patliputra University, Patna, Bihar-20 Mobile Number: Email: principalcocaspatna@gmail.com Website: https://cocaspatna.ac.in	
6. Indicate your category :	Category: GEN, Gender: Female, Person with Benchmark Disability: No	
7. Whether received any financial assistance from ICSSR	No	
11. Whether received any assistance/project from any other institution e.g. UGC, ICAR, CSIR, ICPR, ICHR, etc. :	No	
II. Ph.D details		
Title of the Ph.D :	“Built Environment, Social Capital and its Linkages to Health in an Urban Settlement: A Study of Selected Localities in Greater Mumbai City”.	
Name of the University :	International Institute for Population Sciences, Mumbai	

Year of Passing:	2021
Percentage of marks:	73.3
Main Discipline:	Population Studies

III. Affiliation Details of the Project Coordinator

Name of the affiliating institution	
College of Commerce, Arts & Science, Patna	
Postal address of affiliating institution :	College of Commerce, Arts & Science , Bihar , 800020
Phone Number	7303585203
Email ID	vidyayadav1821@gmail.com
Website	https://cocaspatna.ac.in
Type of affiliating institution :	State University

IV. Details of other Project Directors for the proposed collaborative research (4-6)

Sl No.	Name and Address with contact details Mobile No/email ID	Present Position	Institution
1.	Dr. Vidya Yadav Department of Geography College of Commerce, Arts & Science, Patna-20, Bihar, India Mobile No-7303585203 Email ID: vidya.geo@cocaspatna.ac.in	Assistant Professor	College of Commerce, Arts & Science, Patna -20, Bihar
2.	Dr. Moatula Ao P.G Department of Population Studies Fakir Mohan University, Vyasa Vihar, Nuapadhi, Balasore-756 089, Odisha Mobile: 8249027467 Email ID: jamirmoatula2@gmail.com	Assistant Professor	Fakir Mohan University, Vyasa Vihar, Nuapadhi, Balasore-756 089, Odisha
3.	Dr. Ngangbam Sapan Devi Lilong Haoreibi College, Lilong, Manipur Mobile no: 8879855979 Email ID: sapanadevi1@gmail.com	Assistant Professor	Lilong Haoreibi College, Lilong, Manipur
4.	Dr. Rajeev Kumar P.G. Department of Statistics Patna University, Patna, Bihar	Assistant professor	Patna University, Patna, Bihar
5.			
6.			

V. Research Project Proposal

a. Title of the Research Proposal .

Assessment of Deendayal Antyodaya Yojana (DAY) utilization by Urban Homeless: A Comparative Study among smart cities of Bihar

b. Sample size for the research study

Study area: The study area of present research work will be on two smart cities such as Patna and BiharSharif. The Patna contains highest population whereas BiharSharif comprises lowest population among smart cities of Bihar state. Sampling: The proposed study is going to be conducted on homeless urban dwellers, mainly residing on pavements, roadsides, at railway platforms, under staircases, inside drainage pipes, at a temple –mandaps or in the open areas. Hence, first study will map the residing area of homeless and then create comprehensive sampling frame. Using sampling frame study proposed to be conducted with the convenience sampling of homeless households. Data collection: Proposed study will collect quantitative and qualitative data concurrently from Patna and Bihar Sharif using questionnaire with structured and unstructured questions. The data collection will only conduct after informed consent. While collecting qualitative data study proposed to conducted in-depth interview (IDIs) and focused group discussion (FGDs). Method: Under quantitative methodology study will use descriptive analysis (e.g., univariate, bivariate) and multivariate analysis (logistic regression) to achieve the objectives of the study. Chi-square test will also conduct between indicators to assess association. Qualitative data finding will be used to compensate quantitative findings. There will be complete enumeration of household in Patna i.e. 2006 household & in BiharSharif 244 household. So, the total sample size will be 2250.

c. Total Grant expected for this study (in Rs.)

2056400

Declaration

<input checked="" type="checkbox"/> I hereby declare that:	<ul style="list-style-type: none"> • I am not a defaulter of any previous ICSSR grant. • I have not availed ICSSR pay protection scheme previously. • I have neither been subjected to any disciplinary action nor found guilty of any criminal offence in my career. • The Research Proposal and its contents are entirely original and as per the standard practice • I have not concealed any information in my fellowship application. If ICSSR finds any contrary information at any stage, it may cancel my fellowship out rightly and/or penalize me as per ICSSR rules.
--	--

Place :	Patna
---------	-------

Declaration Date :	2023-07-21
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Signature :	
-------------	---

Annexure/Checklists

- (✓) Forwarding letter from the Head of the affiliating Institution duly stamped and signed on the letter head .
- (✓) Research Proposal in the prescribed format .



INDIAN COUNCIL OF SOCIAL SCIENCE RESEARCH

Major/Minor Projects

Apply under	Minor	
Board Discipline	Gender Studies	
I. Personal Information		
1. Name of the Applicant	Dr. Vidya Yadav	
2. Address for Communication :	P.G. Department of Geography, College of Commerce, Arts & Science, Patliputra University, Patna 7303585203 vidyayadav1821@gmail.com Bihar 800020	
3. Permanent Address :	Same as Communication Address	
4. Date of Birth (DD/MM/YYYY) :	12/01/1988, Age: 34 years 8	
5(a). Mother's Name :	Saraswati Yadav	
5(b). Mobile Number :	9832713526	
5(c). Email Id :		
6(a). Father's Name :	Lakhan Kumar Yadav	
6(b). Mobile Number :	8436756219	
6(c). Email Id :		
7. Employer Details :	Designation: Principal Name: College of Commerce, Arts & Science, Patna Address: College of Commerce, Arts & Science, (Patliputra University) Patna-20, Bihar Landmark- Opposite to Rajendra Nagar Terminal Mobile Number: 8083860424 Email: principalcocaspatna@gmail.com Website: https://cocaspatna.ac.in/	
9. Indicate your category :	Category:GEN, Gender: Female, Person with Benchmark Disability: No	
10. Whether received any financial assistance from ICSSR	No	
11. Whether received any assistance/project from any other institution e.g. UGC, ICAR, CSIR, ICPR, ICHR, etc. :	No	
II. Educational Qualifications		

Name of Degree	Name of the University	Year of Passing	% of marks	Disciplines
Master's	Ravenshaw University, Cuttack, Odisha	2012	82.6	Applied Geography
M Phil	NA			NA
Ph D.	International Institute for population Sciences, Mumbai, Maharashtra	2021	73.3	Population Studies
Post-Doctoral	NA			NA

III-Research Experience of the Project Director

	Number	Brief Detail (Title and supporting Institution)
Projects Completed (Maximum 5)	00	NA
Ongoing projects, if any (with completion date)	0	NA
Fellowships	4	1. Government of India Fellowship for completing Ph.D 2.Fellowship award from DAAD for participating in summer school at Aachen university, Germany 3. Got fellowship as a travel award by welcome trust to present paper in 13th ICUH conference at San Francisco, USA 4.Got best paper fellowship award in Census Dissemination workshop conducted by Directorate of Census Operation, Maharashtra
Ph.D Guidance	0	NA
M.Phil Guidance	0	NA
Papers in Journals, Edited Books/Reports Published, etc.(Details of up to best 5) :		

Sl No.	Title of the Article	Name of the Journal, Place of Publication and Frequency	Month, Year and Volume of Publication with Page Nos.	Is the Journal Scopus Indexed and UGC CARE list? (Yes/No)
1.	What causes Loneliness among household heads: A study based in primary setting in Mumbai, India	Biomed Central, Public Health, Springer Nature, United Kingdom	April, 2022, Vol (22), Issue- 730, pp.1-12	yes
2.	Growing slums in Indian towns: Insights from Census data 2001-11	Demography India, Mumbai,	January, 2022, Vol (50), issue -2, pp-113-130	Yes
3.	Housing Conditions with Reference to Seepage in Different Residential Localities in Mumbai	Chapter in Edited book, Mishra M., Singh R.B., Lucena A.J., Chatterjee S. (eds) Regional Development Planning and Practice. Advances in Geographical and Environmental Sciences. Springer, Singapore	November, 2021, ISBN-978-981-16-5681-1,	No
4.	Assessment and Mapping of Homelessness- A Comparative Study between India and Bihar	Policy Review Paper, Shelter (GOI), New Delhi,	October, 2020, Vol. 21(2), pp.343-377, ISSN-2347-4912	No
5.	Does coal Mining affect household food security? An empirical study of Dhanbad, India	Biomed Central Agriculture and food security, Springer Nature, United Kingdom	January, 2019, Vol. 8, Issue (1), pp.1-13	Yes
6.	Neighbourhood characteristics and residential Satisfaction: A study of Greater Mumbai City	Social Science Spectrum, Mumbai	December, 2018, Vol. 4 (4), pp.191-204. ISSN- 2454-2806	No
7.	Coal Mining and Access to Livelihood Capitals: Mines and Non- Mines affected villages in Jharkhand (India)	Social Science Spectrum, Mumbai	March, 2019, Vol. 5, Issues (1), pp.24-41, ISSN-2454-2806.	No
8.	Does lack of Healthy Housing Affect the prevalence of Infectious Diseases: Linkages between Household Environment and Urban Health in India	Social Science Spectrum, Mumbai	March, 2016, Vol. 2, Issue (1), pp.38-48, ISSN-2454-2806	No
9.	Housing condition and living space in urban India	Bulletin of National Cooperative Housing Federation, (GOI), New Delhi	September, 2015, Vol.28, Issue (3), pp-15-18	No
10.	Spatial Dynamics of Population in Kolkata Urban Agglomeration	Chapter in edited book- Urban development Challenges, Risks and Resilience in Asian Mega Cities, Advances in geographical and environmental sciences, Springer, Japan	July, 2014, DOI:10.1007/978-4-431-55043-3_9, pp-157-173	No

Participation in Research Projects(also with capacity Best 3).

NA

Any other important Academic Achievement (approx. 100 words)

University topper and Gold Medalist during M.A. in Applied Geography in Ravenshaw University (2012). Attended many national and International Seminars, Workshop & Conferences. Awarded fellowship by DAAD to visit Aachen University as guest scientist in 2017, Travel award by Welcome Trust to attend 13th International conference on Urban Health held in San Francisco in 2016. Awarded with best research paper award by Census Operation Maharashtra in 2014, Best Paper award by UGC sponsored National Seminar on climate change Natural Hazard & Resource Management” at UTKAL University, 2012. Reviewer in scientific journal Demography India.

IV Affiliation Details

Name of the affiliating institution

College of Commerce, Arts & Science (Patliputra University), Patna)

Postal address of affiliating institution :

College of Commerce, Arts & Science (Patliputra University), Patna, Kankarbagh, Opposite to Rajendra Nagar Terminal, Patna-20, Bihar , Bihar , 800020

Phone Number

8083860424

Email ID

principalcocaspatna@gmail.com

Website

https://cocaspatna.ac.in

Type of affiliating institution :

State University

V Details of Project Co-Directors (if any, Maximum 3)

Name and Address with contact details Mobile No/email ID

Present Position

Institution

NA

NA

NA

NA

NA

NA

NA

NA

NA

NA

NA

VI Project Proposal

(i) Title of the Project Proposal :

Marriage market for desired groom among modern women: Evidence from the State of Bihar

(ii) Abstract (approx. 200 words)

Numerous transformations have occurred in our traditional Indian society as a result of westernization, modernization, and urbanization. The changes have been felt strongly in the living condition, education, and other aspects of life. Specifically, the females' socio-economic status has improved considerably, as a result they outshine in education and employment front. This gained empowerment has motivated females to express their mate preferences too. Despite the fact that this marriage preference is heavily influenced by their parents understanding and belief. In general, parents and their daughters prefer hypergamy when selecting a groom, followed by homogamy by all classes of people. The proposed study will try to answer whether educated and employed females inclined towards self- preferential marriages, what type of obstacles faced by females in search of suitable government employed grooms, does females married with government employed partner spent satisfactory life. The Present study will propose to examine the major determinants of self- preferential marriages among females, understand the opportunities and repercussion faced by them in search of mate, assess the marital satisfaction level of females. Study used primary data gathered by concurrent mixed (quantitative and qualitative) method approach from Patna city (Bihar). Study proposed comparative assessment between married government employed females and married educated females. Descriptive and inferential statistical used to draw findings and qualitative information will used to supplement the appeared gaps in the data-based findings.

(iii) Introduction of the Proposed Study (approx. 400 words)

Women's engagement in the employment sector and their financial independence had led to significant changes in their social life. With the weapon of education women enhanced herself over the period of time in India. Improved socio-economic conditions has not only given them more clout to make decisions on their education and employment, but also brought a metamorphosis in the concept of marriage and family formation. As a result, in our society, choosing spouses with the same or higher employment status is becoming more common. The prominent trend that persists is 'Marrying up'. In traditional society, 'marrying up', meant marrying into higher class or caste. But in present society, marriage revolves around within caste, higher class, high education with government job. This scenario is now clearly appeared in a Bihar like lower economic state (Empowered Action Group) as well. In Bihar, the demand for prestigious job particularly government job is very high among eligible bride and Grooms. And it is belief of every family that if they get a government job, they will receive a good marriage proposal as their career and life is well settled. It is therefore, the parents feel prevalence to marry their daughters with a groom having government job. Therefore, presently most of the marriages are influenced by status of government job related hypergamy followed by homogamy phenomena too. However, the picture of marriage market had changed its framework and a girl of marriageable age had to wait until she or her parents found a suitable match, now, she can continue her studies. The established belief that increasing female work participation will violate the hypergamy norms of traditional patriarchal society (Macmillan and Gartner 1999, Bertrand et al. 2015, Baland and Ziparo 2017, Bernard et al. 2020), but it is also not the situation. Even it was noticed that number of inter-caste and inter religions marriages those tried to break away traditional pattern but still preferred hypergamous marriages. Only 3 aspects are given importance by modern women: good education, high status, and government jobs.

(iv) Major Research Works Reviewed: 1) International and 2) National. Not less than 15 to 20 important works (approx. 400 words) :

Marriage is one of the most significant events in the lives of humans. In the Hindu faith, it is considered a sacramental union and is almost universal for both men and women throughout India. In marriage parents plays very crucial role; they not only decide the age at which to marry, but they also choose the appropriate partner and arrange the marriage for their son or daughters. Finding a suitable partner with desirable social, economic, and caste status can be a difficult task. People now using social media or matchmakers to find a suitable bride or groom based on their socioeconomic and, most importantly, caste background (Reddy and Rajanna, 1984; Bradford, 1985; Deolalikar and Rao, 1998). Although, improved socio-economic conditions of females not only make them able to take decisions to get good education and employment but also on marriage. Study conducted by Jones and Ramdas (2004), agreed upon the transformations in Asian marriage systems under the impact of increase in literacy level, urbanization, and employment. As a result, in our society, choosing spouses with the same or higher employment status is becoming more common. In caste system, a woman can marry within her own social class or marry into a higher social class (Mohandoss, 1995). Previously hypergamy mainly related with social status and religion but over the time several other identified factors which determined it such as education, government job and income of husband. At the outset these new influencing factors stressed on the traditional marriage patterns to some extent particularly in the urban cosmopolitan secularized areas of India. These factors have resulted in self-choice in marriage. Self-choice knows no geographic, religious or caste bar, for the fundamental need of love and affection become major considerations (Ramanamma and Bambawale, 1976). Further, in order to highlight the changes in marriage patterns, it is equally important to examine who marries whom in terms of age, education, and other attributes in addition to timing of entry into marriage (Utomo, 2014). With improvement in overall literacy, the role of education in mate selection is expected to undergo significant changes in India as well. And it is rightly pointed out by a recent study that, there has been an increase in likelihood of marriages among people of similar educational attainment, especially at the two extremes (Schwartz and Mare, 2003 & Smits, 2003). Several studies have emphasized that educational assortative mating has significant bearing on socioeconomic condition of the household and intergenerational transmission of social behaviour (Kalmijn, 1998; Blossfeld and Timm, 2003), Birkelund and Heldal, 2003). Some other studies suggest that educational homogamy may also increase social inequity (Schwartz & Mare, 2003; Smits, Ultee, and Lammers, Esteve and Cortina, 2006). Studies on marriage and family formation in India have also revealed that the desire for a government-employed groom grows over time. If the groom has a government job, the bride's family is willing to accept a marriage proposal despite the large age difference and economic disadvantage (Kodoth, 2008).

(v) Identification of Research Gap (approx. 300 words) :

Previous research in this area has primarily focused on demographic aspects and has been limited to marriage imbalance due to sex ratio, problems associated with late marriage or finding grooms and brides, physical appearance of the bride, and so on. Many studies have also indicated a marriage squeeze due to an increase in women's ages at marriage as parents of daughters become more concerned with secured and settled sons-in-law. However, there is a scarcity of studies that address hypergamy in education and government jobs, particularly in Bihar. And no comparative study has been conducted till now which indicates the benefits and bearing cost to marry groom working in government sector. As India goes through a cultural transition phase, traditional patriarchal norms are changing and being pressed by modern life elements. Bihar is still one of the states in India that lags behind in various socio-economic parameters, and on the other hand, getting government jobs is considered a dream and family pride, and to achieve this, they struggle, migrate, and spend a lot of time preparing. As a result, the current study on the changing pattern of marriage among highly educated government employed and unemployed females will provide a new direction for capturing brides' perspectives on the marriage market. Moreover, this study will try to address the situation that at what cost a highly educated unemployed bride get married to government employed groom.

(vi) Objectives of the Proposed Study (approx. 100-150 words):

1. To examine the major determinants of self- preferential marriages among females
2. To understand the opportunities and repercussion faced by them in search of mate
3. To assess the marital satisfaction level among females

(vii) Major Research Question/Hypotheses (approx. 150-200 words):

1. Whether educated and employed females inclined towards self- preferential marriages? 2. What type of obstacles (dowry, late marriage, unmatched marriage etc.) faced by females in search of suitable government employed grooms? 3. Does females married with government employed partner spent satisfactory life?

(viii) Proposed methodology for the research work (approx. 400 words)

Proposed study will be use cross-sectional study design to collect primary data from Patna city, Bihar. Data collection will be conducted using concurrent mixed method covering both quantitative and qualitative aspects. The quantitative self-reported information will be gathered with the help of structured questionnaire. Study fixed the quota of 200 sample that collected randomly from both the mutually exclusive subgroups called strata then recruitment of sample units until the desired sample we reach according (married government employed females and married educated unemployed female) denoting 100 from each respectively. Respondent of will belong to the age-group of 18-35 years from various government sector and secondly, married highly educated unemployed females from P.G. department of different colleges. The study will only consider opposite-sex matches and disregard homosexual union formation. The dependent variable of this study is marital status (1=married government employed females 0= married educated unemployed female) and the independent variable will be including female socio-economic, demographic background characteristics. The qualitative data will be collected through 4 (four) key informants (KIIs), 4 (four) In- Depth Interviews (IDIs) and 2 (two) Focused Group Discussion (FGD) conducted equally in two different comparative group. The FGD will be conducted using participants of heterogeneous age group having different educational and working background with an assumption to collect diverse viewpoints on the study subject. It will place in a group of 7-8 people for 30-40 minutes. Before starting the main survey, eligible females will be briefly informed about the purpose of the study and contents of the information to be collected. The survey instrument will be pre-tested with 15 sample in each group to check the sequencing, validity and reliability of the tools framed in the schedule. After necessary modifications in the schedule, the main survey will be conducted. Besides, before conducting the interviews, we will obtain the participants written/verbal informed consent and assured them of confidentiality. Data collection will be done on ODK Software and analysis will done by using STATA version 17. Suitable statistical techniques will be used while data analysis.

(ix) Innovation/Path-breaking aspects of the Proposed Research

This research will be really crucial for the state like Bihar, where cultural transformation is occurring as a result of urbanisation, that challenges the traditional marriage institution norms. The study will try to unfold the prevailing marriage market of Bihar that will be based on the comparison between employed and high educated but unemployed married women. The literature review reveals that this type of study has not been conducted so far which highlight the repercussion and opportunities faced by female during their marriages specially in search for government employed partners. Moreover, the unique primary database generated through field survey will definitely be of great use for formulating the marriage life satisfaction index. It will also help to formulate strategies and future plans - by the government, ministry, concern departments.

(x) Proposed Outcome such as papers in journals, edited book/(s), book, policy papers, document etc. with proposed timeline and place of publications (300 words)

1. During the final stage of research one or two quality research articles based on primary data analysis on the study objectives would be communicated for publication to reputed peer reviewed and UGC- Care listed journals. 2. The research finding from the study 3. After accomplishment of the proposed research, and submission of the project report; the entire study would be published in a book form by a reputed publisher; with due acknowledgement to ICSSR. 4. A comprehensive data set will be generated at the end of the project because the proposed research work is based on primary data. More such research studies can be carried out in the future using the generated data set.

(xi) Any new data to be generated where data deficiency is felt (100-150 words) :

The proposed study will be based on primary data including both quantitative and qualitative, so the data generated through field survey will be really helpful. There is lack of relevant data in the concerned field of research. To supplement the data deficiency, a huge bulk of primary data would be generated related to marriage at Patna city, Bihar. The primary data would be related to the individual level data that will be gathered from the females of two sub-groups (Employed females and highly educated unemployed females) with their background characteristics, mate selection preferences, before and after marriage social status, Repercussion and opportunities faced during marriage like beauty of bride, dowry, late marriage, unmatched mate, violence, degree of empowerment). Based on this available rich source of data marriage life satisfaction index will be created which will definitely try to showcase the marriage scenario in Patna City

(xii) Relevance of the proposed study for policy making :

The government of India works on welfare approach where, marginalised and vulnerable section of society are addressed by specific government department. Particularly for women development and rights protection several government agencies are working. This research finding will provide substantial evidence on social issues pertaining to like dowry, violence, level of women's empowerment etc. This collective evidence will guide policymaker to formulate new policy and upgrade and formulate new ones. The Indian government takes a welfare approach, with specific government departments addressing marginalised and vulnerable sections of society. Several government agencies are working for women's development and their protection of rights. Research finding drawn from this study will provide substantial evidence on social issues such as dowry, violence, and the level of women's empowerment, and others. This collective evidence will help policymakers to develop new policies and upgrade the existing ones.

(xiii) Relevance of the proposed study for society (approx. 200 words) :

The researcher is confident that the findings of this study will be eye-opening for people. They will receive a wealth of information that will raise their awareness of the current changes in the marriage market. The miseries endured by females as a result of their aspirations and failure to obtain desired grooms will be explained in the study, which are usually unheard and untold.

(xiv) Milestones set for each successive quarter of the study

Quarter	Milestone
I	Hiring of research assistant, Extensive empirical literature review on every aspect of the research topic, Developing Conceptual framework for the project, Designing of project report introduction chapters.
II	Preparation of survey tools , mapping of respondents, hiring of field investigator, research staff & associate.
III	initiation of field survey on the basis of structured schedules, collection of both quantitative and qualitative information
IV	Personal visit to few respondents for insights into qualitative information on the study subject
V	Quantitative data collected will then be clean, edited, and will start analysis process. Qualitative data will be transcript from audio records to scripted format while using Atlas-Ti software the qualitative information will be coded
VI	Suitable descriptive and inferential statistical analysis will be conducted with collected quantitative data and substantiate it with qualitative information.
VII	Writing of project report , publish and disseminate the finding in newspaper
VIII	Complete the writing of all chapter of the project report and submit the report to ICSSR

(xv) Budget and Duration (please see Guidelines at 5.3 for proportionate Limit of a head)

Total Grant expected under the scheme (In Rs.)	Duration Proposed (months)
500000	12

(xvi) Proposed budget of the study under expenditure heads with justification

Heads of Expenditure	Number	Months	Rate	Amount
1. Research Staff				
1(a). Research Associate				
1(b). Research Assistant	1	12	16000	192000
1(c). Field Investigator	2	3	15000	90000
2. Field work				50000
3. Equipment and study material				50000
4. Contingency				50000
Total				430000
5. Publication of report - approx. 5-7% (The allocation for publication amount will be retained by the ICSSR for publication of the final report if it is found to be high quality by the expert/experts appointed by the ICSSR)				60000
Grand Total				492000

Justification of different heads of budget (write in 30 words each)

1. Research Staff

The need of research staff (one research assistant and one field investigator would be for extensive literature review, preparation of survey tools, and for field survey.

2. Field work

The proposed research work would be based on primary data. For this purpose extensive field work and sample survey are required to be undertaken.

3. Equipment and study material

Study materials like books and reports of government/ non-government sources are needed for relevant information, 2 computer Tablets and stationery items.

Declaration

I hereby declare that:

- I am not a defaulter of any previous ICSSR grant.
- I have not availed ICSSR pay protection scheme previously.
- I have neither been subjected to any disciplinary action nor found guilty of any criminal offence in my career.
- The Research Proposal and its contents are entirely original and as per the standard practice
- I have not concealed any information in my fellowship application. If ICSSR finds any contrary information at any stage, it may cancel my fellowship out rightly and/or penalize me as per ICSSR rules.

Place :

Patna

Declaration Date :

13/10/2022

Signature :



Annexure/Checklists

Forwarding letter from the Head of the affiliating Institution duly stamped and signed on the letter head. .

CV of all Researchers (PD and Co-PDs) with their signatures and consents in writing (Brief CVs, not more than two to three pages each).

Self-attested SC/ST certificate or certificate of disability issued by the competent authority, if required.



CSIR-EMR-II Acknowledgement of receipt of Proposal under CSIR-HRDG-EMR-II

1 message

CSIR-HRDG-EMR-II <hrdgemr2@csirccmb.org>
Reply to: CSIR-HRDG-EMR-II <hrdgemr2@csirccmb.org>
To: dimple.diat@gmail.com

Fri, 3 Feb 2023 at 14:42

Dear dimple kumari,

Your research proposal titled: ' Surface Functionalization of Metal/Metal oxides Nanoparticles via copper catalyzed cross coupling reactions for biomedical applications ' has been registered with EMR-II Portal.

The registration/reference no. of your submitted research proposal is as follows:

Proposal ID:'.22898.'

CSIR-HRDG-EMR-II

Note: This is an auto generated Email, please do not reply to this mail.
For further assistance, you may please contact
Email: nsemr2@csirhrdg.res.in
Phone.No: 011-25842850



UGC-DAE CSR ** CRS Project Submission**

1 message

UGC-DAE CSR <support@csruserportal.com>

Thu, 23 Nov 2023 at 22:07

Reply to: support@csruserportal.com

To: dimple.diat@gmail.com

Cc: goutam.pramanik@gmail.com

Welcome to UGC-DAE CSR

Dear Dr. Dimple Kumari

Your Project: **In-house facilities of Kolkata Centre** has been submitted with project number: **CRS/2023-24/1490** has been received.

Name(s) of Principal Collaborator(s)/Coordinator at UGC-DAE CSR :Dr. Goutam Pramanik

Names(s) of Collaborators from DAE (if any) :NA

Names(s) of Collaborators from DAE (if any):NA

Note: This is a system generated email. Please don't reply.



Phone : 0612-2350136 (O)
Email : principalcocaspatna@gmail.com
drtapanshandilya@yahoo.co.in
Website : www.cocaspatna.ac.in

College of Commerce, Arts & Science

Kankarbagh, Patna - 800 020

(A Constituent Unit of Patliputra University, Patna)

NAAC RE-ACCREDITED 'A' Grade, with CGPA 3.10

OFFICE OF THE PRINCIPAL

Ref. : *CC/191/2022*

Date : *16.04.2022*

Endorsement from the Head of the Institution of PI

This is to certify that:

1. Institute welcomes participation of **Dr. Ayan Mukherjee, Assistant Professor** as the Principal Investigator for the project titled **Development of porous C_3O_4 / $NiCo_2O_4$ nanostructured thin film for high performance supercapacitor electrode** and that in the unforeseen event of discontinuance by the Principal Investigator, the Co-Investigator will assume the responsibility of the fruitful completion of the project with the approval of SERB.
2. The PI, **Dr. Ayan Mukherjee** is a permanent or regular employee of this Institute/University/Organization and has **27 years** of regular service left before superannuation
3. The project starts from the date on which the University/Institute/ Organization/College receives the grant from SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi.
4. The investigator will be governed by the rules and regulations of University/ Institute/ Organization /College and will be under administrative control of the University/ Institute/Organization/College for the duration of the project.
5. The grant-in-aid by the SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi will be used to meet the expenditure on the project and for the period for which the project has been sanctioned as mentioned in the sanction order.
6. No administrative or other liability will be attached to SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi at the end of the project.
7. The University/Institute/Organization/College will provide basic infrastructure and other required facilities to the investigator for undertaking the research project.
8. The University/ Institute/Organization/College will take into its books all assets created in the above project and its disposal would be at the discretion of SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi.
9. The University/ Institute/Organization/College assumes to undertake the financial and other management responsibilities of the project.

Seal of University
Institute/Organization/College
Date: 16.04.2022



The Principal
Signature
Registrar of University/Head of the Institute/
Head of organization / Principal of College
Patna- 800020





Development of porous Co_3O_4 / NiCo_2O_4 nanostructured thin film for high performance supercapacitor electrode

File Number : CRG/2022/005085

Submitted By : Dr. Ayan Mukherjee

Submission Date : 30-Apr-2022



Phone : 0612-2350136 (O)
E_mail : principalcocaspatna@gmail.com
Website : www.cocaspatna.ac.in

College of Commerce, Arts & Science

Kankarbagh, Patna – 800 020

(A Constituent Unit of Patliputra University, Patna-20)

NAAC RE-ACCREDITED 'A' Grade, with CGPA 3.10

OFFICE OF THE PRINCIPAL

Ref:

Date: 21.11.2022

DECLARATION

1. As a Principal Investigator (PI), I understand that it is my responsibility to carry out the Collaborative Research Scheme (CRS) project work as per rules and regulations of UGC-DAE CSR.
2. The scientific program of the CRS will be carried out jointly by me and a Principal Collaborator at UGC-DAE CSR. All scientific publications resulting from the CRS, will be communicated with each other's consent. Technical and scientific assistance from UGC-DAE CSR and DAE personnel will be acknowledged, either in the acknowledgements or in authorship.
3. Financial support received from UGC-DAE CSR will be acknowledged explicitly in all publications. Please add following sentence in the acknowledgement section of the manuscript, **"This work was partially/fully carried out using the facilities of UGC-DAE CSR"**
4. Progress reports, extension requests, conclusion documents, etc., will be submitted by me to the UGC-DAE CSR with the consent of the Principal Collaborator.
5. Copies of the publications, thesis, etc., resulting from the CRS will be sent to UGC-DAE CSR.

Place: **PATNA**

Date: **21.11.2022**

Ayan Mukherjee *Antosh*
Signature of Principal Investigator



Signature and Seal of Head of Institution / Department

[Signature] 21.11.22
Principal
College of Commerce, Arts & Science
Patna- 800020



Chemical and Biological Sensing Via Polarity of Materials: Using Environment Friendly Lead-Free Perovskite-Phase Metal Oxide

File Number : CRG/2023/006913

Submitted By : Dr. LAXMAN SINGH

[SERB Qualified Unique Identification Document: SQUID-1984-LS-5151]

Submission Date : 19-Mar-2023

PROPOSAL DETAILS

(CRG/2023/006913)

Dr. LAXMAN SINGH

laxmanresearcher84@gmail.com

Associate Professor (Chemistry)

Siddharth University, Kapilvastu

Pachangawa, Siddharthnagar, Uttar pradesh-272202

Technical Details :

Scheme :	Core Research Grant		
Research Area :	Environmental Engineering (Engineering Sciences)		
Duration :	36 Months	Contact No :	+919910186046
Date of Birth :	15-Jul-1984		
Nationality :	INDIAN	Total Cost (INR) :	34,45,420
Is PI from National Laboratory/Research Institution ?	No		

Project Summary :

Since past few decades Lead based $PbTiO_3$, $Pb(Zr,Ti)O_3$ etc perovskites have been proven to be very important materials for variety of applications and technology. With a continuous demand for the tunable devices and very high dielectric parallel plate capacitors, perovskites $A(A=Ca, La, Pr, Dy, Gd..)$ $Cu_3Ti_4O_{12}$ widely applicable towards the many applications as in electrodes of solid oxide fuel cells, metal-air batteries, gas sensors and high-performance catalysts all over the world. In the early stage of investigation of this class of ternary perovskites that their electrical properties were dependent on the processing methods, crystalline states such as powder vs. multi crystals and single crystals. In addition, it was also observed that trace of chemical impurities affected the dielectric constant and resistivity significantly. This provided the basis for chemical sensing by using this class of materials. CCTO is a very important member of this very important perovskite family show dielectric constant of the order of 10^4-10^5 . It shows ability to undergo a series of cationic exchange reactions which results into corresponding isomorphs. Colossal dielectric constant in this class of materials are associated with the presence of re-oxidized grain boundary regions on the outer surfaces of the large semiconducting grains or to a secondary phase at the grain boundaries which confirm the internal barrier layer capacitor (IBLC) mechanism present in these ceramics. Some results of impedance spectroscopy demonstrated that there are electrically heterogeneous semiconducting grains with insulating grain boundaries. It was also observed that significant transition occurs in morphologies due to impurities as well as intentional doping. Slight lead oxide doping showed even transition from nonfasted to faceted morphology and huge decrease in dielectric constant. With these goals, we used the parallel plate capacitors as chemical and biological sensors. The earlier literature indicated huge difference in the dielectric and resistivity of the exposed samples. This indicates that perovskites can be used for chemical and biological sensors at very low cost. Also, preliminary data indicates that after exposing in atmosphere, there materials can recover to original characteristics. Although we have used variety of processes for preparing this class of materials including wet (flame synthesis) and semiwet methods, results presented in this proposal are based on annealing method of compacted powder material. The perovskite nanostructured materials are having the capability to detect the very small type of molecules such as CO_2 , O_2 , NO_2 , H_2 , NH_3 , etc. The lead free perovskite having the structural formula $ACu_3Ti_4O_{12}$ are highly thermal stable, high sensitivity, high structural stability with low cost synthesis procedure will be potential candidate in sensing performance to various biological and chemical species in solution as well as solid states.

Objectives :

- o Perovskites with stoichiometry $CaCu_3Ti_4O_{12}$ (CCTO), CCATO, and PCTO along with few compositions of $A(A=Ca, La, Dy, Pr, Gd..)Cu_3Ti_4O_{12}$ will be synthesized along with miniaturization of grain size (50-100 nm).
- o 20~ 25% lower raw material cost. The economical analytical grade chemicals such as metal nitrates will be used as precursors for synthesis purpose.
- o Comparable or higher thermal and structural stability of the perovskite systems will be produced than the existing materials.
- o Investigate the effects of molecular structure and thermal stability relationships using the in-situ X-ray, Solid state NMR, XPS, TEM, IR and Raman etc. imaging tool to provide insights for designing better materials.
- o The best thermally stable structure of the perovskite materials should be supported for chemical and biological sensing.
- o One of the goals of this project is the detailed investigation of the interaction between hetero-structure of the grain-grain boundary, polarization resistance within the materials should be established.
- o The outcome of the research can be explored for filing patent and its commercialization as per the DST norms. Results obtained will be published in reputed journal in the material research field and the Ph.D. scholar (through the institute) will compile the investigation for his/her Ph.D. thesis along with M.Sc. project.

Keywords :

Chemical, biological, sensors, perovskite,

Expected Output and Outcome of the proposal :

The presented project use to develop environmentally friendly based ABO_3 perovskite materials in numerous sensors applications such as humidity, biological, chemical sensors. Chemical Sensing: Chemical sensing tests were performed using acetone of the pellets. Exposure of chemicals and biological agents: Technology challenges It is proven but it is always challenging to attain the dielectric and resistivity values needed from the state-of-the-art capacitors and our preliminary results and experience in crystal growth and materials synthesis will ensure success in this CCATO and PCTO materials. Potential Impact to Defense and country Performance Parameters: Sensitivity: Since there is a huge change in dielectric constant these sensors will be very highly sensitive compared to the existing sensors. Affordability Costs: The chemicals used in CCTO, PCTO and LCTO are very low cost. Since it can reduce the weight and volume of energy of the sensors for ground and space-based sensors by large amount Innovativeness of the effort Our innovative approach of aligning the capacitor materials in the low temperature enhances the resistivity and breakdown voltage which helps in processing materials at lower temperature than traditional methods for this novel and exciting CCTO and PCTO compound for sensors and also a side benefits for high-energy-density capacitor technology. This is a novel and innovative to achieve the goal of large area, low cost and low sensors.

Any other relevant information:

Any other relevant matter: Prof. N.B. Singh, Professor in the Chemistry and Biochemistry, and Computer Science and Electrical Engineering department of the UMBC, USA, will help in this project without no cost. He will to develop the technology for industrial application as he has almost 40 years' experience in industry. He will visit the parent institute (Department of Chemistry) Siddharth University. He will also help in to develop the sensing materials to technology for industry. Prof. N. B. Singh a Fellow of the American Society of Materials, a Fellow of Society of Optics and Photonics, a Fellow of the Optical Society of America (OSA), and a Fellow of the Royal Society of Chemistry, is internationally famous for the leadership in management and researches. Before joining the UMBC, he served 29 years in Northrop Grumman and served as Technical Director. He has 25 US patents, more than 220 journal papers and more than 250 corporate trade secrets.

Suitability of the proposed work in major national initiatives of the Government:

Innovate India

Theme of Proposed Work:

Environment

Collaboration Details for last 5 Years :

S.No.	Name	Type of Collaboration
1	Prof. Youngil Lee Professor Department of Chemistry University of Ulsan 93 Daehak-Ro Nam-gu Ulsan 44610, Korea Department of Chemistry University of Ulsan 93 Daehak-Ro Nam-gu Ulsan 44610, Korea South Korea [01-Jan-2013 to 01-Jan-2030]	We have sharing the funding of open access journal publication. Visiting professorship . I have been use the resources of his laboratory
2	Prof. N.B. Singh Professor University of Maryland, Baltimore County (UMBC) 1000 Hilltop Circle, Baltimore, MD 21250 University of Maryland, Baltimore County (UMBC) 1000 Hilltop Circle, Baltimore, MD 21250 USA [01-Jan-2018 to 02-Jan-2018]	We are sharing the research out comes in the form of publication. Participation in national and international conference etc.
3	Prof. Mikhael BECHELANY Professor Institut Européen des Membranes (IEMM, ENSCM UM CNRS UMR5635) Place Eugène Bataillon Institut Européen des Membranes (IEMM, ENSCM UM CNRS UMR5635) Place Eugène Bataillon France [01-Jan-2018 to 01-Jan-2025]	We have results out put in the form of research article

Planned Collaboration for the proposed work with any foreign scientist/ institution ?**No**

S.No.	Name	Type of Collaboration
1	Prof. N.B. Singh Professor University of Maryland, Baltimore County (UMBC) 1000 Hilltop Circle, Baltimore, MD 21250 University of Maryland, Baltimore County (UMBC) 1000 Hilltop Circle, Baltimore, MD 21250 USA	This program is joint program between Siddharth university, Patliputra University and University of Maryland, Baltimore County (UMBC). UMBC will provide data on PCTO and CCATO work in leadership of Prof. N. B. Singh of the Chemistry and Biochemistry and Computer Science and Electrical Engineering.
2	Prof. Youngil Lee Professor Department of Chemistry University of Ulsan Department of Chemistry University of Ulsan South Korea South Korea	We need some specific characterizations such as Solid State NMR to determine the detail investigation of the structure at molecular level.

SERB Project Proposal 2023

Dr. Laxman Singh (PI)

Associate Professor

Department of Chemistry,

Siddharth University, Kapilvastu, Siddharth Nagar

With

Dr. Ayan Mukherjee (Co-P.I.)

Assistant Professor,

Department of Physics,

College of Commerce, Arts & Science,

Patliputra University, Patna, Bihar-800020, India.

In Collaboration

Prof. N. B. Singh, FASM, FSPiE, FOSA and FRSC

Department of Chemistry and Biochemistry &

Department of Computer Science and Electrical Engineering

University of Maryland, Baltimore County (UMBC)

1000 Hilltop Circle, Baltimore, MD 21250

Phone: (410) 455-3427

Email: singna@umbc.edu

Subject: **Environmental Engineering**

Research Team Members: Dr. Laxman Singh, Dr. Ayan Mukherjee and Prof. N. B. Singh

**Project Title: Chemical and Biological Sensing Via Polarity of Materials:
Using Environment Friendly Lead-Free Perovskite-Phase Metal Oxide**

Principal Investigator: Dr. Laxman Singh, Siddharth University, Kapilvastu, UP,
India

Proposal to: Core Research Grant

March 2023



Phone : 9431659034
Email : principal@cocaspatna.ac.in
Website : www.cocaspatna.ac.in

College of Commerce, Arts & Science

Kankarbagh, Patna – 800 020

(A Constituent Unit of Patliputra University, Patna)

NAAC RE-ACCREDITED 'A' Grade, with CGPA 3.10

OFFICE OF THE PRINCIPAL

Endorsement from the Head of the Institution of Co-PI

This is to certify that:

1. Institute welcomes participation of **Dr. Ayan Mukherjee, Assistant Professor** as the Co-Principal Investigator for the project titled “**Non-precious Ferroelectric ABO₃ type Perovskite Oriented Hybrid Bifunctional Cathode Electrocatalyst for Oxygen Reduction Reaction and Oxygen Evolution Reaction (OER) for Fuel Cell and Metal Air Batteries**” and that in the unforeseen event of discontinuance by the Principal Investigator, the Co-Investigator will assume the responsibility of the fruitful completion of the project with the approval of SERB.
2. The Co-PI, **Dr. Ayan Mukherjee** is a permanent or regular employee of this Institute/University/ Organization and has **26 years** of regular service left before superannuation
3. The project starts from the date on which the University/Institute/ Organization/College receives the grant from SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi.
4. The investigator will be governed by the rules and regulations of University/ Institute/ Organization /College and will be under administrative control of the University/ Institute/Organization/College for the duration of the project.
5. The grant-in-aid by the SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi will be used to meet the expenditure on the project and for the period for which the project has been sanctioned as mentioned in the sanction order.
6. No administrative or other liability will be attached to SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi at the end of the project.
7. The University/Institute/Organization/College will provide basic infrastructure and other required facilities to the investigator for undertaking the research project.
8. The University/ Institute/Organization/College will take into its books all assets created in the above project and its disposal would be at the discretion of SCIENCE & ENGINEERING RESEARCH BOARD (SERB), New Delhi.
9. The University/ Institute/Organization/College assumes to undertake the financial and other management responsibilities of the project.

Seal of University
Institute/Organization/College
Date: 09.12.2023



Signature

Principal of College
Principal
College of Commerce, Arts & Science
Patna-20



College of Commerce, Arts & Science

(A constituent Unit of Patliputra University, Patna)

NAAC Re- Accredited With Grade- A CGPA of 3.10/4

General Types of Research Methodology

1 Quantitative Research

2 Qualitative Research



Online Research Methodology Course

First Batch 15th to 29th November, 2022

Second Batch 15th to 29th May, 2023

Time: 4:00 to 06:00 P.M.

Call for Registration & Participation

About the College

College of Commerce, Arts & science, Patna, established in 1949, recognized under Sections 2 (f) and 12 (B) of the UGC Act 1956 is a premier constituent College of Patliputra University. College was established by great visionary Late Pt. Indu Shekhar Jha on the advice of Dr. Rajendra Prasad with a pious motive to make quality education accessible for aspiring youths without any discrimination based on socio-cultural-economic grounds. The vision of its great founder Pt. Indushekhar Jha was to make the commerce education accessible to the underprivileged and subaltern students of Bihar, which was rarely available. This revered institution started its journey from a small campus where P. N. Anglo School is located now to its present campus. Flowing in the incessant flow of imparting knowledge and being exposed to the warmth of time, this institution went on incorporating many streams in itself and today in this college education is imparted in the faculties of Sciences, Social Sciences, Commerce, Humanities and Law up to postgraduate levels. It is one of the oldest academic institutions located in the heart of the capital of Bihar, Patna. The College is situated in the exclusive neighbourhood of Rajendra Nagar Railway Terminal and inhabits a 5.89-acre plot campus. The lush green landscape invites an aesthetic charmer and enhances the College atmosphere to an educational eden.

Initially, it was a constituent unit of Magadh University in the name of College of Commerce and was renamed as College of Commerce, Arts & Science in 2016. Later, it became a constituent unit of the Patliputra University, Patna when this university was formed by the Bihar Government on 18 July 2018 after being bifurcated from Magadh University, Bodh Gaya. The College was re-accredited by NAAC as Grade 'A' in its second cycle of accreditation with a CGPA of 3.10 on a four-point scale. After the journey of more than seven decades this institution has achieved its mission and vision to a greater extent for which it was established and it is a matter of great satisfaction that today this institution is acclaimed throughout the state of Bihar for its high academic standards. The College has consistently demonstrated outstanding performance in academics, sports, and Co/extra-curricular activities. It has made significant and unparalleled contributions in terms of producing scholars, bureaucrats, intellectuals, politicians and sportsperson serving in different domains not only

in our own country but even at international levels. Vibrant and effective presence of our alumni all over the world at key positions in almost all spheres of life is a testimony of its successful journey.

College of Commerce, Arts and Science is opportune to have a galaxy of faculties who command a rare distinction in academic excellence at least in Bihar and whose accomplishments in academia is appreciated universally. The college dare claims to set new yardsticks in Bihar as far as quality research and teaching is concerned. Despite certain limitations which are beyond the college domain like space constraints, proper playground, etc., our students have excelled in various sports streams at different levels. No matter whether it is NCC or NSS or any other wing, this college has proven its worth.

This college has excellent infrastructure with automated central library linked to world-wide free information flows and databases, well equipped laboratories and congenial and natural campus ambience and classrooms. However, the volume of publication in peer reviewed journals with high impact factor and citation index is moderate but the quality of research is worth citing. College administration is trying its best to catch it soon and increase the volume of research too. Teaching and research in all faculties of Sciences, Social Sciences, Humanities, Commerce and Law are available up to PG level. Ph. D. Programmes are also available in most subjects. The college offers 13 postgraduate, 17 undergraduate, 07 vocational, 03 Add-on (with certificate, diploma and advance diploma) and 04 professional/self-financed courses. The college aspires to commensurate to the national and global standards in teaching as well as in research.

Our institution visions to develop an educational set up to bring out a transformative change in the society by nurturing high moral and spiritual values in students, giving quality education in multiple disciplines, empowering the society through knowledge and quality research and fostering creativity and entrepreneurship in students and in this way making students a capable global citizen.

All the stakeholders are working hard with full commitment with a mission to develop and maintain a human repository of knowledge, disseminating it

among the students and creating new and relevant insights in diverse disciplines through state-of-the-art research. The college retains inspiring facets of its proud history and with an equally sharp gaze, it looks ahead to assimilate the exciting world of new knowledge as they go on unfolding. Our esteemed institution aims to inculcate positive human values in its students and making them capable global citizens, sensitive to human and environmental issues and at the same time quality professionals in their respective fields.



Concept Note:

This course designed to be practical. The theoretical knowledge that constitutes research methodology is therefore organised around the operational steps that form this research process for both Quantitative and Qualitative research. The key concepts of **Research Methodology** such as *Research Problem, Research Design, Sampling Techniques, Research Proposal, Data Collection, Data Analysis, and Research Report*. This course aims to explain the concepts within shortest time possible whilst keeping it really SIMPLE.

This course will primarily benefit 3 groups:

Students: Who are newcomers to academic research and have therefore assumed students of NOT having any prior knowledge.

Professionals: Gain significant knowledge on concepts of market research or journal writing.

Academic Supervisor: Use this course to teach students about key research concepts and of course, research enthusiasts are welcome, too.

Who this course is for:

- College/University students
- Academic researchers
- Faculty members

Thematics: (30 Hours Course Module) (Time: 04:00 to 06:00 P.M.)

1. Introduction to Research: Research Philosophy & Types
2. Research Design and Types
3. Data collection and Data Visualization
4. Analysis of Data and Techniques
5. Systematic Literature Review and Meta Data Analysis
6. Introduction to different Qualitative Research Methods
7. Developing an understanding about Qualitative and Quantitative Data Analysis
8. Writing Research Report and Research Papers using LaTeX
9. Advanced Searching Tools and Referencing Tools
10. Scientific Journal Finder
11. Indexing and Impact Factors
12. Publication Ethics: Patent, Copyright and Plagiarism

Objective of the Course:

- Understand the basic concepts of research and its methodologies
- Identify appropriate research topics
- Select and define appropriate research problem and parameters

- Will able to give research legitimacy and provides scientifically sound findings.
- Enable students to prepare report writing and framing research proposals.

Expected Learning Outcomes

After successful completion of the online course, the participants will able to:

1. Gain better understanding on how to identify a research problem and design a valid research project to answer specific research questions
2. Get hands-on training in the usage of several opensource tools that can assist them in their research endeavours.
3. Write effective research papers and thesis in the journal designated formats using online tools.
4. Know the process of finding good quality journals for research and publishing

Registration Details

Eligibility

Research scholars and postgraduate students are eligible to apply for this programme. All those who meet the eligibility criterion are required to register by visiting <https://www.cocaspatna.ac.in>

Registration: Compulsory registration is required to participate in the course.

After successful registration, the participants will receive a confirmation via email. Please keep checking the spam folder of the email as the bulk email sent may end up in the spam folder. An official group has been made for communication with the participants on "Telegram." You are therefore requested to install the Telegram App either from the Play Store or App Store. The link to join the official group will be provided in the confirmation mail.

Important:

Attempting and submitting all the quizzes and assignments is mandatory, and each participant should score at least 50% aggregate to be eligible for the completion certificate. Registration is mandatory for participation. Graded certificates on the basis of performance will be awarded to the participants.

For Further Communication, Write to us at:

Vidyayadav1821@gmail.com

ORGANISING BOARD OF THE COURSE

PATRON

Prof. Indrajit Prasad Roy

PROGRAMME COORDINATOR

Dr. Rashmi Ranjana, Assistant Professor, Department of Geography

Ranjana
DR. RASHMI RANJANA
HEAD
P.G. DEPT. OF GEOGRAPHY
COLLEGE OF COMMERCE, ARTS & SCIENCE, PATNA

ORGANIZING COMMITTEE MEMBERS

Dr. Vidya Yadav, Assistant Professor, Department of Geography

Dr. Santwana Rani, Associate Professor, Department of Botany

Dr. Mridula Kumari, Associate Professor, Department of Economics

Dr. Baikunth Roy, Assistant Professor, Department of Economics

Session-2022-2023

Course Completion Report on Research Methodology

First Batch 15th to 29th November, 2022
Second Batch 15th to 29th May, 2023

Time: 4:00 to 06:00 P.M.

College of Commerce, Arts & Science
Patna-20

1. **Course Background:**

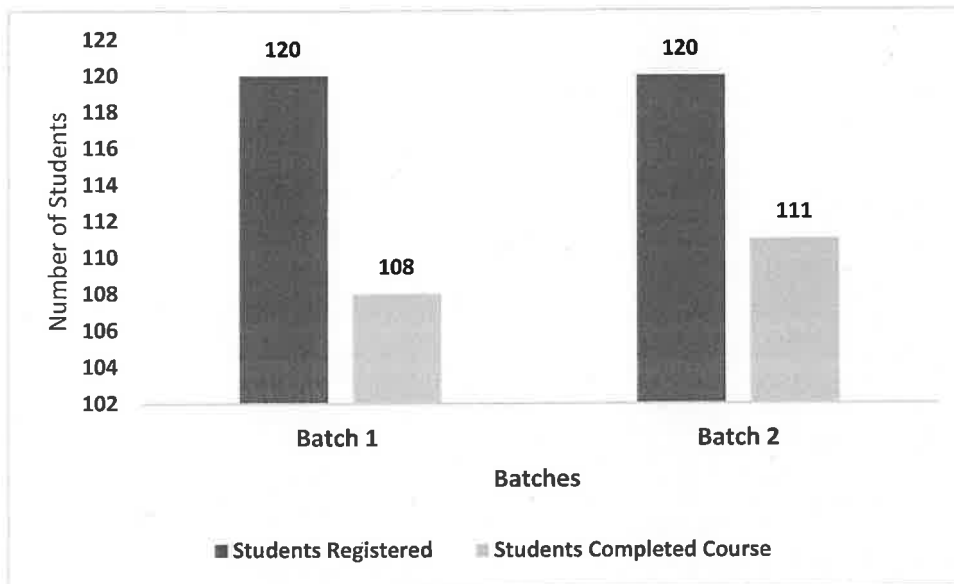
This course designed to be practical. The theoretical knowledge that constitutes research methodology is therefore organised around the operational steps that form this research process for both Quantitative and Qualitative research. The key concepts of **Research Methodology** such as *Research Problem, Research Design, Sampling Techniques, Research Proposal, Data Collection, Data Analysis, and Research Report*. This course aims to explain the concepts within shortest time possible whilst keeping it really SIMPLE.

2. **Objective of the Course:**

- Understand the basic concepts of research and its methodologies
- Identify appropriate research topics
- Select and define appropriate research problem and parameters
- Will able to give research legitimacy and provides scientifically sound findings.
- Enable students to prepare report writing and framing research proposals.

3. **Participants:**

Early Research Careers, Research scholars and postgraduate students are eligible to apply for this programme. All those who meet the eligibility criterion are eligible to attend this course. In the Academic Session 2022-2023, we have conducted 2 batches of this course on Advanced Research Methodology. Total approximately 120 students registered in each batch for this course. The detail of the student's registration and students who completed the course are presented with help of diagram given below.



4. Outcome of the Course:

By the end of this course, participants learn how to:

1. Gain better understanding on how to identify a research problem and design a valid research project to answer specific research questions.
2. Get hands-on training in the usage of several opensource tools that can assist them in their research endeavours.
3. Write effective research papers and thesis in the journal designated formats using online tools.
4. Know the process of finding good quality journals for research and publishing.

5. Course Outline: (30 Hours Course Module) (Time: 04:00 to 06:00 P.M.)

- i. Introduction to Research: Research Philosophy & Types
- ii. Research Design and Types
- iii. Data collection and Data Visualization
- iv. Analysis of Data and Techniques
- v. Systematic Literature Review and Meta Data Analysis
- vi. Introduction to different Qualitative Research Methods

- vii. Developing an understanding about Qualitative and Quantitative Data Analysis
- viii. Writing Research Report and Research Papers using LaTeX
- ix. Advanced Searching Tools and Referencing Tools
- x. Scientific Journal Finder
- xi. Indexing and Impact Factors
- xii. Publication Ethics: Patent, Copyright and Plagiarism

6. Training Approach

The course is taught in online mode through a mix of theory, group works and case studies. Training manuals and additional reference materials are also provided to the participants.

7. Certification

Upon successful completion of this course, participants will be issued with a certificate.

8. Overall Assessment about the course

The assessment of the training course was based on the survey being conducted through an evaluation session at the end of the training program to measure whether the training objectives have been achieved, participant's expectation is met and whether the course is relevant to the participants towards successful completion of the course. The evaluation suggest that the training was conducted in line with the course outline and meets the participants expectations. They have also felt that the training meets the overall objectives.

9. **Suggestion in the improvement in the future**

- i) The training was very well organized, and it should continue in the same way when the next training is conducted.
- ii) As the training was in online mode it would better if could have happen in offline mode.
- iii) Number of training days need to be increased.


Dr. Rashmi Ranjana

Course Coordinator
Assistant Professor
Department of Geography
College of Commerce, Arts & Science
Patna-20


Prof. Indrajit Prasad Roy

Principal
College of Commerce, Arts & Science
Patna-20

Cert. No. 12/057

COLLEGE OF COMMERCE, ARTS AND SCIENCE, PATNA



THIS IS TO CERTIFY THAT

SHIVANI

Of

Dept. of Chemistry, College of Commerce, Arts and Science, Patna

has successfully completed the certificate course in “*Advanced Research Methodology*” of
30 hours duration conducted by College of Commerce, Arts and Science, Patna

during the period 15/11/2022 to 29/11/2022 .

Ranjana

Dr. Rashmi Ranjana
Course Co-Ordinator

Indrajit Prasad Roy

Principal
College of Commerce, Arts & Science, Patna
Prof. (Dr.) Indrajit Prasad Roy
Principal

Course: Vedic Mathematics

Duration: 30 hours

Course Objectives:

The main objectives of the course are

- Enhance calculation speed and numerical skills through Vedic Mathematics
- Develop logical and analytical thinking
- Sharpens the brain
- Crack entrance exams and get scholarship
- Provides an insight into ancient Indian mathematics

Course Syllabus:

Unit-I: Introduction to Vedic Mathematics, Vedic Maths Formulae-Sutras and sub-Sutras, Concept of Base and Compliments, Vedic methods of Addition, Addition without Carry Forward. **[5 hours]**

Unit-II: Vedic methods of Subtraction (all from 9 last from 10), Subtraction from numbers like 100, 1000, 10000..., Decimal numbers subtraction. **[5 hours]**

Unit-III: Magical Multiplication with 11-19, General multiplication- 2×2 , 3×2 , 4×2 , 3×3 , Magical Multiplication, Base Value Multiplication (Nikhilam Method). **[8 hours]**

Unit-IV: Sutra for finding Square of a number, Square of any two digits numbers- Base methods, Square of numbers ending with 5, Square root, Cubing (Yavadunam Sutra). **[4 hours]**

Unit-V: Magical Calander for year 2020, Magical Calander Concept (2001-2020), Concept of 100 Years Calanders. **[8 hours]**

Suggested Readings:

1. Sumita Bose -2017 "Vedic Mathematics"- V&S Publishers, New Delhi.
2. H.K. Gupta -2014 "Vedic Mathematics"- BPI Publishers, New Delhi
3. Vedic Mathematics Made Easy, Dahawal Bhatia, Jaico Publication, New Delhi, 2011.

Course Outcomes:

At the end of the course the students will be able to:

- do faster calculation as compared to the traditional method.
- utilize Vedic sutras to enhance their skills for competitive examinations and able to solve question quickly in competitive examinations.
- provides an easy and convenient solution to difficult mathematics problems and calculations.
- enhance mental concentration.



COLLEGE OF COMMERCE, ARTS AND SCIENCE, PATNA

CERTIFICATE IN VEDIC MATHEMATICS

THIS IS TO CERTIFY THAT

Shahjahan



Of

Dept. of Mathematics, College of Commerce, Arts and Science, Patna

has successfully completed the certificate course in "Vedic Mathematics" of 30

hours duration conducted by College of Commerce, Arts and Science, Patna,


for the period... 01/10/2020 to 31/11/2020


Dr. Shambhu Sharan

Course Co-Ordinator

Cert. No.: VM/CC/ 001




Prof. Tapan Kumar Shandilya
Principal
College of Commerce, Arts & Science, Patna
Principal



**COLLEGE OF COMMERCE, ARTS & SCIENCE
PATNA-20
(A Constituent Unit of Patliputra University, Patna)**



Course Completion Report

Title of the course: - Vedic Mathematics

Mode of Learning: - Online

Mathematics Department, COCAS, Patna

Academic Session: - 2020-2021 (Total Batch Conducted: - 3)

Batch 1: 1st October 2020 to 30th November 2020

Batch 2: 12th January 2021 to 12th March 2021

Batch 3: 1st April 2021 to 31st May 2021

Total Duration: 30 Hours

Time Table

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Batch 1 / Batch 2 / Batch 3	L1 (9:00- 09:50 AM)		L1 (9:00-09:50 AM)		L1 (9:00- 09:50 AM)		L1 (10:00-10:50 AM)

Note: - Holiday as per academic calendar

Total Student Enrolled: -

	Enrolled Students	Passed Students
Batch 1	120	112
Batch 2	120	106
Batch 3	120	108
Total		326

Note: Only students who have more than 75 % attendance are allowed to take certificate.


Course Co-Ordinator


Principal
College of Commerce, Arts & Science, Patna



Enhancing office Productivity:

Microsoft office and

On-suite training for

Non-Teaching Staff

College of Commerce, Arts
& Science, Patna-800020



Phone : 0612-2350136 (O)
E_mail : principalcocaspatna@gmail.com
drtapanshandilya@yahoo.co.in
Website : www.cocaspatna.ac.in

College of Commerce, Arts & Science

Kankarbagh, Patna - 800020
(A Constituent unit of Patliputra University, Patna)
NAAC RE-ACCREDITED 'A' Grade, with CGPA 3.10

OFFICE OF THE PRINCIPAL

Date: 14/09/2021

A short-term capacity building programme for the non-teaching employees of the college is being organised by the IQAC of the college from 20/09/2021 to 25/09/2021. Following non-teaching employees are directed to participate in this capacity building programme.

Name of the Participants

1. Sanjeev Kumar
2. Binod Kumar
3. Rajesh Kumar Choudhary
4. Vicky Kumar
5. Manoj Kumar
6. Kamlesh Kumar
7. Raushan Kumar

8. Brajkishore Nr
9. Tripurari Prasad
10. Ashok Kumari Sahani
11. Anuj Kumar
12. Pankaj Kumar
13. Jai Prakash Bhartuhar
14. Dharmendra Kumar
15. Arun Kumar



14/09/2024
IQAC Co-Ordinator
Co-ordinator
Dr. Anuj Kumar
Quality Assurance Cell
College of Commerce, Arts & Science, Patna

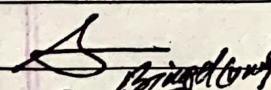

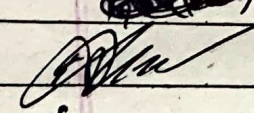
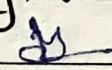

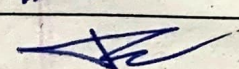
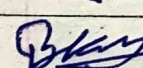
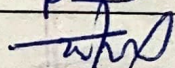
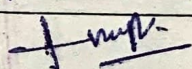
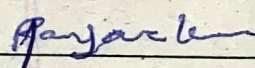
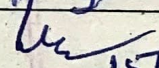




Principal
Principal
College of Commerce, Arts & Science
Patna-800020
Prof. (Dr.) Tapan Kumar Shandilya

ATTENDANCE

DATE: 20/09/2021

S. NO. NAME SIGNATURE

1.	Sanjeev Kumar.	
2.	Birod Kumar.	
3.	Rajesh Choudhary.	
4.	Vicky Kumar.	Vicky Kumar
5.	Manoj Kumar.	
6.	Kamlesh Kumar	
7.	Roushan Kumar	
8.	Braj Kishore Sr.	
9.	Tripathi Pradeep	
10.	Ashok Kumar Sethi	Ashok Kumar Sethi
11.	Arjun Kumar.	
12.	Pankaj Kumar.	
13.	Jai Prakash Bhartiya.	 15/09/23
14.	Dharmendra Kumar.	
15.	Arun Kumar.	Arun Kumar 

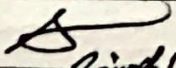
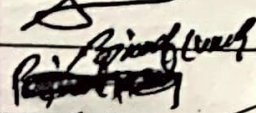
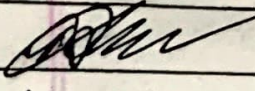
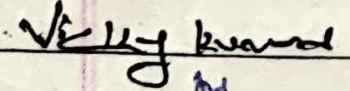

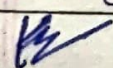

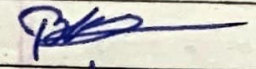
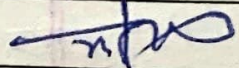
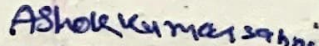
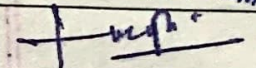
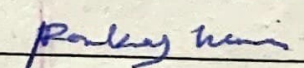
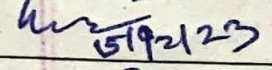

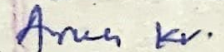
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DATE: 21/09/2021

S.NO

NAME

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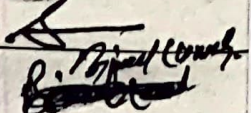
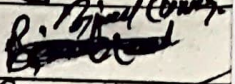




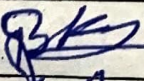
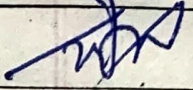
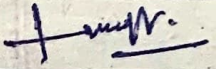
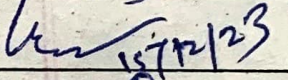
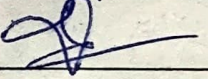
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|-----|----------------------|---|
| 1. | Sanjeev Kumar. |  |
| 2. | Pirod Kumar. |  |
| 3. | Rajesh Kr. Choudhary |  |
| 4. | Vicky Kumar |  |
| 5. | Manoj Kumar |  |
| 6. | Kamlesh Kumar. |  |
| 7. | Raunhan Kumar. |  |
| 8. | Braj Kishore Nr. |  |
| 9. | Tri Purani Prabh |  |
| 10. | Ashok Kr. Sahani | 
Ashok Kumar Sahani |
| 11. | Anuj Kumar |  |
| 12. | Pankaj Kumar. |  |
| 13. | Jai Prakash Bantua. | 
15/9/21/23 |
| 14. | Dharmendra Kr. |  |
| 15. | Arun. Kumar | 
Arun Kr. |

DATE: 22/05/2021

S. No

NAME

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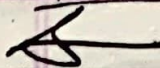
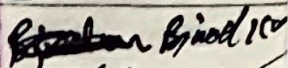
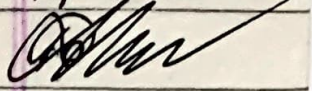

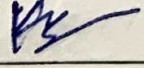

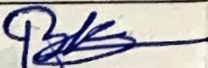
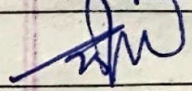
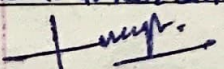
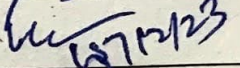

- | S. No | NAME | SIGNATURE |
|-------|------------------------|---|
| 1. | Sai Sanjeev Kumar |  |
| 2. | " Binod Kumar |  |
| 3. | " Rajesh Kr. Choudhary |  |
| 4. | " Vicky Kumar | Vicky Kumar |
| 5. | " Manoj Kumar |  |
| 6. | " Kamlesh Kumar |  |
| 7. | " Raulhan Kumar |  |
| 8. | " Brajeshore N.S. |  |
| 9. | " Tripurari Prasad |  |
| 10. | " Ashok Kumar Satani | Ashok Kumar Satani |
| 11. | " Anuj Kumar |  |
| 12. | " Pankaj Kumar | Pankaj Kumar |
| 13. | " Sai Prakash Bharthua | 
15/12/23 |
| 14. | " Dharmendra Kumar |  |
| 15. | " Arun Kumar | Arun Kumar |

S.No

DATE: 23/09/2021

NAME

SIGNATURE


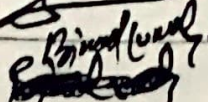
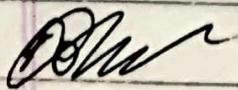
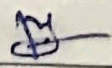
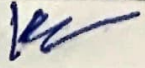
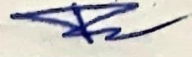

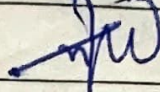
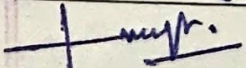
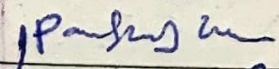
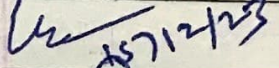
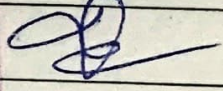
- | S.No | NAME | SIGNATURE |
|------|--------------------|---|
| 1. | Shri Sanjeev Kumar |  |
| 2. | Binod Kumar |  |
| 3. | Rajesh K Choudhary |  |
| 4. | Vicky Kumar | Vicky Kumar |
| 5. | Manoj Kumar |  |
| 6. | Kamlesh Kumar |  |
| 7. | Raushan Kumar |  |
| 8. | Braj Kishore Mr. |  |
| 9. | Tripureni Prasad |  |
| 10. | Ashok Kumar Sahni | ASHOK KUMAR SAHNI |
| 11. | Anuj Kumar |  |
| 12. | Pankaj Kumar | Pankaj Kumar |
| 13. | Jai Prakash Bhanu |  |
| 14. | Dharmendra Kumar |  |
| 15. | Arun Kumar | Arun Kumar |

DATE: 24/09/2021

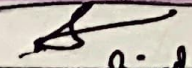
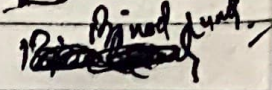
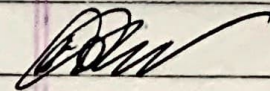
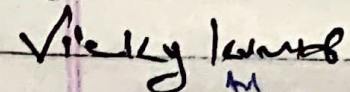
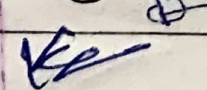
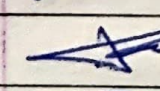
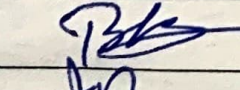
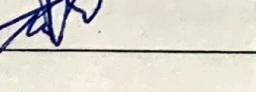
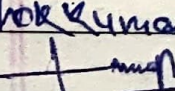
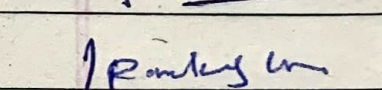
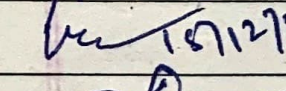
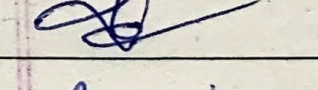
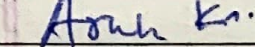
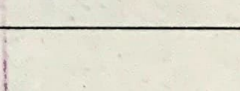
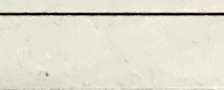
S.NO

NAME

SIGNATURE

1.	Sanjay Kumar	
2.	Binod Kumar	
3.	Rajesh K. Choudhary	
4.	Vicky Kumar	Vicky Kumar
5.	Manoj Kumar	
6.	Kamlesh Kumar	
7.	Raunhan Kumar	
8.	Braj Kishore N.	
9.	Tripurari Prasad	
10.	Ashok Sahini	ASHOK KUMAR
11.	Anj Kumar	
12.	Pankaj Kumar	
13.	Jai Prakash Bhatnagar	
14.	Pharmender Kumar	
15.	Arun Kumar	Arun K.

DATE: 25/09/2021

S.NO	NAME	SIGNATURE
1.	Sanjay Kumar.	
2.	Binod Kumar.	
3.	Rajesh Kumar Chaudhary.	
4.	Vicky Kumar.	
5.	Mangaj Kumar.	
6.	Keimlath Kumar.	
7.	Raushan Kumar.	
8.	Brajkishor Mishra.	
9.	Tripurani Prasad	
10.	Ashok Kr. Suthan.	
11.	Amur Ajeay Kumar.	
12.	Pantaj Kumar	
13.	Jai Prakash Bhanu Kumar.	
14.	Dharmendra Kumar.	
15.	Arun Kumar.	

**Short Term Capacity Building Programme on
Enhancing Office Productivity: Microsoft Office
and G-Suite Training for Non-Teaching Staff**

Hands-on Sessions Activities Demonstration

20.09.2021 to 25.09.2023 (6 Days Programme)

Mode of delivery: Offline

Target Participants: Support Staff (non-teaching staff) of College of Commerce, Arts & Science, Patna

Number of Participants: 15

Class Details: There will be 2 sessions. Each session will comprise of 2.5 hours of Hands-on-Training session. And there will be 1 hour lunch break.

Attendance: The participants are required to maintain 90% Attendance. Otherwise, certificates may not be issued.

Registration: Free

ABOUT THE PROGRAMME

In the modern higher education landscape, non-teaching staff play a crucial but often overlooked role in ensuring the efficient operation of universities and colleges. They manage administrative tasks, provide vital student support, and facilitate communication between departments. Proficiency in productivity suites like Microsoft Office and G Suite has become essential for these unsung heroes. A six-day capacity-building program titled "Enhancing Office Productivity: Microsoft Office and G-Suite Training for Non-Teaching Staff" has been designed to cater to their specific needs.

This program equips non-teaching staff with essential skills to maximize the potential of Microsoft Office and G-Suite tools, enhancing proficiency in Word, Excel, PowerPoint, Google Workspace, and Google Drive. Participants gain practical insights and techniques to streamline tasks, encourage collaboration, and boost overall productivity. These skills enable them to excel in their roles, contributing significantly to the success of academic institutions.

PROGRAMME SCHEDULE

Day 1-2: Microsoft Word and Power point

Introduction to Microsoft Word

- Ø Overview of Microsoft Word and its significance in document creation.
- Ø Navigating the Word interface: Ribbons, Tabs, Quick Access Toolbar.
- Ø Creating, saving, and opening documents.
- Ø Document organization: Headers, footers, page numbers, and section breaks.

Document Formatting and Efficiency

- Ø Basic and advanced text formatting: fonts, styles, themes, and formatting painter.
- Ø Working with paragraphs: line spacing, indentation, bullet points.
- Ø Page layout options: margins, orientation, page breaks.
- Ø Efficient use of tables and lists.

Advanced Word

- Ø Exploring advanced features in Word, such as styles, mail merge, and forms.
- Ø Advanced formatting options: columns, text boxes, and drop caps.
- Ø Collaboration tools: Comments and track changes.

Introduction to PowerPoint

- Ø Introduction to Microsoft PowerPoint and its role in creating presentations.
- Ø Navigating the PowerPoint interface: Ribbons, Tabs, Slides, Slide Master, Slide Sorter.
- Ø Creating engaging presentations, adding slides, content, and multimedia, Slide transitions and animations
- Ø Using speaker notes and rehearsing presentations.

Day 3-4: Microsoft Excel and PowerPoint

Introduction to Microsoft Excel

- Ø Microsoft Excel and its applications in data management and analysis. Ø Navigating the Excel interface: Ribbons, Tabs, Quick Access Toolbar.

Data Management and Analysis using Excel

- Ø Formulas and functions: Understanding basic and advanced functions.
- Ø Data entry and organization: Sorting, filtering, and conditional formatting.
- Ø Tips for efficient data management and analysis.

Advanced Excel

- Ø Exploring advanced features in Word, such as styles, & mail merge
- Ø Advanced formatting options: columns, text boxes, and drop caps.
- Ø Collaboration tools: Comments and track changes.

Outlook and OneDrive

- Ø Introduction to Microsoft Outlook: Managing emails, calendars, and tasks efficiently.
- Ø Leveraging OneDrive for cloud-based document storage, sharing, and collaboration.
- Ø Integration and synchronization between Outlook and OneDrive for seamless workflow.

Day 5-6: G-Suite Applications

Introduction to G Suite

- Ø Overview of Google Workspace and its significance.
- Ø Navigating the G Suite interface: Gmail, Google Drive, Calendar
- Ø Setting up and managing your G Suite account.

Efficient Email Management with Gmail

- Ø Mastering Gmail for effective email communication
- Ø Organizing and managing emails with labels, filters, and categories.
- Ø E-Mail Etiquettes
- Ø Utilizing advanced features like Google Chat and Meet for real-time communication.

Collaborative Document Creation with Google Docs

- Ø Creating, editing, and formatting documents in Google Docs.
- Ø Version control and revision history.
- Ø Real-time collaboration and commenting features.

Data Management and Collaboration with Google Sheets

- Ø Data entry, organization, and analysis using Google Sheets.
- Ø Collaborative data editing and sharing.
- Ø Creating charts and graphs for data visualization.

Mentors

Principal, College of Commerce, Arts & Science, Patna

Prof (Dr) Indrajit Prasad Roy

IQAC Co-ordinator

Dr Santosh Kumar (Associate Professor)

Resource Persons

- 1. Sri Himanshu Ojha**
- 2. Sri Amitesh Kumar**

Programme Co-ordinator

Dr Baikunth Roy

Assistant Professor, Department of Economics

College of Commerce, Arts & Science, Patna

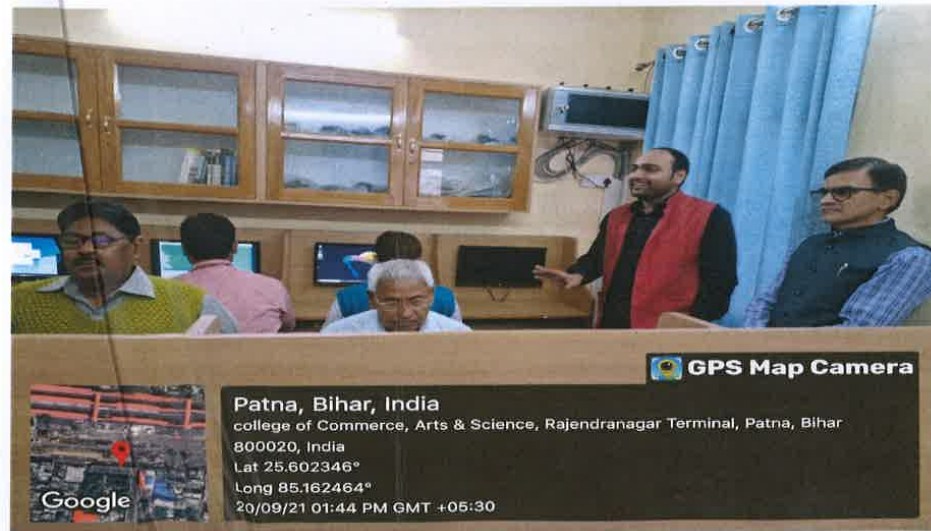


GPS Map Camera

Patna, Bihar, India
college of Commerce, Arts & Science, Rajendranagar Terminal, Patna,
Bihar 800020, India
Lat 25.602346°
Long 85.162464°
20/09/21 01:43 PM GMT +05:30



Google



GPS Map Camera

Patna, Bihar, India
college of Commerce, Arts & Science, Rajendranagar Terminal, Patna, Bihar
800020, India
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Long 85.162464°
20/09/21 01:44 PM GMT +05:30



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COLLEGE OF COMMERCE, ARTS & SCIENCE
PATNA-20
(A Constituent Unit of Patliputra University, Patna)



Course Completion Report

**Title of the Course: - Enhancing Office Productivity: Microsoft Office and G-Suite Training
for Non-Teaching Staff**

Mode of Learning: - Physical Mode at the Department of Bachelor of Business Management,
Computer Lab.

Academic Year: 2021-2022 (Total Batches Conducted: 1)

Batch 1: 20th September 2021 to 25th September 2021

Total Week: - 1 Week (6 Days & 30 Hours)

Time Table

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Batch 1	10:30 AM to 4:30 PM	10:30 AM to 4:30 PM	10:30 AM to 4:30 PM	10:30 AM to 4:30 PM	10:30 AM to 4:30 PM	10:30 AM to 4:30 PM

Note 1: Lunch Break -- 1 PM to 2 PM

Number of Learners: 15

	Enrolled Learners	Passed Learners
Batch 1	15	15

Note 2: Course completion certificate was issued to those learners who had 90% attendance.

3/09
29/09/2021

The Name of the Staff who Successfully Participated in the Programme:

Name of the Participants

1. Sanjeev Kumar
2. Binod Kumar
3. Rajesh Kumar Choudhary
4. Vicky Kumar
5. Manoj Kumar
6. Kamlesh Kumar
7. Raushan Kumar
8. Brajkishore Nr
9. Tripurari Prasad
10. Ashok Kumari Sahani
11. Anuj Kumar
12. Pankaj Kumar
13. Jai Prakash Bhartuhar
14. Dharmendra Kumar
15. Arun Kumar

Boj
9/9/2021

Course Co-Ordinator

Dr. Baikunth Roy

Tu Shandilya

Principal
College of Commerce, Arts & Science
Patna- 800020

Prof. (Dr.) Tapan Kumar Shandilya



College of Commerce, Arts and Science
कॉलेज ऑफ कॉमर्स, आर्ट्स एंड साइंस
A Constituent Unit of Patliputra University, Patna

NAAC Re-Accredited GRADE - A | CGPA: 3.10 / 4

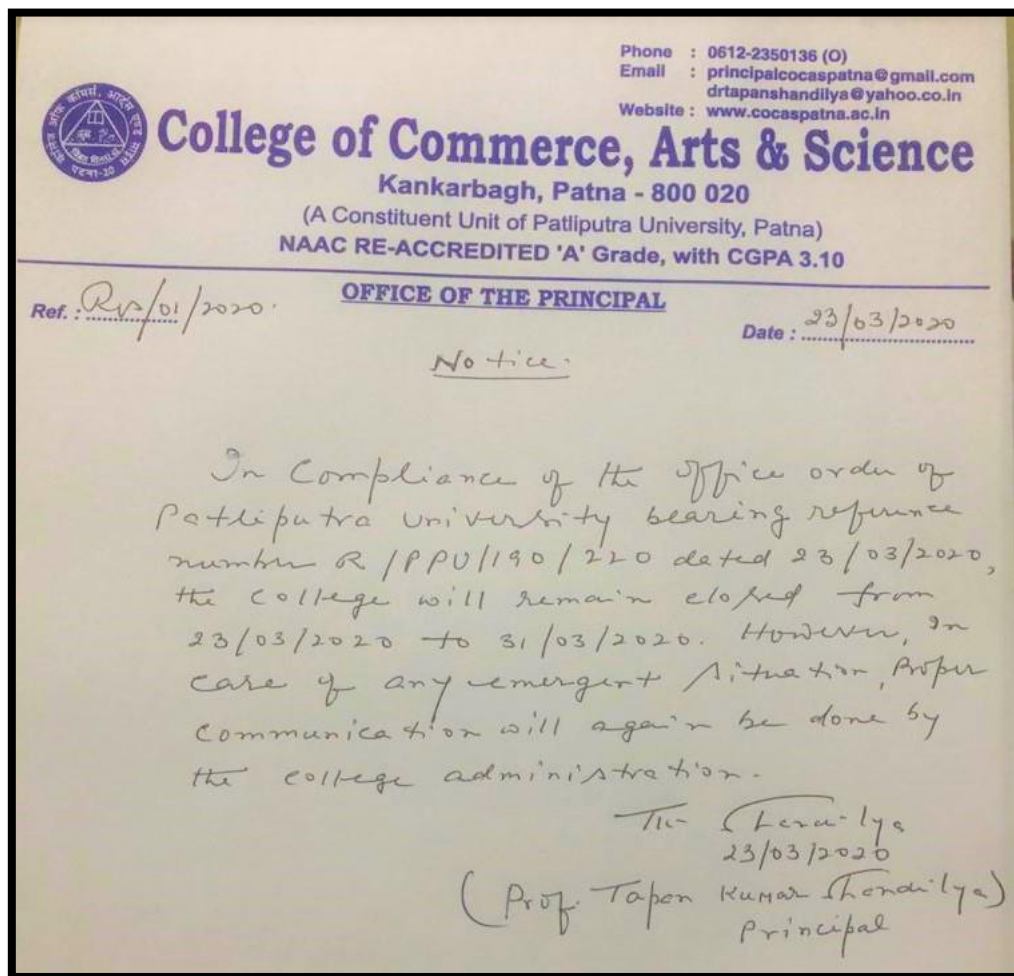
Report
of
Online Teaching
and
e-content delivery to students

First Report
(17/04/2020)

Prof. (Dr) Tapan Kumar Shandilya
Principal
College of Commerce, Arts and Science, Patna

After the outbreak of corona pandemic, an office order was circulated by **Patliputra University, Patna**, vide ref no - **R/PPU/190/2020** dated **23/03/2020** through which the colleges were closed till **31st March, 2020** in the light of the **epidemic diseases act 1897 section (2)**, the order no **3736** dated **13/03/2020** of the general administration department, the advisory of HRD circulated on March 21, 2020 and the lockdown decision of Government of Bihar.

- In compliance of this order of **Patliputra University** the college administration issued a circular vide ref no: **RES/01/2020** dated **23/03/2020** and it was informed to all stakeholders that in case of any emergent situation proper communication will be done and their services may be sought by the college administration.



- On **28th March, 2020** a 2nd was issued by the college administration in the form of an appeal to teachers and to keep the teachers of college academically active and performing during lockdown confinement it was requested to all teachers to
 - Write at least one research paper and communicate it for publication in Journals of national/international repute in the concerned field of research
 - Plan at least one research project and pen down the ideas of the proposed research work elucidating the objectives of the proposed research, its contemporary relevance, methodology to be used, timeline and budget so that the proposal may be

forwarded to a proper funding agency after completing official formalities as soon as the situation normalizes and the college opens.

- Prepare some digital teaching materials, lecture notes, question bank etc.

It is worth noting here that our college administration had foreseen the severity of the situation and without waiting for any order either from university or from the good office of the Hon'ble chancellor we had started our preparation to keep our teachers active, vibrant and working even during lockdown and preparing materials and infrastructure for online teaching support to our students which may be required to be delivered in near future.

Respected Teachers,

We all know that the pandemic situation due to covid-19 has forced us to be home quarantine and our institutional activities have gone in deep inertia. But under the given situations it is unavoidable. Apart from a health effect of corona virus, an economic impact of various actions undertaken by the government to combat the virus is also worth pondering which would ultimately affect the overall economic health of the country. The economic impact on India is four pronged vide the external demand, domestic demand, supply disruptions and financial market disturbances. Our institution also is set to experience it's impact and we shall work out some innovative economic practices at institutional level to get rid of it. At the same time,

It is a matter of great concern for all of us that our 3rd cycle NAAC Accreditation is close by and impending. We all love our esteemed institution which is just like our mother. Our institutional preparedness for the forthcoming NAAC Accreditation is going to suffer a great loss due to the ongoing lockdown. It is therefore requested to all the respected teachers of college to please use this lockdown as an opportunity and take a resolve to do three things which may help us in coping up the loss to some extent.

1.) Write at least one research paper and communicate it for publication in a journal of national/international repute in your field of research. (Better if the journal is included in UGC Care list. All internationally recognized journals are there in the care list in part 2)

2.) Plan a research project and pen down the ideas of the proposed research work under the heading objectives of the proposed research, Its relevance, Methodology to be used, timeline, budget etc. so that it may be sent to a proper funding agency after completing official formalities as soon as the situation normalizes and the college opens. You are advised to do an ample literature survey related to the proposed research work if you are any how able to get access of resources.

3.) Prepare some digital teaching materials, lecture notes, question bank etc. which may help our students in diverse manner.

We will keep issuing circulars like this at certain intervals till the entire lockdown period. Please give serious consideration to these circulars.


Stay safe and obey the lock down strictly.

**Thank you all.
Kind Regards**

**Prof. Tapan Kumar Shandilya
Principal
Dr. Santosh Kumar
IQAC & NAAC Co-Ordinator.**

- On **01/04/2020** a subsequent office order was issued by **Patliputra University** due to the extension of the national lockdown till **14/04/2020** and the colleges were closed till **14/04/2020** vide the office order bearing ref no- **R/PPU/191/2020** dated **01/04/2020**.

The college administration issued a 3rd circular **RES/03/COCAS/20** dated **01/04/2020** through which teachers were asked to write an article on different aspects, be it the impact on economy, resurgence of new socio political order or its scientific aspects or something like psychological aspect regarding the global covid-19 crisis in the form of a review paper or a research article to be published later on after a proper peer review in the form of an edited book or in a special issue of some good journal.



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Ref:-RES/03/COCAS/20Date:- 01/04/2020

OFFICE OF THE PRINCIPAL

Notice

An article on different aspects (be it the impact on economy, resurgence of a new socio-political order or its scientific aspect or something else like the Psychological aspect) regarding the global Covid 19 crisis (either a review paper or a research article)/ or a write up is being invited from all the teachers of college latest by 15 th of April 2020. These articles will be published either in the form of an Edited book or in a special issue of some good journal. You are requested to send your paper/article either on the e-mail id of college " principalcocaspatna@gmail.com" or on the WhatsApp number of the Principal of College 9431049871. You are humbly requested to use the lockdown leisure in writing this article.

I hope you all will take it seriously and will contribute positively to this intellectual and academic endeavor.



Prof (Dr.)Tapan Kumar Shandilya
Principal


- On 11/04/2020 the college administration issued a 4th circular and announced an essay writing competition for students on the theme “**Corona covid- 19 virus : a disaster in the present scenario**” with eight sub themes. It is satisfying to bring it to record here that more than 150 entries of students have already been received till date on the official e-mail id of college.

Notice

An essay writing competition is being organised by our college. Essay on topic "Corona Covid-19 Virus: A disaster in present scenario" has been invited from students . 8 sub themes have been suggested. Students can write essay on any of these sub-themes as per their choice but the entire write-up should be focused towards the central theme. All the HoDs are requested to please circulate the poster attached herewith on their respective departmental WhatsApp groups in which students of department are there.

Prof.(Dr.) Tapan Kumar Shandilya

Principal



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College of Commerce, Arts & Science
Kankarbagh, Patna – 800020
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Prof. (Dr.) Tapan Kumar Shandilya
(M. A. Gold Medalist), Ph. D.
Principal
Former Vice Chancellor, Nalanda Open University, Patna.
Former President, Indian Economic Association.

ESSAY WRITING COMPETITION

CORONA COVID – 19 VIRUS : A DISASTER IN PRESENT SCENARIO
WHERE WE ARE AND WHERE WE WILL

- CASH PRIZE TO FIRST 10 ENTRIES.
- PARTICIPATION CERTIFICATE TO ALL PARTICIPANTS.
- ONLY STUDENTS CAN PARTICIPATE.

TOPICS

- 1 COVID – 19 : A GLOBAL ECONOMIC MELTDOWN.
- 2 COVID – 19 : THE IMPACT AND ROLE OF MASS MEDIA DURING THE PANDEMIC.
- 3 COVID – 19 & EPIDEMIOLOGICAL INTERSECTION.
- 4 COVID – 19 : SOCIAL LIFE AFTER THE PANDEMIC.
- 5 COVID – 19 : A WAKE-UP CALL FROM MOTHER NATURE ?
- 6 COVID – 19 : IS CHINA THE REAL CULPRIT ?
- 7 COVID – 19 : ROLE OF PM MODI ON GLOBAL PLATFORM.
- 8 COVID – 19 : CORRELATION BETWEEN WHO AND CHINA.

CONTACT
Mobile :9835828527 (Er. Ram Niwas)
E-mail :principalcocaspatna@gmail.com
cocas.ramniwas@gmail.com
Website:www.cocaspatna.ac.in

Send your typed or handwritten entries to principalcocaspatna@gmail.com.
Last Date : 15/05/2020.
Preferable Languages : Hindi/English.

- On **11/04/2020** itself a reminder was given to the teachers of college through 5th lockdown circular regarding submitting the article in compliance of circular 3 dated 01/04/2020.

A Gentle Reminder

All the teachers of College were requested to write an article/ research paper/ review paper on the prevalent global crisis of Covid-19 pandemic latest by April 14, 2020. I am sure, you all might have given consideration to this notice and might be giving finishing pondering and correction to your article. This is for your gentle reminder and to bring to your notice that if some more time is needed . It may be submitted by the 25th of April 2020.

Prof.(Dr.) Tapan Kumar Shandilya

Principal

- On the same date i.e. on **11/04/2020** itself all the teachers, Non-teaching employees and the students of college were requested to download **Aarogya Setu app** in the light of advisory of **UGC vide D.O. No – 1-1/2020 (SECY)** dated **10th April, 2020**.

Notice

All the teachers, non teaching employees and the students of college are requested to download Arogya Setu App. UGC has issued an advisory for strict adherence of Academic Fraternity to all the preventive and precautionary measures to combat Covid-19 problem.

All the HODs of different departments are requested to kindly post this message to their departmental Whatsapp groups in which students are there.

Please treat it important.

Prof.(Dr.) Tapan Kumar Shandilya

Principal

- The college administration issued 6th lockdown circular vide ref no – **RES/06/COCAS/20** dated **13/04/2020** and even before the notification of university done on **14/04/2020** through which the principals of colleges were instructed to ensure online teaching to students, our college administration had requested all the HODs of the conventional departments, the coordinators of vocational courses and teachers of college to make available to our students some e-contents and video lectures and do online as far as practicable. We brought to the notice of all the teachers of college the list of different software/apps/digital platforms for their kind reference that may be taken help of during online teaching and making students available e-contents in different forms.



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NAAC RE-ACCREDITED 'A' Grade, with CGPA 3.10

OFFICE OF THE PRINCIPAL

Ref:-RES/06/COCAS/20

Date:- 13/04/2020

Urgent Notice

In the light of repeated advisories of UGC, all the HODs of the Conventional Departments and the Co-ordinators of Vocational Courses are hereby earnestly requested to make available to your students some e-contents, and video lectures of the respective faculty members and manage for some online courses during the lockdown period as far as practicable. Every department is expected to report the office of the undersigned about the efforts undertaken by the respective departments in this direction after the situation normalizes and college opens after the ongoing lockdown comes to an end.

This is to be noted that some online courses is already being given by different departments/teachers of our college and e-contents, video lectures and narrated PPT being made available by using softwares/Apps like Edmodo, google classroom, Zoom, etc.

I hope you all will take serious note of it and will do the needful. A list of different softwares/Apps/Digital platforms is attached herewith for kind reference so that the teachers may get benefitted themselves and refer it to their students too.

Prof (Dr.)Tapan Kumar Shandilya

Principal



COLLEGE OF COMMERCE, ARTS AND SCIENCE, PATNA (PATLIPUTRA UNIVERSITY)

Internal Quality Assurance Cell (IQAC)

Sub: Online Learning Resources

We all know that the country is fighting against COVID 19. As per the advisories of UGC it is advisable for us that by taking preventive and precautionary measures, maintaining social distancing and staying in the confines of our homes/hostels, we can utilize this time to enrich ourselves through On-line learning. The University Grants Commission (UGC), has released a list of initiatives of the MHRD, UGC and its Inter University Centers (IUCs) - Information and Library Network (INFLIBNET) and Consortium for Educational Communication (CEC), using which the academic community can utilize their time productively during this lockdown period.

Following is a consolidated list of resources/ digital platforms. Most of these are open resources/ digital platforms and can be accessed by the teachers, students and researchers free of cost.

The faculty members of college are advised to prepare contents **for Master Degree Programmes in various subjects**, Undergraduate programmes in various subjects and the vocational courses co-ordinators are also instructed to do the same and advise students to be benefitted by these e-contents and remote access with respective teachers through different digital resources. Some of the resources/ digital platforms are given below for kind reference. If possible teachers may develop their YouTube channels and provide the access of the same to students which they may use as their personal intellectual depositories also. The college will develop a full fledged studio to record lectures of faculties as soon as the situation normalizes.

1. **SWAYAM online courses:**

<http://storage.googleapis.com/uniquecourses/online.html>

Free or cost and without registration, students & learners can access quality resources with this link. According to UGC, students or learners who registered on SWAYAM (swayam.gov.in) in the January 2020 semester can continue their studies as usual.

2. **UG/PG MOOCs:**

http://ugcmoocs.inflibnet.ac.in/ugcmoocs/moocs_courses.php

Students and learners can access 86 PG courses & 222 UG courses through this link. These are learning material of the SWAYAM UG and PG (Non-Technology) archived courses.

3. **e-PG Pathshala:**

<https://epgp.inflibnet.ac.in/>

It provides great quality, curriculum-based, interactive e-content containing 23,000 modules (e-text and video) in 70 Post Graduate disciplines of social sciences, arts, fine arts and humanities, natural & mathematical sciences.

4. **e-Content courseware in UG subjects:**

<http://cec.nic.in/>

It provides e-content in 87 UG courses with about 24,110 e-content modules.

5. **SWAYAMPRABHA:**

<https://swayamprabha.gov.in/>

It is a group of 32 DTH channels delivering high quality educational curriculum based courses covering diverse disciplines such as arts, science, commerce, performing arts, social sciences & humanities subjects, engineering, technology, law, medicine, agriculture etc to all teachers, students and citizens across the country interested in lifelong learning. These channels are free to air and can also be accessed through your cable operator. The telecasted videos/lectures are also archived videos on the Swayamprabha portal.

6. **CEC-UGC YouTube channel:**

<https://www.youtube.com/user/cecedusat>

It provides free access to unlimited educational curriculum based lectures.

7. **National Digital Library:**

<https://ndl.iitkgp.ac.in/>

It is a digital repository of a vast amount of academic content in different formats and provides interface support for leading Indian languages for all academic levels including researchers and life-long learners, all disciplines, all popular form of access devices and differently-abled learners.

8. **Shodhganga**

<https://shodhganga.inflibnet.ac.in/>

It is a digital repository platform of 2,60,000 Indian Electronic Theses and Dissertations for research students to deposit their Ph.D. theses and make it available to the entire scholarly community in open access.

9. **e-Shodh Sindhu**

<https://shodhganga.inflibnet.ac.in/>

It provides current as well as archival access to more than 15,000 core and peer-reviewed journals and several bibliographic, citation and factual databases in different disciplines from a large number of publishers and aggregators to its member institutions including centrally-funded technical institutions, universities and colleges that are covered under 12(8) and 2(f) Sections of the UGC Act.

10. **Vidwan**

<https://vidwan.inflibnet.ac.in/>

It provides a database of experts which provides information about experts to peers, prospective collaborators, funding agencies, policymakers and research scholars in the country. UGC also requested Faculty members to register on the Vidwan portal to help expand the database of experts.

It is expected that our students and teachers will find these resources highly beneficial and they are likely to be enriched immensely.

Coordinator
IQAC

Principal cum Chairman
IQAC

- Again in compliance of the **Patliputra University** notification bearing ref no – **R/PPU/199/2020** dated **14/04/2020** the college administration issued 7th lockdown circular bearing ref no – **RES/07/COCAS/20** dated **15/04/2020** and the teachers were again requested to arrange online classes for students, make e-contents available to students and to bring to the notice of students about different digital

resources available free of cost like SWAYAM, UG/PG MOOC, e-PG pathshala, CEC e-content course for UG, SWAYAM PRABHA, CEC UGC YouTube channel, VIDWAN, NPTEL, etc. The NSS/NCC coordinators were instructed to ensure participation of our NCC/NSS students to support district administration in fighting with the covid pandemic.



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OFFICE OF THE PRINCIPAL

Ref:-RES/07/COCAS/20

Date:- 15/04/2020

- 4) A write up has been invited by the teachers on Covid-19 problem on its different aspects by April 25. An essay competition notice has been circulated among students who have been asked to write an essay on "Corona Covid-19 Virus: A Disaster" and send it to the official e-mail id of College. I am happy to inform that more than 100 entries have been received till date.
- 5) NSS and NCC Co-ordinators are requested to get in touch with district administration through Principal and ensure them about the participation of our NCC/NSS students in any kind of service during this national disaster period, if it is so required. NSS/NCC Co-ordinators are supposed to spread consciousness about social distancing and compulsory use of Mask/ Sanetizer.
- 6) The Principal will be taking different meetings with all HODs , Vocational Course Co-Ordinators ,Office Staffs and IQAC CO-ordinator through Zoom on different dates whose schedule will be communicated soon.

All the stakeholders are requested to please treat this notice as urgent , give serious consideration and do the needful for its compliance.

Prof (Dr.)Tapan Kumar Shandilya

Principal



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Ref:-RES/07/COCAS/20

Date:- 15/04/2020

Notice

Attention of all the teachers, students and non teaching employees of college is drawn towards the Patliputra University notification bearing reference no.R/PPU/199/2020 Dated 14/04/2020 (attached herewith) to bring following points for serious consideration of all for compliance and needful.

- 1) Knowing that the students are the most important stake holders and the institution is for them only, we are already concerned and conscious so that they suffer minimum loss in their academics due to lockdown . A lockdown circular was issued by college administration bearing ref. no. Res/06/COCAS/20 Dated 13/04/2020 and the teachers were requested to ensure online teaching and mentoring students through different study resources available free of cost. It is satisfying to know that teachers responded enthusiastically. A list of digital resources like Swayam, UG/PG Mooc, e-PG Pathshala,CEC e-Content Course for UG, Swayamprabha, CEC-UGC Youtube Channel,National Digital Library,Shodhganga, e-Shodhganga, Vidwan, NPTEL etc was attached with this circular as a ready reference.
- 2) If any Department has not still started supporting students and conducting webinars through Zoom, Edmodo etc or any other such tool they are requested to do the same without late.We know that you may face some infrastructural constraints but try to do something with whatever resources are available with us in this period of National insurgency. The College administration ensures to equip with all these facilities and establish a studio for video recording of lectures soon after the end of the lockdown.
- 3) Realizing that the teachers are the pivots of institution, the college administration is equally conscious for their empowerment too during this lockdown also and through different lockdown circulars teachers have been requested to write research papers and at least one research project during this lockdown confinement at home. I am sure, teachers might be doing something in this regard.

- Through 8th lockdown circular of college administration vide ref no – **RES/08/COCAS/20** dated **15/05/2020** all HODs, vocational course coordinators and teachers were asked to report to the principal about the steps taken for ensuring the availability of e-contents, video lectures, virtual classes and other kind of academic support rendered to students during lockdown confinement.



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OFFICE OF THE PRINCIPAL

Ref:-RES/08/COCAS/20

Date:- 15/04/2020

Notice

In Compliance of the office order of Patliputra University bearing reference no. R/PPU/201/2020 Dated 15/04/2020, All the HODs , Vocational Course Co-ordinators and all the teachers of College are hereby requested to compulsorily report about the steps taken for ensuring the availability of e- contents, video lectures, virtual classes and any other kind of academic support rendered to students during lockdown confinement of teachers and students both on the official email id of college" principalcocaspatna@gmail.com" by the evening of 16/04/2020. Please send the report on IQACNAACCOCAS Group also. The compiled report is to be sent to University within 2 days. Please treat it as urgent.

Prof (Dr.)Tapan Kumar Shandilya

Principal

- The college administration issued 10th lockdown circular bearing ref no **RES/10/COCA/20** dated **16/04/2020** and all the stakeholders were asked to download **Aarogya Setu app**, put their suggestion on **Bharat Padhe online** campaign and take care of psychological concern of the mental health of students. This circular was issued in compliance of the **Patliputra University** letter issued by Registrar vide letter no **R/PPU/203/2020** dated **16/04/2020**.



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OFFICE OF THE PRINCIPAL

Ref:-RES/10/COCAS/20

Date:- 16/04/2020

Notice

The Kind attention of all the teachers and non teaching employees of college is drawn towards the letter of Patliputra University issued by Registrar vide letter no. R/PPU/203/2020 Dated 16/04/2020 regarding the downloading of Arogya Setu App, inviting ideas/suggestion about Bharat padhe online campaign and psychological concern of the mental health of students. All the teachers and non teaching employees are requested to honour the spirit of the letter. The said letter is attached herewith as a reference.

Prof (Dr.)Tapan Kumar Shandilya
Principal

- In compliance of the letter of the Registrar of **Patliputra University** bearing Ref no **R/PPU/202/20** dated **16/04/2020** the stakeholders of college were asked to do the needful. However, the instructions contained in the said letter of university had already been circulated through different lockdown circulars by college administration.



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OFFICE OF THE PRINCIPAL

Ref:-RES/12/COCAS/20

Date:- 16/04/2020

Notice

The letter of the Registrar of Patliputra University bearing ref no. R/PPU/202/20 Dated 16/04/2020 is hereby brought to the notice of all for perusal and needful. However, it is to be noted here that the instructions contained in this letter has already been circulated through a lockdown circular issued by the undersigned vide letter no. Res/08/COCAS/20 Dated 15/04/2020.

This circular is being issued in compliance of the above mentioned letter of University.

Prof (Dr.)Tapan Kumar Shandilya
Principal

The teacher of almost every departments (conventional and vocational) have responded very enthusiastically and are delivering online teaching to students through different apps/digital platforms like Edmodo, Zoom, Google Hangouts, Google Classroom, Video Lectures, Lecture Notes, Narrated PPT, YouTube Live and Facebook Live, etc.

The snaps of a few live online interaction of the faculty members of college with the students of their respective departments is given below as references

▪ Department of Botany and Biotechnology

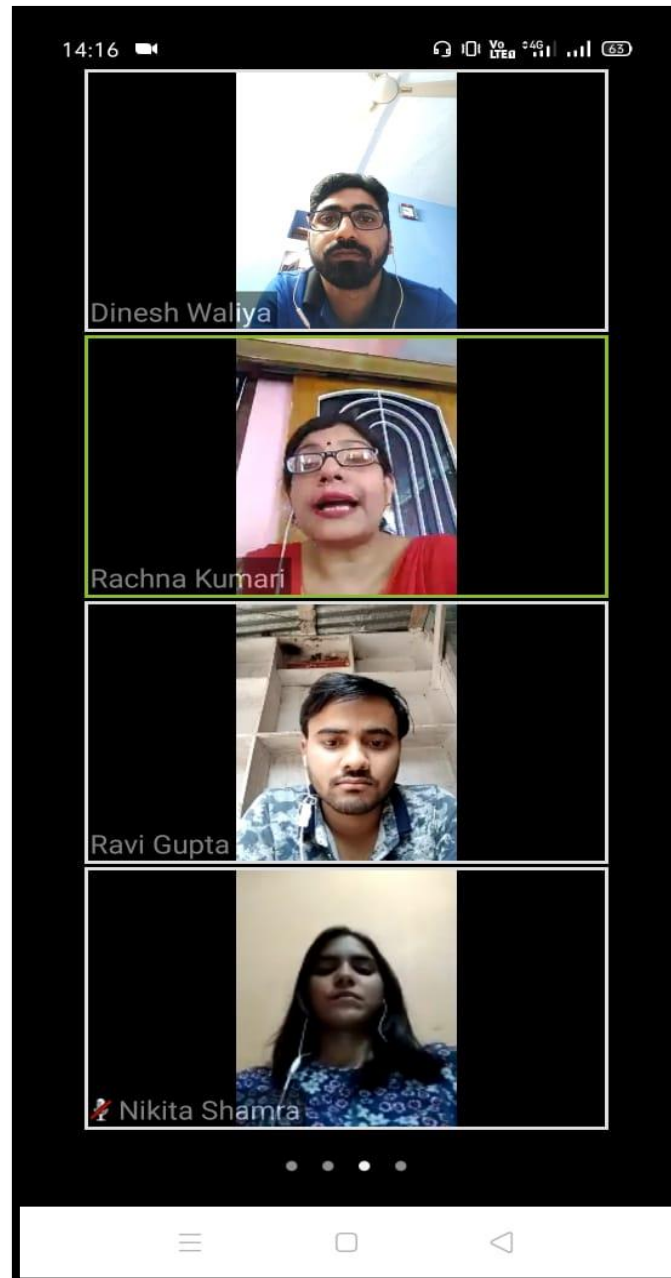
The Department of Botany has created three different WhatsApp groups for PG semester I,II and III and another group for undergraduate part I students. The teachers have started sharing study materials, questions for solving, addressing their queries. Students have responded by sending their answers through email. The teachers of department of Botany are of the opinion that the Zoom app account is being hacked and so seems to be unsafe, Hence they are looking for some other safe app for online teaching. Very shortly they are likely to be connected through Google Hangout or Edmodo.

The Course Coordinator of M.Sc Biotechnology **Dr. Manoj Kumar 2** and the instructors of the department played important role in delivering online teaching support to the students of Department of Biotechnology.



▪ Department of B.Lis

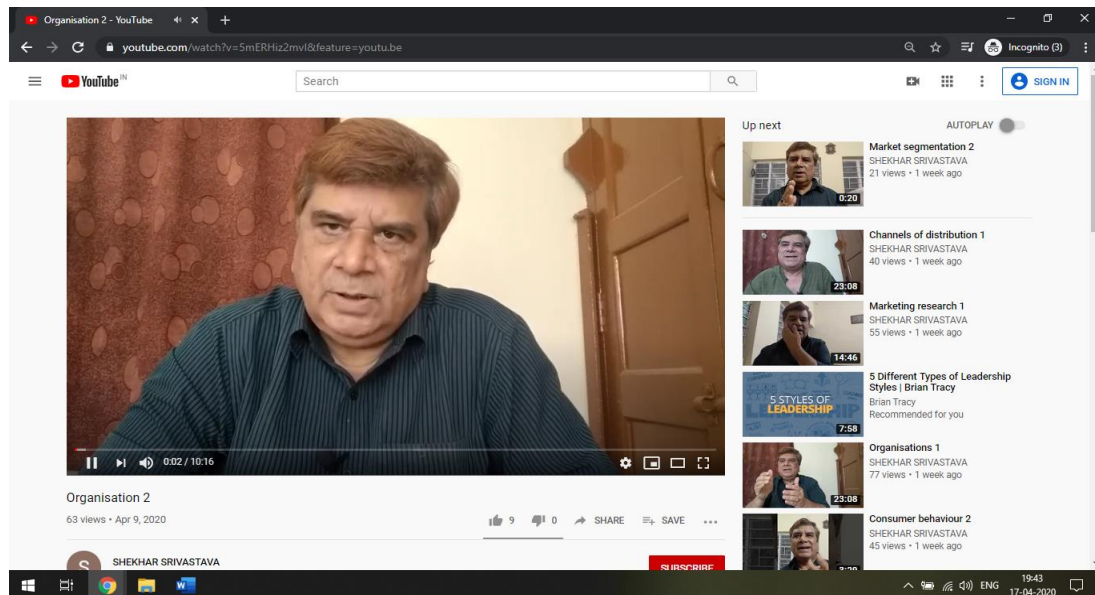
Dr. Aditi, Coordinator of B. Lis and the other faculty members of department are taking online classes of the students of department.



▪ Department of BBM

The faculties of department of BBM are conduction online classes and some video lectures are being delivered by the instructors of the department. The queries of students is regularly being answered.

The coordinator of the department **Prof. (Dr.) Kumar Chandradeep** has played a pivotal role in coordinating all these activities in department.



Video Link : <https://www.youtube.com/watch?v=5mERHiz2mvl&feature=youtu.be>

STUDY MATERIAL ON BUSINESS ENVIRONMENT

BBM-I, PPU, Patna

CHAPTER-1

Structure of Indian Economy

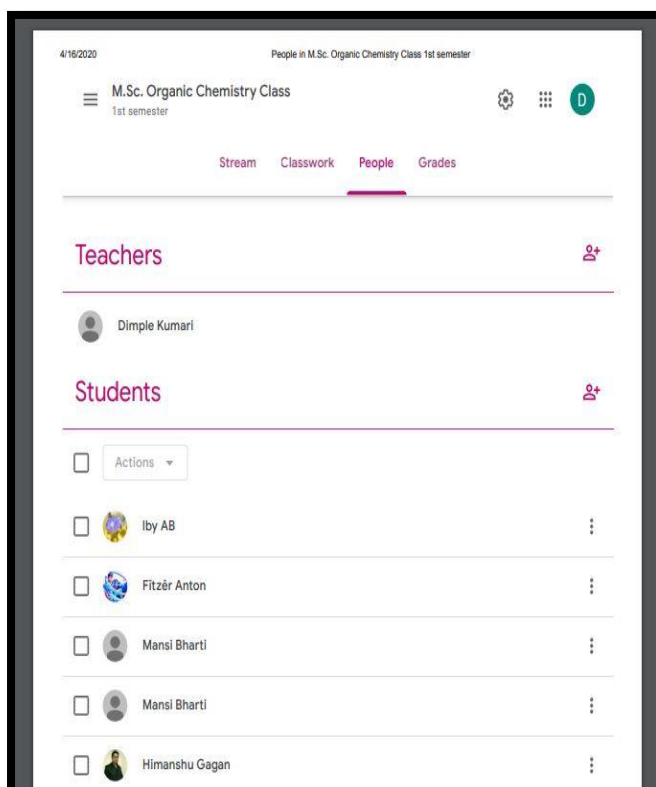
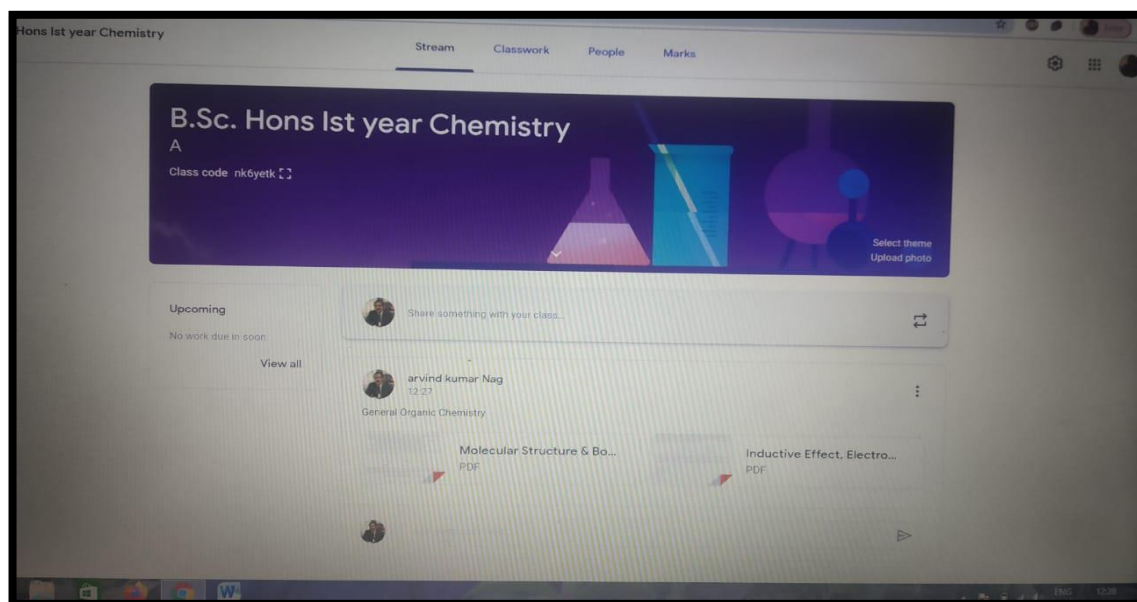
India is a developing country and our economy is a mixed economy where the public sector co-exist with the private sector. The economy of India is seventh largest economy of world on the basis of GDP calculation and also India is a member of G-20 major economies.

Features of Indian Economy

- Low per capita income
- Low standard of living
- High poverty
- In equal income distribution
- Dominance of agriculture
- Existence of rich resources
- Inadequate capital formation
- Unemployment and underemployment
- Technological backwardness
- Infrastructural inadequacies
- Dualistic economy

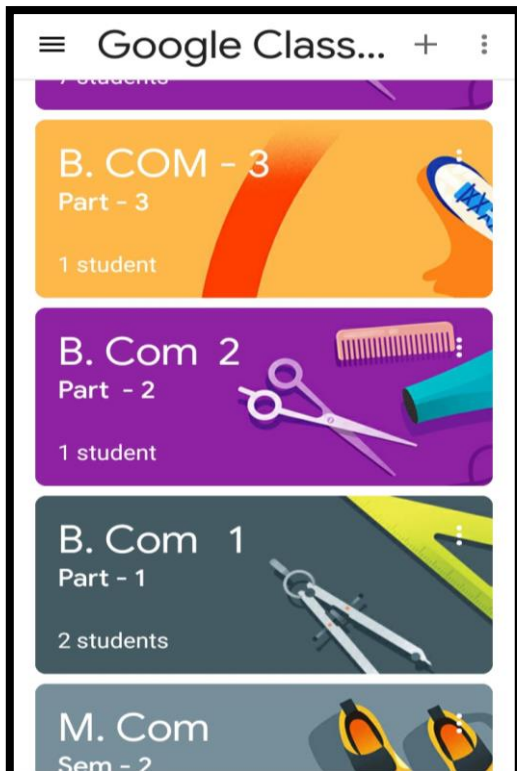
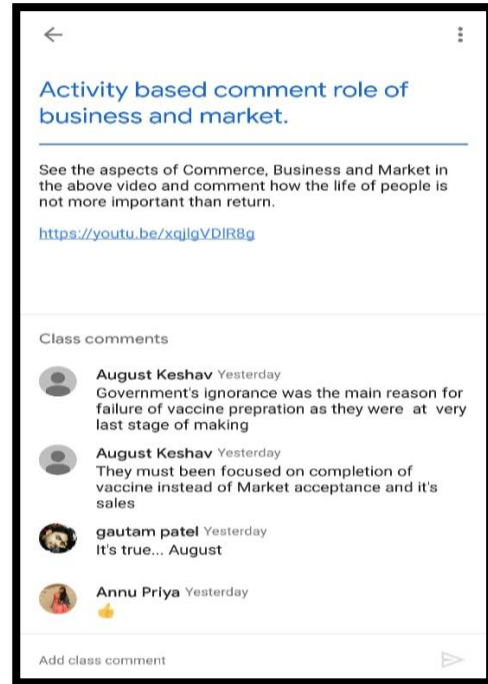
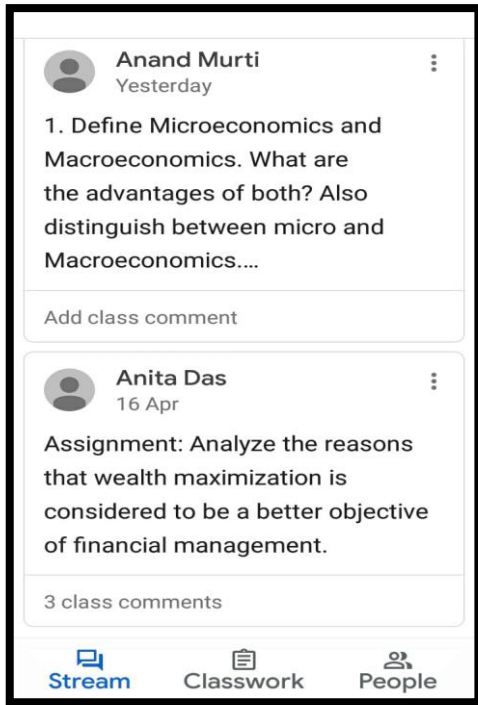
▪ Department of Chemistry

Prof. A.K Nag, HOD, Dept. of Chemistry, **Dr. Dimple Kumari**, Assistant Professor, Dept. of Chemistry and other teachers of department are engaging classes of students through google classroom providing them lecture notes and responding to the queries of students on whatsapp group of department students.



▪ **Department of Commerce**

Prof. Padmini Prasad, HOD, Commerce, **Prof. Imtiyaz Hasan**, **Dr. Krishnabhushan Padmadeo**, **Dr. Anand Murty Pandey**, **Dr. R.U. Singh**, **Dr. Anita Das**, **Dr. Anil Thakur** and other teachers of Commerce Department are providing lecture notes to students and are connected with them through google classroom.



Leverage Analysis

Today we are going to discuss about the topic of leverage, its concept, types and significance. Leverage is a term drawn from the science of engineering which indicates the mechanical advantage or effectiveness gained by the action of a lever. A lever is a tool for getting more work done with less physical force.

Literally lever means the inducing or compelling force. In financial management literature – the use of ‘debt’ capital in financing the total assets is considered as lever, likewise the fixed cost if these are associated with acquisition of assets may also be considered as lever. Thus the concept of leverage is used to assess the risk related to high fixed costs or with a high debt equity ratio. In finance, leverage is an indication of advantage in the volume of output or debt financing cause a much more increase or decrease in the profits of a company.

According to Prof. S.C.Kuchelhal – Leverage may be defined as meeting a fixed cost or paying a fixed return for employing resources or funds. Thus through the leverage analysis financial manager can assess the optimal capital structure of mixture of different forms of capital, the ratio between the debt-equity capital, and the situation where the after paying the fixed interest bearing charges the return on investment (ROI) will be highest.

In the previous chapter ‘Cost of Capital’ we have discussed that the capital raised or acquired from the market either in any form whether debt, preference and equity capital not free of cost. Company has to pay either fixed interest charges in case of debt capital or earning per share in case of equity capital. Thus through the leverage analysis financial manager will be able to decide or determine which form of mixture of capital will be suitable and profitable.

Thus we can say that leverage is such a tool which operates both sides. While on the one hand, if it increases the risk, it also provides opportunity on the other hand raising the return on capital employed. High leverage is remained profitable for the business until the sales revenue level is high, but as soon as the sales revenue level began to fall it disproportionately reduces the volume of profit, merely 10% increase sales may boost up operating profit more than 30% or 10% decrease in sales may reduce operating profit less than 30% or more. So, it requires high degree of skill, prudence and market experience to trade on high leverage.

Importance of Leverage : Leverage is certainly an important tool for determining capital structure, maximising the earning per share to the shareholders, reducing the cost of capital of the business.

(i) In financing decision making process, leverage helps a financial manager to fix the ratio among the different kind of securities, the ratio between debenture, preference and equity share capital.

Marketing Management

Introduction

In ancient times, the transactions between two persons or two organizations were merely exchange of goods that is commonly known as barter system. The barter system had limitations not only to volume exchange process but also to the quality available in the market which is acceptable to the customer. Therefore, the more acceptance system of buying for goods and services in kind or cash or in suitable currency became more and more relevant. In short, marketing is all about identifying and meeting the customer needs profitably.

Definition

According to F. E Clark – “Marketing consists of those efforts which effect transfer in ownership of goods and services and provide for their physical distribution”.

According to Malcolm – “Marketing is the creative and delivery of standard of living to the society”

Concept of Marketing

- 1) **The Production Concept** – The production concept is the management philosophy, which believes and operates with the guiding force that the consumer will prefer those products which are conveniently available in adequate quantity and affordable. The features of production concept are-

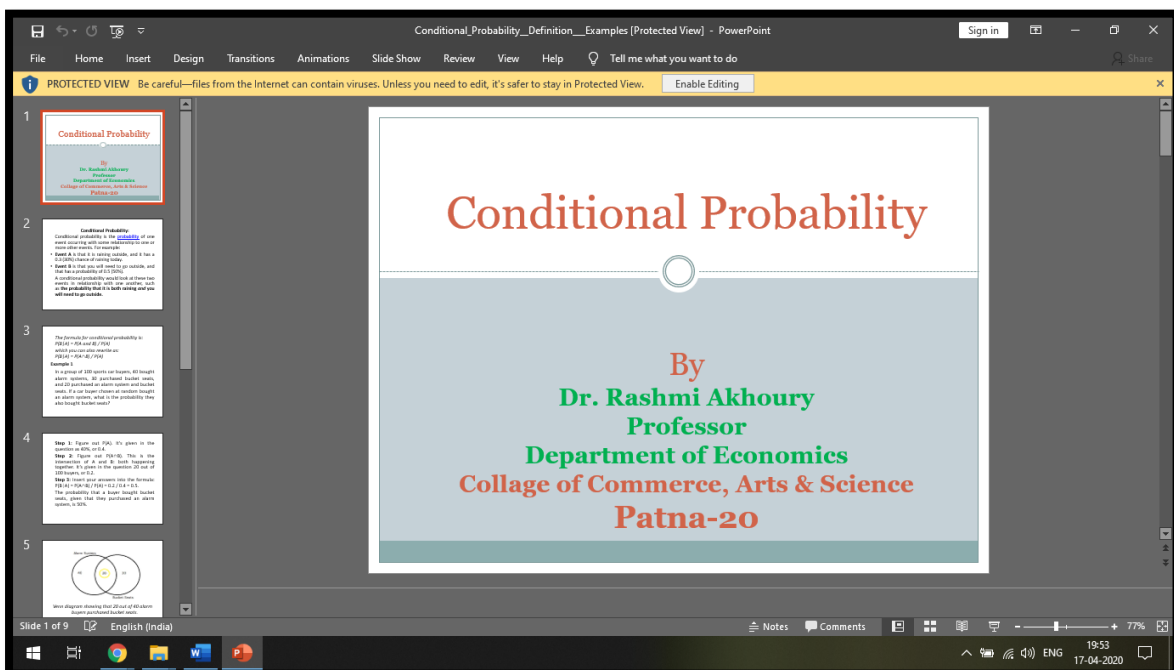
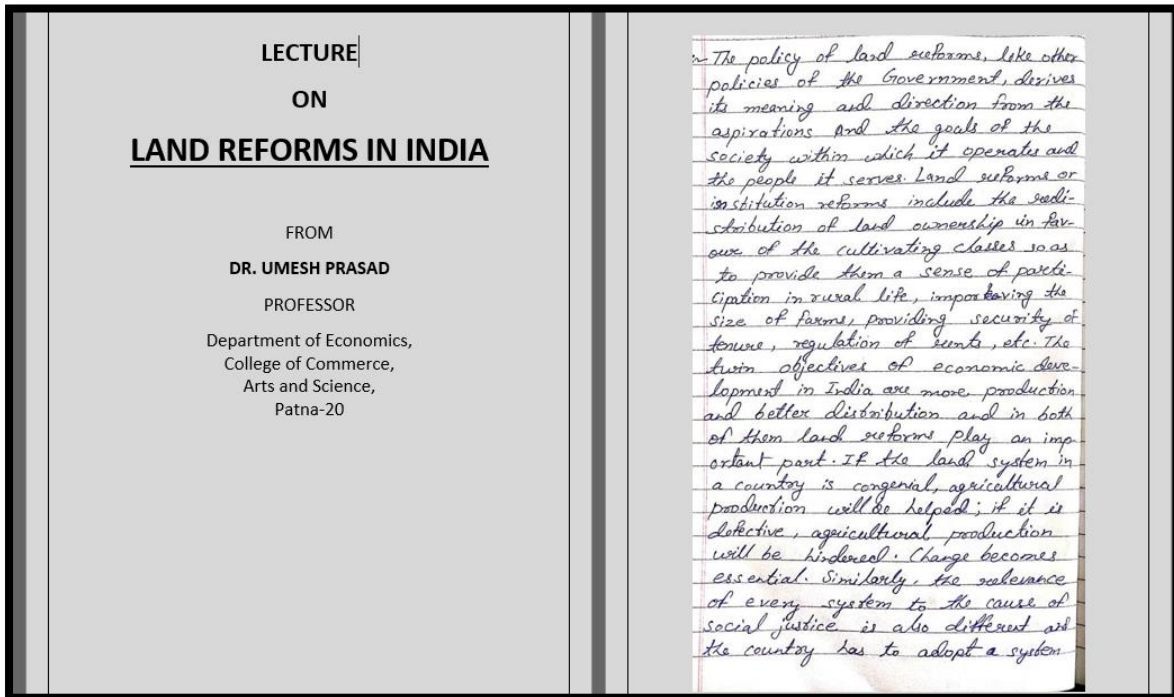
- This concept is based on the belief that consumer’s needs can be satisfied with reasonable quality and reasonably priced product.
- There is fair amount of competition and competing products are sold with complete knowledge of the products available in the market.
- The manufacturer should maintain availability of sufficient quantity of products and consistency in quality.

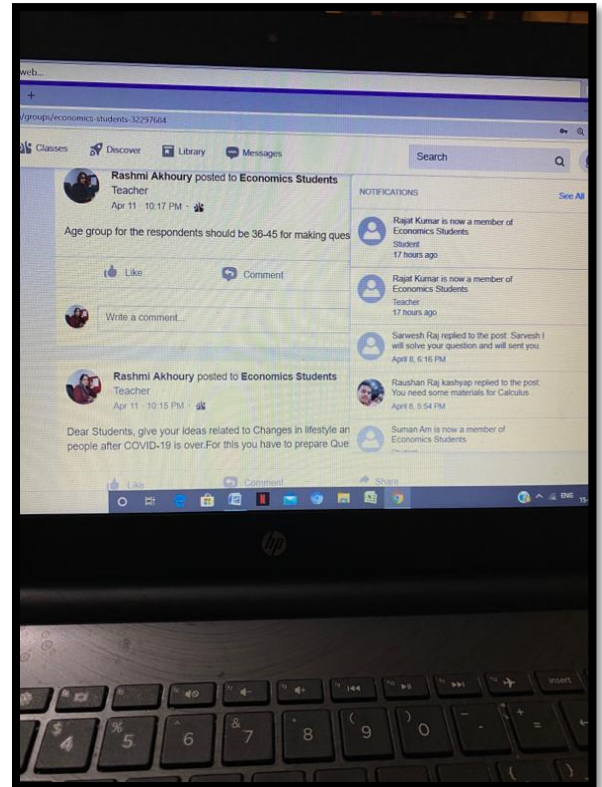
- 2) **The Product Concept** – The product concept is management philosophy that consumers

Department of Economics

Prof. Umesh Prasad, HOD, Economics is sharing his lecture notes with students through WhatsApp group.

Prof Rashmi Akhoury of Dept of Economics and the other teachers are engaging classes of students via WhatsApp group interactions and other modes. Dr. Akhoury is using Edmodo learning platform and is connected with students right from 24th of March, 2020. She started virtual classes from 1st April, 2020.





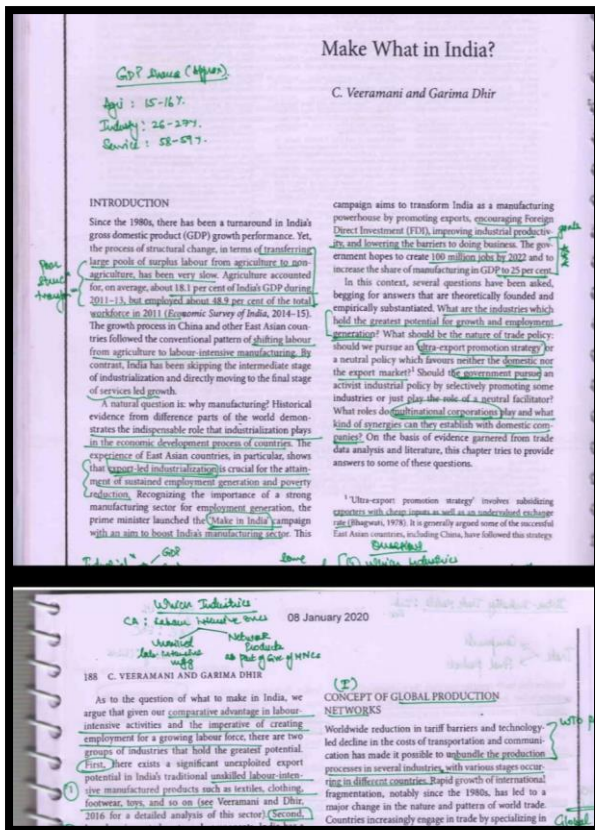
Prof. Baikunth Rai of the same department is providing his lecture notes and PPTs to the students of department through WhatsApp group and other digital platforms.

Key Highlights: Economic Survey

Concept Notes and Background

Course Instructor:
Baikunth Roy
 Dept. of Economics





B. Performance of Indian Agriculture: Temporal, Spatial, and Comparative Perspectives

Chapter 2. The Context and Conundrums of Contemporary Agriculture

Indian agriculture has been widely studied.¹⁸ Without going into a detailed review, this section highlights salient features of the current agricultural economy to provide an understanding of the background and context for the analyses that follow.

India's Food Security Puzzle

For India, the **priority for agricultural policy and strategy historically has been to achieve food security**. The performance of agriculture is thus most often assessed by Indian policy makers in terms of its success in achieving national food security—essentially self-sufficiency in food, specifically cereals (rice and wheat). By this yardstick, Indian agriculture has achieved significant success, **given the rising per capita production of cereals between the 1960s and now** (Figure 1).

Figure 1: Per capita availability and production of cereals (grams/day)

Source: Authors.

The rapid increase in cereal production seen throughout the 1970s and 1980s came from growth in yields driven by the green revolution; net cultivated area has remained largely unchanged since the 1970s (Annex 2, Figure A.2.1). **Irrigation development has increased gross cultivated area, but the prospects to bring new land into cultivation appear limited** (Annex 2, Figure A.2.2). Following a sluggish decade from about the mid-1990s, production growth appears to be back on track.

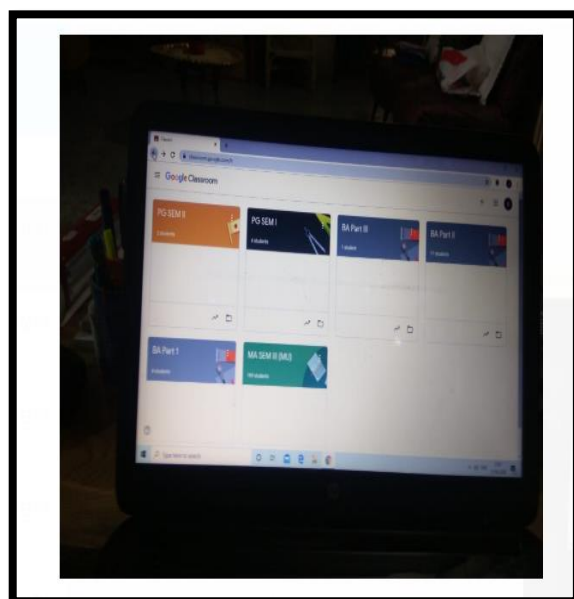
Figure 1 also shows how **per capita cereals availability (defined as production net of change in stocks and trade) has declined in recent years**. After rising in the 1980s and 1990s, cereals availability has fallen to levels near those of the 1960s, causing concern among policy makers (GOI 2013a), who are also concerned by the persistence of hunger at a time when food production is at an all-time high. This disparity is as much of a puzzle as the income-calorie puzzle—the consistent decline

Prod ↑ but availability ↓ Cereals cons^m ↓ + Malnutrition ↑
+
More calorie puzzle (Y, G) Amount and Yr.

¹⁸ For technical background and discussions of some contemporary issues in Indian agriculture, see GOI (2007, 2012); Dev (2008); Gulati and Ganguly (2010); Kotwal, Ramaswamy, and Wadhwa (2011); Ferroni (2013); and Chand and Bajar (2012).

■ Department of English

Dr. Saloni Kumar, HOD, Dept of English, **Dr. Afroz Ashrafi**, Associate Professor (English), **Prof. Kumar Chandradeep** of the same department and other teachers are engaging classes via Whatsapp group, Google Classroom and Video Lectures.

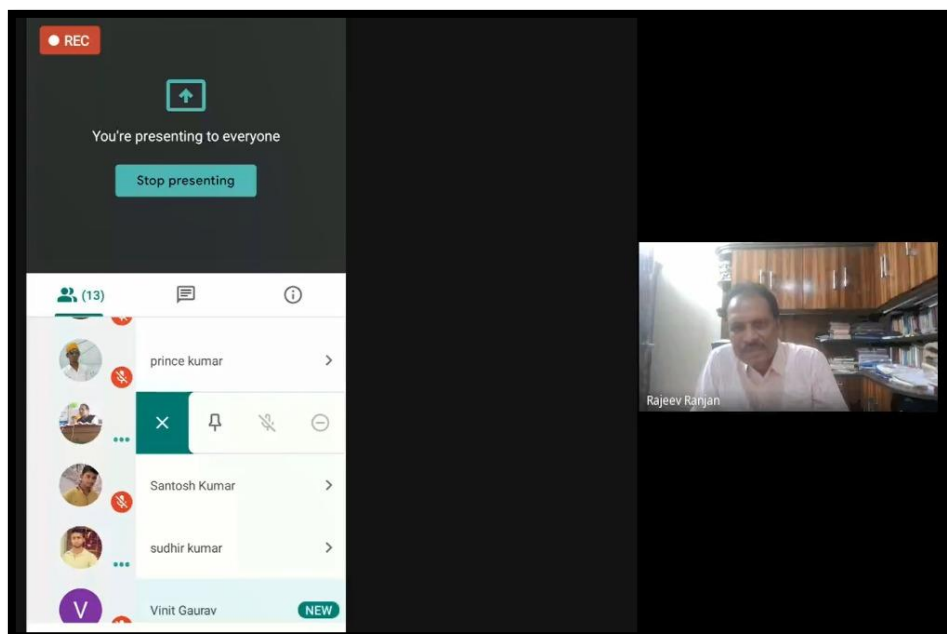


▪ Department of Geography

Dr. Rashmi, HOD, Geography and the other faculty members of department are connected with students through WhatsApp group and providing them the lecture notes of their respective topics.

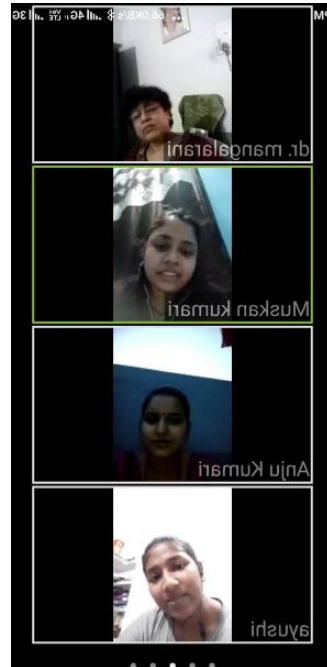
▪ Department of History

Prof. Rajiv Ranjan of Dept. of History is engaging classes of the students of his department through google hangout. **Prof. Rajesh Shukla** and other teachers of department are connected through students through whatsapp group and other digital platforms and are making students available their lecture notes.



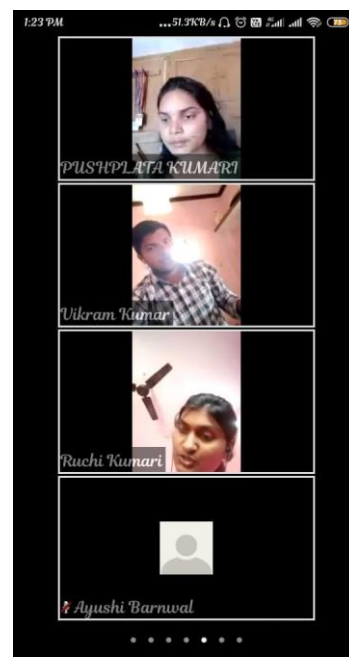
▪ Department of Hindi

Prof. Mangla Rani, Dept. of Hindi is taking online classes of the students of Hindi Department and is connected through all the students through different digital platforms and responding to their queries.



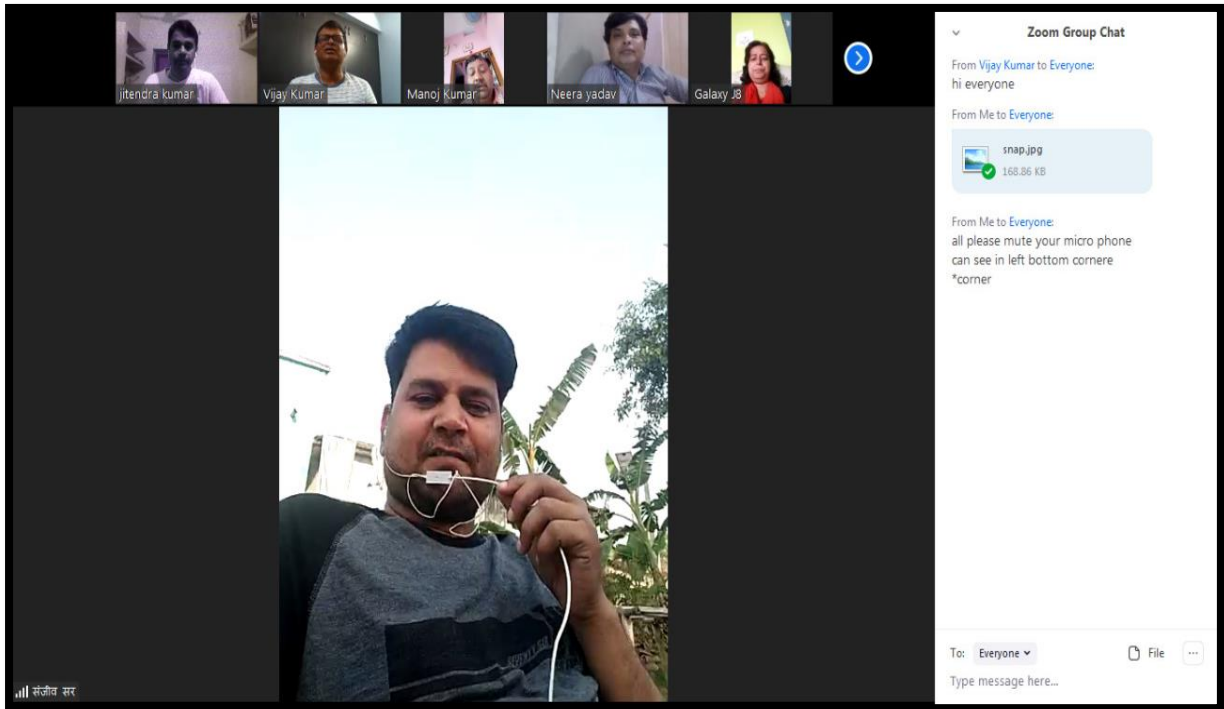
▪ Department of Mathematics

Dr. Shambhu Sharan and others teachers of Dept. of Mathematics are engaging online classes through ZOOM App. In first round classes of PG Students have been engaged



▪ Department of MCA

Dr. Vijay Kumar, Coordinator MCA and the other instructors of departments are taking online classes of the students of MCA department



▪ **Department of Mass Communication**

Prof. Tarique Fatmi, the coordinator of the department and all the other instructors are delivering their lecture notes to students and conducting online classes as per a pre decided schedule (already informed to students).

DEPARTMENT OF JOURNALISM AND MASS COMMUNICATION
College of Commerce, Arts & Science, Patna.
(A Constituent Unit of Patliputra University, Patna.)

Session : 2019-20

Online Lecture Schedule for the Certificate & Diploma Course on Whats App.

DAY	Time	Topic	Name of Faculty
MON	11:00 AM – 12:15 PM	History of Journalism	Dr.T.Fatmi Coordinator
TUES	11:00 AM – 12:15 PM	Elements of News/ Reporting/ Feature writing.	Dr.T.Fatmi Coordinator
WED	11:00 AM – 12:15 PM	Lecture on Current Topic.	Dr.T.Fatmi Coordinator
FRI	11:00 AM – 12:15 PM	Techniques of News Anchoring	Dr.T.Fatmi Coordinator

ALWAYS REMEMBER!!!

: W U H A N :

W- WASH YOUR HAND
U – USE MASK PROPERLY
H- HAVE TEMPERATURE, CHECK REGULARLY
A- AVOID LARGE CROWD
N- NEVER TOUCH YOUR FACE WITH UNCLEAR HANDS.

“STAY HOME, STAY SAFE”

Dr.Tarique Fatmi
Co-ordinator

Prof.(Dr.) Tapan Kumar Shandilya
Director/ Principal

1. अंतर्संबंधों का विकास

- जनसंपर्क एक ऐसी तकनीक है।
- यह आपसी रिश्तों में सहजता, सरलता और मानवीय सहानुभूति फैलाती है।
- यह एक इकाई में काम करने वाले व्यक्ति की दूसरी इकाई में सहजता, सरलता और अनौपचारिकता फैलाकर काम करती है।
- क्षेत्र चाहे सुचना का हो या प्रकाशन का जनसंपर्क हमेशा आपसी संबंधों के विस्तार के कारण सफल होता है।
- क्योंकि जनसंपर्क की कार्य सीमा न केवल कार्यालय में बिताए समय के लिए है और न ही जनसंपर्क कार्यकर्ता कभी मुक्त है।
- इसलिए, जहां भी रिश्ते एक बार बनते हैं। वे न केवल अच्छी तरह से काम करते हैं। बल्कि परस्पर संबंध भी निभाते हैं।

2. बीहर्संबंधों की वृद्धि

- संस्थान से अवगत होने के नाते जब जनसंपर्क विभिन्न विभागों, संस्थानों, और निकायों के संबंध में विस्तार करता है।
- इसका अपना मुखमंडल स्वयं के सामने दिखाई देगा, साथ ही औपचारिक संबंधों के अलावा, विभिन्न आयोजनों में अन्य सहयोगियों की भागीदारी भी होगी।
- अधिक जनसंपर्ककर्मी असहयोगी हो जाता है। उसके संबंधों में समान वृद्धि होती है और उसका व्यक्तित्व विकसित होता है।
- एक तरफ, सत्ता या प्रशासन के साथ लगातार संबंध होता है।
- दूसरी ओर, नियोक्ता के संदेश या विचार को उनके पास पहुंचाता है और उन्हें खुद के लिए भी आश्वस्त करता है।

3. नियोक्ता छवि निर्माण

- जनसंपर्क का उद्देश्य न केवल नियोक्ता के संस्थान और संस्थान के बीच व्यावहारिक या व्यावसायिक संबंधों को बढ़ावा देना है।
- बल्कि यह ऐसे वातावरण को तैयार करने में बहुत सफल है जो अपने नियोक्ता संस्थान की छवि में मदद करता है।
- वास्तव में, जनसंपर्ककर्मी के कार्यकर्ता अपने संस्थान की नीति-रीति संबंध में संस्थान की एक छवि निर्माण की है।
- गहरी विश्वसनीयता के आधार पर ही स्थान का छवि निर्माण भी बनता जाता है।
- क्योंकि, अन्य संस्थान के माध्यम से विशेषज्ञ, संस्थानों और कार्यों, गुण-धर्म, संदेश या अन्य संगठनों के साथ अपेक्षित संदेशों की गुणवत्ता का पता लगाता है।

4. जनसंपर्क प्रबंधन-कार्मिक संबंधों का सेतु

जनसंपर्क का उद्देश्य संगठन की एक छवि को बाहरी रूप से बनाना है न कि संस्था के लिए इसकी स्वीकृति प्राप्त करना। संस्थान के प्रति जनसंपर्क का विशेष दायित्व घोषित नहीं हो कर भी एक विशेष जिम्मेदारी के रूप में होता है। इसलिए उस दायित्व की पुष्टि में, प्रबंधन और कर्मियों के माध्यम से वह सेतु का काम करता है।

▪ Department of M. Lis

Dr. Santwana Rani the Coordinator of M. Lis alongwith the other instructors of department has made a WhatsApp group in the name of e-study group. Notes on different types of networking devices has been provided by **Rachna Kumari**. Difference between qualitative and quantitative research –

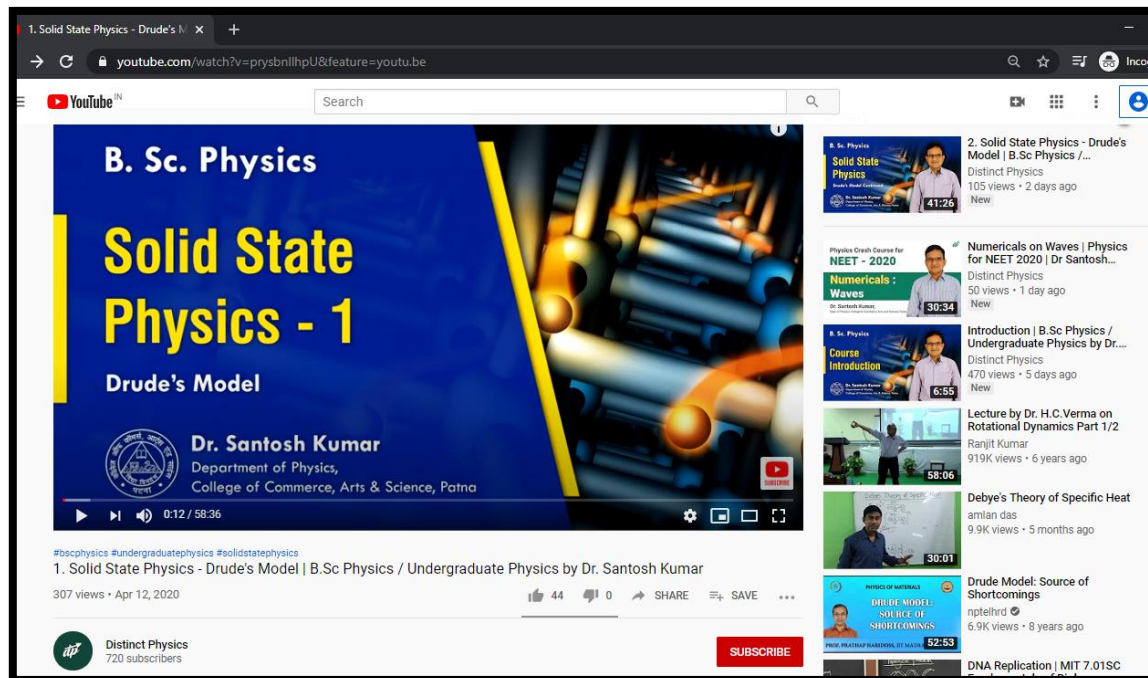
- Study link has been shared by **Ruby Yadav**. A pdf file on barriers of information communication has been sent to students by **Renu Kumari**.
- **Rachna Kumari** has conducted online class on Zoom app.
- Questions and answers session are being conducted on WhatsApp group.

▪ Department of MBA

Dr. Mridula Kumari, Coordinator of MBA Department and the teachers of that department are sharing study materials of their respective papers on Whatsapp group, clarifying the doubts of students and addressing to their queries. For special papers different groups of different special papers i.e. Finance, HR, Marketing have been created and students are getting benefits.

■ Department of Physics

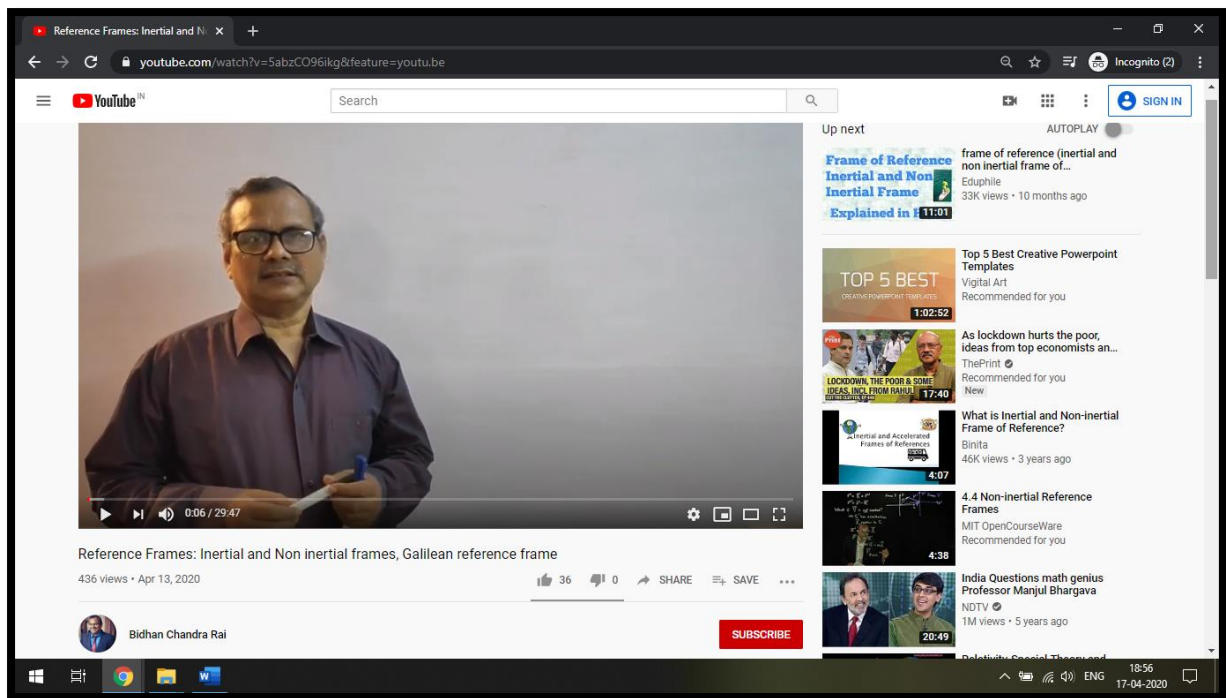
Prof. Ashutosh Kumar Sinha, HOD, Physics, Dr. B.C. Rai, Dr. Santosh Kumar and other faculty members of department are engaging classes of students via Video Lectures and class notes. A few snaps are given below



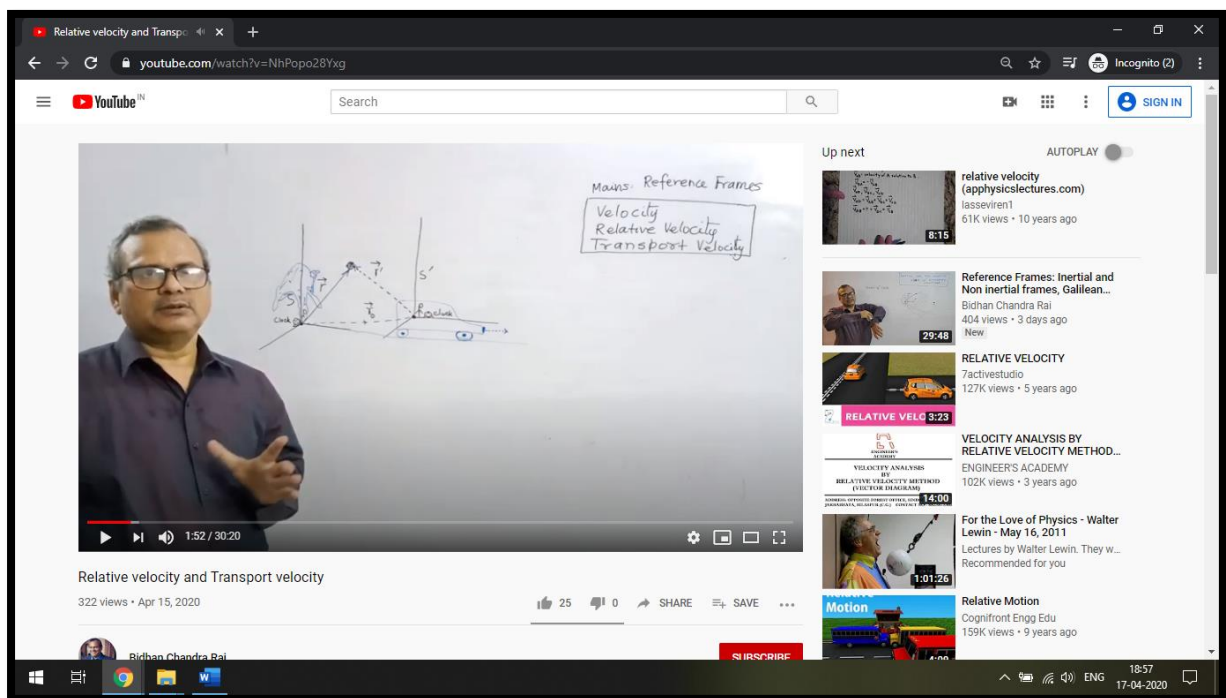
Video Link : <https://www.youtube.com/watch?v=prysbnllhpU&feature=youtu.be>



Video Link : <https://www.youtube.com/watch?v=I8kaVECKF78>



Video Link : <https://www.youtube.com/watch?v=5abzCO96ikg>



Video Link : <https://www.youtube.com/watch?v=NhPopo28Yxg>

2001

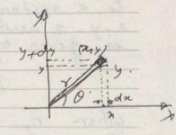
SEPTEMBER

① and $\therefore Z = \left[\int_0^\infty \left[\int_0^\infty e^{-\frac{h^2}{8mkT} \frac{n_x^2}{a^2}} dx \right] \left[\int_0^\infty e^{-\frac{h^2}{8mkT} \frac{n_y^2}{b^2}} dy \right] \right]$
 $\left[\int_0^\infty e^{-\frac{h^2}{8mkT} \frac{n_z^2}{c^2}} dz \right] \quad \text{--- (1)}$

Each integral is of the type $\int_0^\infty e^{-ax^2} dx$ with $a = \frac{h^2}{8mkT}$

SAT 8 which can be evaluated as: $I = \int_0^\infty e^{-ax^2} dx$ --- (1)

Can also be written as $Z = \int_0^\infty \int_0^\infty e^{-ay^2} dy$ --- (2)



SUN 9 $\therefore Z = \int_0^\infty \int_0^\infty e^{-a(x^2+y^2)} dx dy$ --- (3)

Let us change the integration variables to polar coordinates r and θ . Then $x^2 + y^2 = r^2$ and $dx dy = r dr d\theta$.

The area being integrated is the first quadrant.

2001

AUGUST

TUE 28 $\therefore \beta = \frac{d \ln \Omega}{dU} = \frac{d}{dU} \left(\frac{S}{k} \right)$ (using $S = k \ln \Omega$)
 $\alpha, \beta = \frac{1}{k} \left(\frac{dS}{dU} \right)$ --- (1)

using (1) in (1) Comparing (1) & (2) we get $\beta = \frac{1}{kT}$

\therefore Maxwell (classical) distribution law will become

WED 29 $N_i = \frac{A g_i e^{-\frac{E_i}{kT}}}{e^{-\frac{E_i}{kT}}} = A g_i e^{-\frac{E_i}{kT}}$

Significance of A in $N_i = A g_i e^{-\frac{E_i}{kT}}$
 $\therefore N_i = A g_i e^{-\beta E_i}$
 $\therefore \sum N_i = A \sum g_i e^{-\beta E_i}$

THU 30 or, $A = \frac{N}{\sum g_i e^{-\beta E_i}}$

The sum in the denominator plays a fundamental role in statistical mechanics. It was first introduced by Boltzmann who called it 'zustandsumme' or 'sum over states'. It is denoted by Z and the accepted English expression for this sum is the partition function.

Thus, $Z = \sum g_i e^{-\beta E_i} = \sum g_i e^{-\frac{E_i}{kT}}$
 and $A = \frac{N}{Z}$

■ **Department of Political Science**

Prof. Arvind Aditya Raj, Dept. of Political Science is making his students available the lecture notes and other required course materials through WhatsApp group and other ways.

CONCEPT OF HUMAN RIGHT

For PG Semester 4 Students (MU)

Dr. Arvind Adityaraj
Professor & Ex. Head
Department of Political Science
College of Commerce, Arts & Science

Introduction;
 Human rights are certain universal moral and legal standards to which those in power must stick in their treatment of people. They are the sum of individual and collective rights laid down in state constitutions and international law. It is a common observation that human beings everywhere require the realization of diverse values or capabilities to ensure their individual and collective wellbeing. This requirement, whether conceived or expressed as a moral or a legal demand, often painfully frustrated by social as well as natural forces, resulting in exploitation, oppression, persecution and other forms of deprivation. Deeply rooted in these observations are the beginning of human rights and the national and international legal processes associated with them. They strive to shield humankind from gross political, legal and social abuses and various forms of deprivations. They are a set of righteous ideas about the treatment to which all individuals are eligible by dint of being human¹. Adhering to these basics and also laying the foundation for enabling people to actually exercise and enjoy their rights through affirmative measures, primarily concern state authorities such as governments, armed forces and police, but increasingly those having non-governmental power such as multinational corporations, business establishments, as well as religious entities or individuals that exert power over other people. The universality of human rights is sometimes been challenged claiming they are a Western notion, part of a neocolonial attitude that is propagated worldwide. A study published by the United Nations Educational, Scientific and Cultural Organizations (UNESCO) in 1968 clearly showed that the profound aspirations underlying human rights correspond to concepts – the concepts of justice, an individual's integrity and dignity, freedom from oppression and persecution and individual participation in collective endeavours – that are encountered in all civilization and periods. Today the universality of human rights is borne out by the fact that the majority of nations, covering the full spectrum of cultural, religious and political traditions, have adopted and ratified the main international human rights instruments. Brzezinski called human rights "the single most magnetic political idea of the contemporary time". Human rights delimit state power and at the same time, require states to take positive measures ensuring an environment that enables all people to enjoy their human rights. History of last 250 years has been shaped by the

▪ Department of Psychology

Dr. Dinesh Kumar, HOD, Dept. of Psychology and the other teachers of his department is connected with students through Whatsapp group and making them available the lecture notes.

Dr. Vandana Maurya of Psychology department has provided her students the lecture notes of the paper she teaches in the form of PPTs.

Dr. Kirti of this department is also providing lecture notes to students.

Dr. Sangeeta Sinha has uploaded a video lecture on Mental Health Awareness about Covid-19

B.A. Sem I (H)

- 10th April – Psychoanalytic School of Psychology. Form – Video
- 11th April – Freud, level of consciousness. 11111111111111111111 – Audio
- 13th April – Freud anatomy of personality. Form – Audio
- 14th April – Freud, ID, Ego, Superego. Form – Study Material
- 15th April – Freud, of personality. Form – Study Material
- 16th April – Ego Defence Mechanism. Form – Phone Calls, WhatsApp

M.A. 1st Semester (2019-21)

- 13th April – Connected through WhatsApp groups and Phone calls.
- 14th April – Study Material – Division of Brain
- 15th April – Assignment - Write-up on Functions of Brain
- 16th April – Methods of Studying Brain. Form – Study Material, Phone calls.

Dr. Vandana Maurya
Assistant Professor
Department of Psychology,
College of Commerce, Arts & Science,
Patliputra University, Patna

What does Anxiety mean?

- ⦿ Intense and prolonged feelings of fear and distress that occur out of proportion to the actual threat or danger.

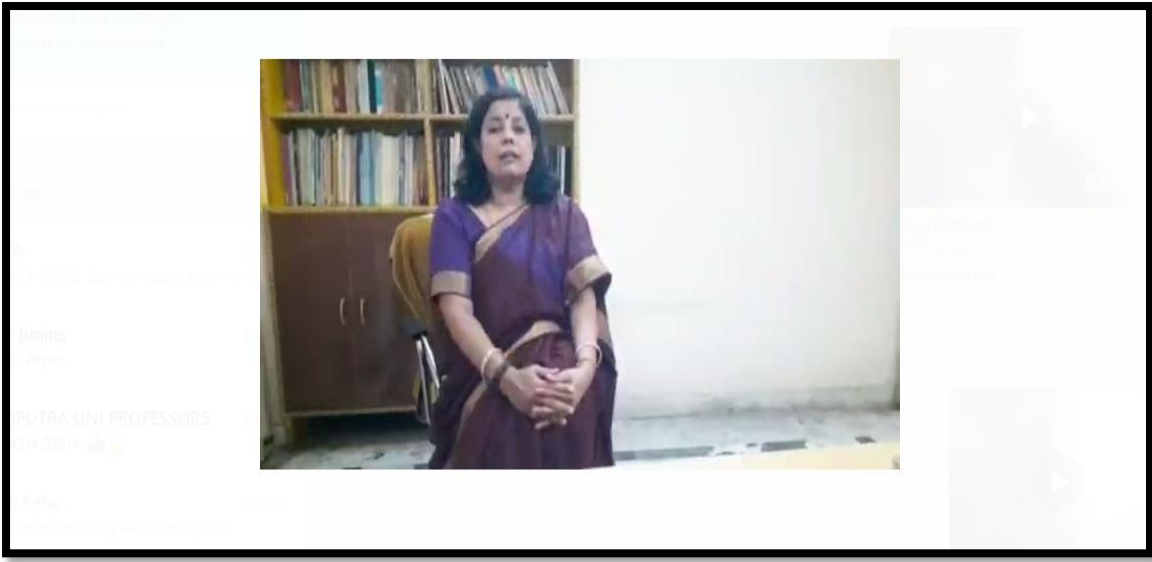
- ⦿ Feelings of fear and distress that interfere with

Educational Psychology
B.A. D (Hons), Paper - III

By: Dinesh Kumar
Prof. and Head
Dept of Psychology
College of Commerce, Arts & Sc, Patna

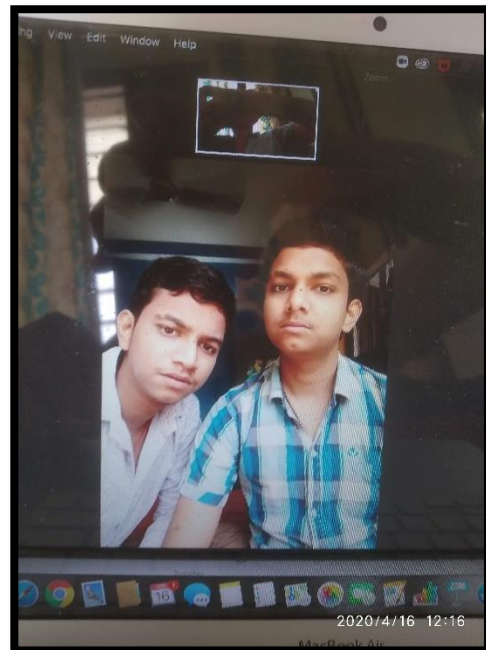
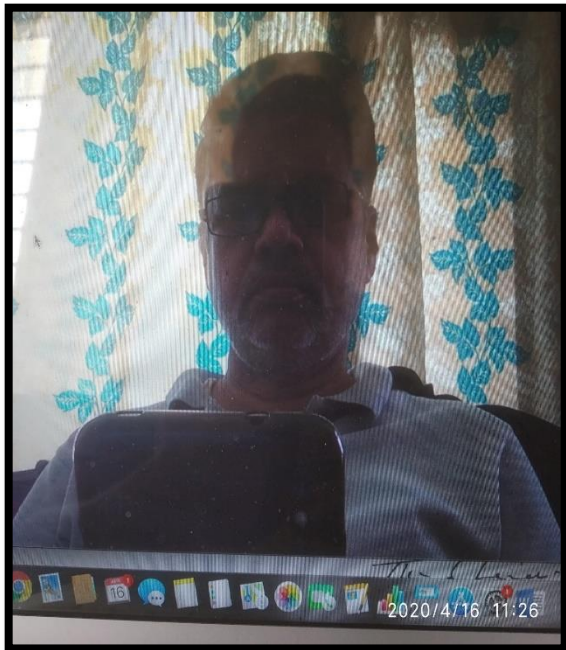
उद्देश्य (Lesson Structure)

- * विभिन्न विधियों का विवरण:
(Methods of Educational Psychology)
- (a) साक्षात्कार विधि (Interview Method)
 - ⇒ साक्षात्कार विधि का अर्थ (Meaning of Interview)
 - ⇒ साक्षात्कार विधि के उद्देश्य (Merits of Interview Method)
 - ⇒ साक्षात्कार विधि के दोष (Demerits of Interview Method)
 - ⇒ निष्कर्ष (Conclusions)
- (b) अतीत इतिहास विधि (Case History Method)
 - ⇒ अतीत इतिहास विधि का अर्थ (Meaning)
 - ⇒ Merits (विशेषता, उचित)
 - ⇒ Demerits (असंगत, अस्पष्ट)
- (c) रेटिंग विधि (Rating Method)
 - Meaning (अर्थ)
 - Types (प्रकार)
 - Merits (उचित)
 - Demerits (असंगत)
- (d) रैटिंग विधि (Rating Method)



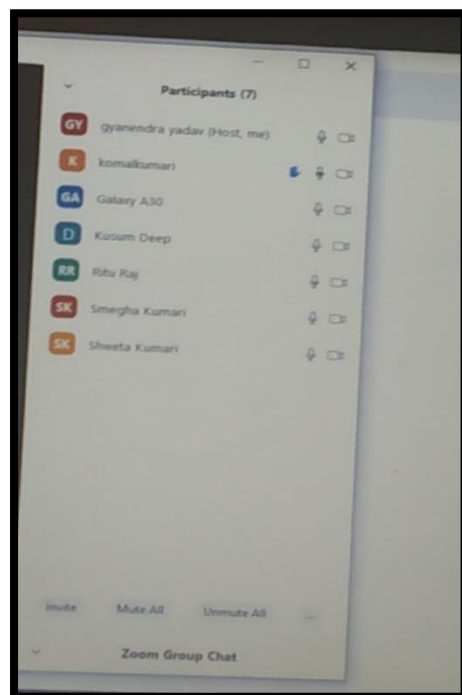
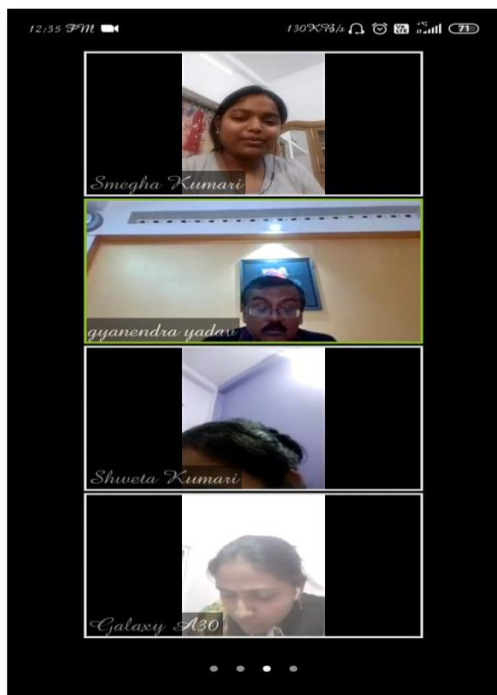
▪ **Department of Philosophy**

Dr. Pramod Kumar, HOD, Philosophy is taking online classes of his students.



▪ **Department of Sociology**

Dr. Gyanendra Yadav, HOD, Dept. of Sociology is engaging online classes for the students of his department.



Department of Urdu

Prof. SI Quadri, Dr. Akbar Ali and Dr. Tareeq Fatmi are all engaging classes of students and making them available course materials and lecture notes.

B. A. II

Ghalib: Gulshan-e-Na Afreeda

عالم: غنابلپ گلشن نا آفریدہ

SAFDAR IMAM QUADRI
Head, Deptt. of Urdu, College of Commerce, Arts & Science, Patna-800020
202, Abu Plaza, Ashok Rajpath, Nit More, Patna- 800006
Email: safdarimamquadri@gmail.com
Mob. No. : 9430466321

صدر راجہ امام قادی
صدر شعبہ اردو کالج آف کامرس آف ایڈ سائنس، پٹنہ

عالم نے اپنی قاری کوئی کو بیحد وچہ اعتبار مانا لیکن ان کی شہرت اور عظمت کے ستارے واقعتاً اور دشامعی سے روشن ہوئے تھے وہ بے رنگ اور کبھی کبھی تنگ من قرار دیتے تھے۔ دراصل وہ محمد قاری روایت کی روشنی اور چمک سے آراستہ قلم فن میں سکڑے راج اور قوت کی سند قاری کے پاس تھی۔ یہ عجیب اتفاق ہے کہ عالم نے علمی طور پر بھی اردو سے جتنے گنا زیادہ شہری سراہیے قاری میں یادگار چھوڑا۔ قاری نثر بھی مقدر میں اردو سے زیادہ رہی لیکن وقت سے عظمت، فضیلت اور اہمیت کی نگاہ دیکھنے سے عطا کی۔

عالم قاری روایت کے اثر میں دوسروں سے زیادہ رہے ہوں، اس کا کوئی کئی پختہ ثبوت چھٹین کے پاس نہیں ہے لیکن ان کے ساری مزاج سے اس روایت کی ہم دھجی ایک نئے ادبی آفتاب کا اشارہ کرتی ہے۔ یہیں عالم اسلاف کی آرمائی ہوئی ہنرمندی کے سرخشاں بھی قرار پاتے ہیں اور مشکل پسندی کی وہ بھٹی گلے میں بندھ جاتی ہے جس نے ایک ساتھ عالم کو عورت اور سوانی دونوں عطا کی۔ اپنی شہری زبان وضع کرنے کے مرحلے میں عالم نے اسی روایت کو بنیاد بنا کر اپنے نثر و ادب میں ایک بار وہ اس روایت کے تالیق وار کمانی دیتے ہیں تو مشکل پسندی کا لہجہ ابھرتا ہے مگر دوسرے مرحلے میں اسی روایت کے خلاف کڑا بوکر عالم ہمیں متبع کی طرف رخ کرتے

Session-2020 B.A. Part-1, Paper-II

Objective/Subjective Urdu Hons
Presented by Dr. Akbar Ali, Associate Professor
College of Commerce, Arts and Science,
Patliputra University, Patna
Mobile No. 8863009466, Email: prof.akbarali@gmail.com

راجہ عظیم آبادی اور عظیم آباد

راجہ عظیم آبادی، دبستان بہار کے ان شعراء میں ہیں جن کی بدولت اس دبستان کو عظمت حاصل ہے۔ راجہ ایک باکمال شاعر تھے۔ چھٹا سو فی مفت تھے۔ تمدن اور روش کی وجہ سے گوشہ نشین رہے۔ ابتدا سے عہد میں اپنی کوئی بچپان نہیں بنا سکے۔

راجہ عظیم آبادی شاعری میں کافی تسلیم کیے جاتے ہیں۔ جن پر اہل عظیم آباد کوثر ہے۔ حقیقت یہ ہے کہ خواجہ میر درد کے رنگ و خوں کوئی میں جو شخص نے اپنا یاد اور میر کے طرز کو سوائے راجہ کے کسی نے نہیں اپنایا۔ جس طرح وہ باکمال زمانہ ہوئے۔ اس اعتبار سے ان کے نئے حالات گمانی میں ہیں۔ سخی کر بھی کہنا مشکل ہے کہ انہوں نے شاعری میں کس سے اصلاح لی۔ مگر وہ دونوں میں اس سلسلے میں خاصا اختلاف پایا جاتا ہے۔ راجہ کی قدر و منزلت کا جہاں تک سوال ہے اس لئے ان کا کام ہی کافی ہے لیکن ان کی طبیعت میں دشواری تھی نہ ہوا جانا یاد کرتے۔ نتیجہ یہ ہوا کہ وہ اکثر اہل علم کی نظروں سے اوجھل رہے۔ آج بھی ان کے سلسلے میں صورت حال کوئی خاص تبدیلی نظر نہیں آتی ہے۔ دو اشعاروں نے بھی اس سرسری سا ذکر ان کے تعلق سے کیا ہے۔ یعنی نام شائع علامہ علی اور شخص راجہ تھا۔ والد کا نام شائع نہیں بتایا جاتا ہے۔ ان کی ولادت سے تعلق عام رائے یہ ہے کہ ۱۱۲۳ھ میں موضع ماس میں ہوئی۔ یہ جگہ پٹنہ سے تقریباً گیارہ بارہ کوس کے فاصلے پر ہے۔

سال وفات کے سلسلے میں عظیم آبادی کا خیال ہے:

”راجہ مرحوم کے سال ولادت میں کوئی اختلاف نہیں تمام تذکرہ نویس متفق ہیں کہ آپ کی ولادت کا سال ۱۱۲۳ھ ہے لیکن سال وفات کے سلسلے میں اختلاف ہے لیکن وفات کے سلسلے میں ان کے شاگردوں کی آراء میں اختلاف ہے۔“

To
The Principal
College of Commerce, Arts and Science, Patna

Sub: Compliance regarding the Teaching-Learning activities during the Lock Down period by the Department of Urdu

Ref: Yours RES/08/COCAS/20 dated 15 April, 2020 & PPU letter R/PPU/201/20 dated 15 April, 2020

Dear Sir

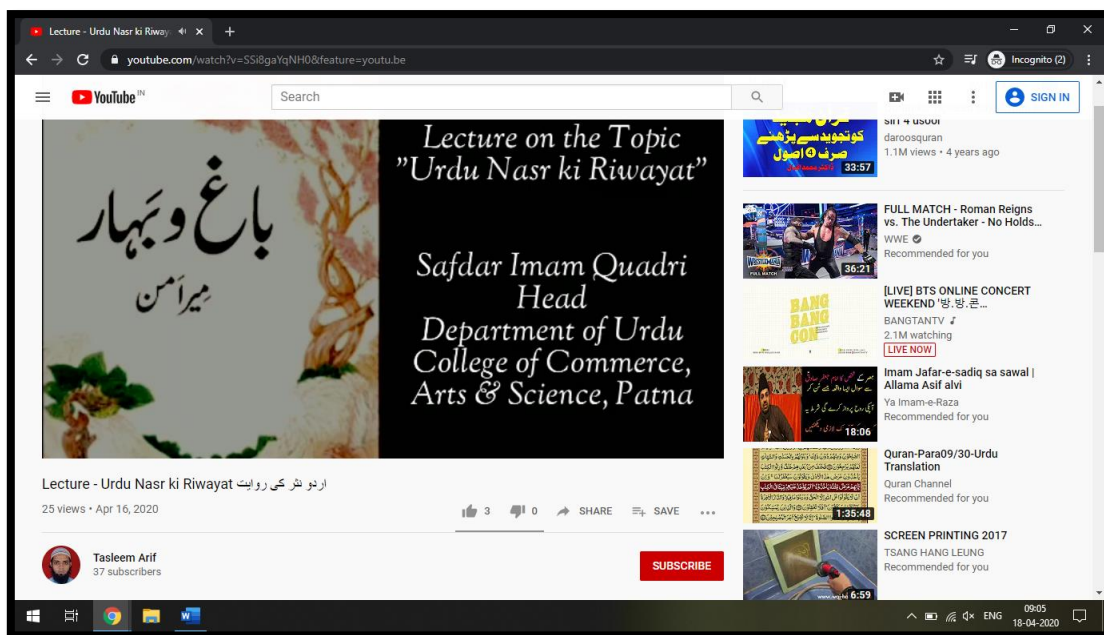
I am pleased to share with you that during the Lock Down period, we were in continuous touch with our students residing in different parts of the state on their mobile. We have used the earlier created What's App groups of our students and tried to serve them best as their educational requirements. We have sent them notes on their topics, short answer and long answer questions for their final examinations. We have served them a question bank of Objective pattern for Intermediate and Graduation levels. We have tried our best to solve their problems on mobile as directed them to continue with their studies in this tough time for the humanity.

Here, it is worthy to mention that during this period of time, we have used it for the enhancement of our academic pursuit. We have developed some new course materials, review articles and focused on student oriented writings as detailed below:

By Dr. Tarique Fatmi, Associate Professor, Department of Urdu

1. Khwateen Fiction Nigaron ke Imteyazi Khususiyat (07 Pages)
2. Mejaz ki Shayerana Azmat (09 Pages)
3. Maulana Abul Kalam Azad: Al-Hilal..... (09 Pages)
4. Saleha Aabid Hussain ke Novelon ke Chand Niswani .. (13 Pages)



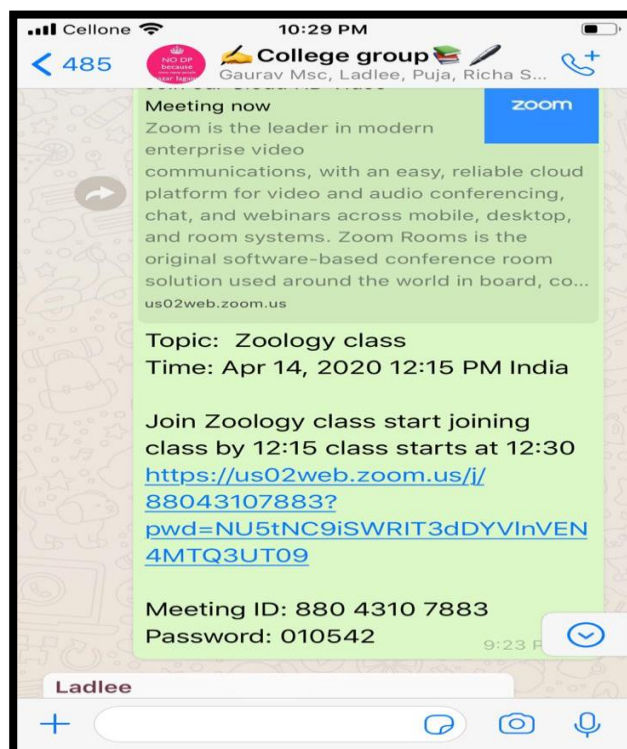
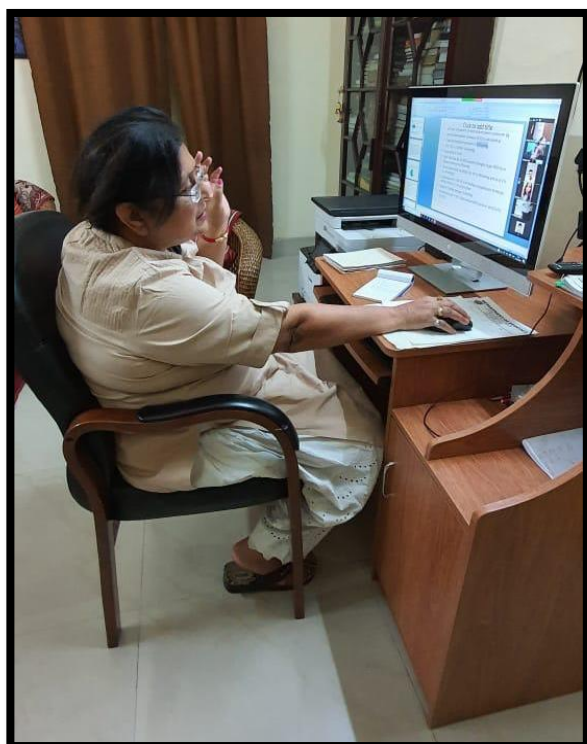


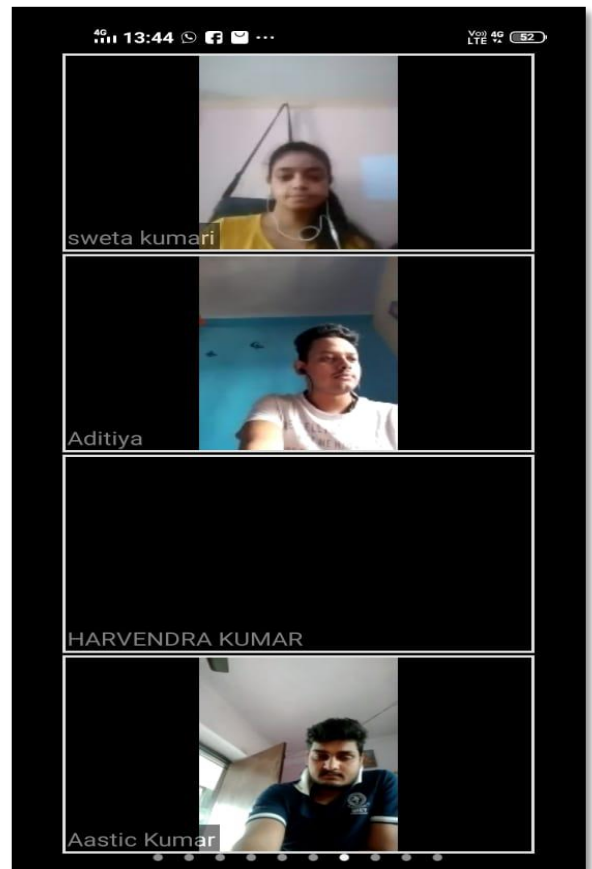
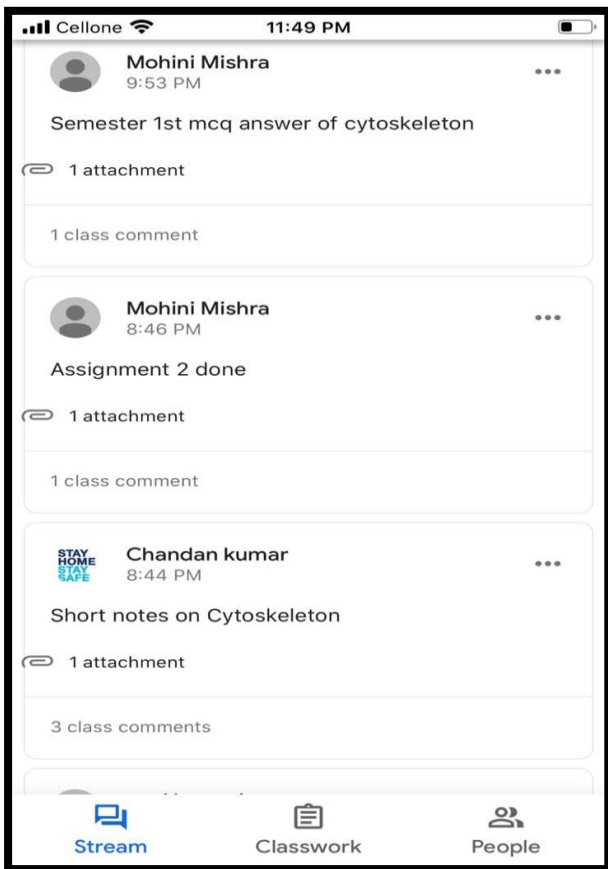
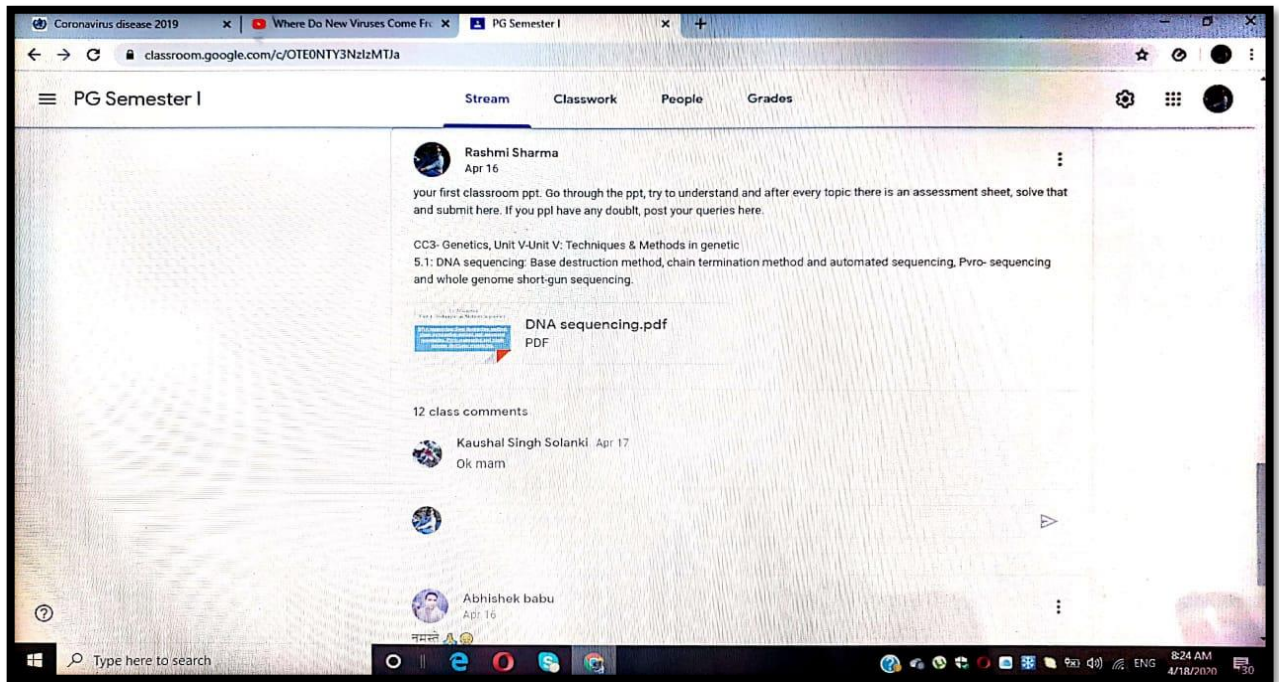
Video Link : <https://www.youtube.com/watch?v=SSi8gaYqNH0&feature=youtu.be>

▪ Department of Zoology

Prof. Bindu Singh, HOD, Dept. of Zoology is conducting online classes. She is providing lecture notes and taking tests of students also. She has engaged classes of B.Sc Hons I, B.Sc Hons II, M.Sc I, II and III semester. Assignments are being provided to students through google classroom.

Dr. Rashmi Kumari, Assistant Professor, Dept. of Zoology is engaging classes through google classroom and Video Lectures.





youtube.com/watch?v=B54LBn5r5xc&feature=youtu.be

Incognito


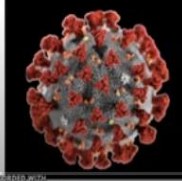
YouTube

Search


SIGN IN

Introduction to Coronaviruses(SARS, MERS, COVID-19: Hosts, Symptoms & History

Part-I



Dr. Rashmi Kumari
Assistant Professor
Department of Zoology
College of Commerce, Arts & Science
Patliputra University, Patna



0:01 / 10:43

COVID-19

Up next

AUTOPLAY

Video Link : <https://www.youtube.com/watch?v=B54LBn5r5xc>



INTERNATIONAL SEMINAR ORGANIZED ON STRESS MANAGEMENT AND
ENERGIC HEALING DATED 16.07.2018

IQAC INTERNATIONAL SEMINAR
on
STRESS MANAGEMENT & ENERGIC HEALING

Invited Speakers

Prof. C.N. Daftuar, Pune & Mr. Chin Kheng Boon, Singapore

Organised by:

P.G. CENTRE OF PSYCHOLOGY

College of Commerce, Arts & Science, Patna - 800 020

Date: 16th July, 2018

Time : 11.00 AM





संगोरी कॉलेज ऑफ कॉमर्स, आर्ट्स एंड साइंस में सिंगापुर से आए विशेषज्ञ ने दी जानकारी

सिंगापुर में भारत से अधिक तनाव व अवसाद

जास, पटना : कॉलेज ऑफ कॉमर्स, आर्ट्स एंड साइंस में सोमवार को 'प्रतिबल प्रबंधन एवं शक्ति उपचार' पर अंतरराष्ट्रीय सम्मिानार का आयोजन मनोविज्ञान विभाग ने किया। सम्मिानार में सिंगापुर से आए विशेषज्ञ अतिथि चिन बून ने स्ट्रेस मैनेजमेंट के विभिन्न उपायों को पावर प्वाइंट से प्रस्तुत किया। युवाओं और छात्रों को अवसाद और तनाव से मुक्त होने के सहज उपायों और उपचार से अवगत कराया। उन्होंने कहा कि भारत की तुलना में सिंगापुर में अवसाद और तनाव की समस्या अधिक है। इससे दूर करने के लिए, योग, स्पर्श थेरेपी, रेकी आदि का सहारा लिया जा रहा है। हजारों साल से योग लोगों का तनाव दूर करना आ रहा है। अब इसका लाभ दूसरे देश भी तेजी से उठा रहे हैं। उन्होंने विभिन्न व्यायामों का प्रदर्शन कर छात्रों को तनावमुक्त रहने की कला सिखाई। सिंगापुर से आए छात्रों के टल ने मनमोहक नृत्य प्रस्तुत किया। विदेशी मेहमानों ने स्थानीय छात्रों से पठन-पाठन की शैली पर भी बातचीत की। मुख्य वक्ता माहाराजा सयाजीराव विरवाविद्यालय बड़ोदरा के मनोविज्ञान विभाग के पूर्व विभागाध्यक्ष प्रो. चितरंजन नारायण दस्तुआर ने तनाव और अवसाद के लिए रेकी और स्पर्श थेरेपी के लाभ से शिक्षक और छात्रों अवसाद दूर करने की विधि बताई। उन्होंने कहा कि रेकी मनोवैज्ञानिक उपचार विधि है जो पूर्णतः भारतीय है। उसका उल्लेख ऋग्वेद में भी मिलता है। इससे तनाव, अवसाद समेत विभिन्न शारीरिक और मानसिक रोगों का उपचार होता है। सम्मिानार का उद्घाटन प्राचार्य प्रो. तपन कुमार शोडित्य ने किया। उन्होंने कहा कि वर्तमान में हर एक व्यक्ति किसी न किसी रूप में अवसाद का शिकार है। तमाम मनोरोगों से बचने के लिए उन्होंने योग को अपनी दिनचर्या में शामिल करने की सलाह दी। सम्मिानार का संचालन प्रो. जय मंगल देव व धन्यवाद ज्ञापन विभागाध्यक्ष प्रो. दिनेश कुमार ने किया।

P.G. Department of Psychology, college of commerce in collaboration with IQAC organized an International seminar on stress management and energetic healing dated 16/07.2018. Invited speaker was prof. C.n. daftuar, pune and mr. Chin kheng boon, singapore. Dr. Tapan kumar shandilya principal of the college presided over the conference.

They emphasised that stress management involves adopting strategies to cope with and reduce stress levels. This can include mindfulness practices, exercise, proper time management, and seeking social support. On the other hand, energetic healing encompasses various holistic approaches aimed at balancing and harmonizing the body's energy systems, such as reiki, acupuncture, or qi gong. While stress management focuses on psychological and lifestyle factors, energetic healing explores the subtle energies believed to influence overall well-being. Both approaches aim to promote physical and mental health through different mechanisms. 46 participants participated in this seminar.

ONE-DAY LECTURE ON 'ULTRA REAL NUMBER' ORGANIZED ON 27.07.2018.



Department of Mathematics, College of Commerce, Arts and Science, Patna in collaboration with IQAC and Bihar Mathematical Society organized one day lecture on ultra real number on 27.07.2018. The programme was presided over by dr. Tapan kumar shandilya. Dr. Vijay kumar was distinguished speaker. This is a survey of several approaches to the framework for working with infinitesimals and infinite numbers, originally developed by abraham robinson. 51 participants participated in this seminar.

SEMINAR ON “ACHARYA SHIVPUJAN SAHAY: HIS PERSONALITY AND DEEDS” ON 9.08.2018



THE HINDI DEPARTMENT OF THE COLLEGE OF COMMERCE, ARTS, AND SCIENCE ORGANIZED A SEMINAR IN COLLABORATION WITH THE INTERNAL QUALITY ASSURANCE CELL IQAC OF THE COLLEGE ON THE 125TH JAYANTI OF ACHARYA SHIVPUJAN SAHAY ON “ACHARYA SHIVPUJAN SAHAY: HIS PERSONALITY AND DEEDS” DATED 09.08.2018. DR. TAPAN KUMAR SHANDILYA PRESIDED OVER THE SEMINAR. HON’BLE VICE CHANCELLOR PROF. GULABCHAND RAM JAISWAL INAUGURATED THE SEMINAR. THE DISTINGUISHED GUESTS WAS USHAKIRAN KHAN AND THE KEYNOTE SPEAKER WAS PROF. MANGALMURTI.

THE MAIN THEME DISCUSSED IN THE SEMINAR BY VARIOUS SCHOLARS WAS ON ACHARYA SHIVPUJAN SAHAY’S DIVERSE IDEAS THAT COULD BENEFIT THE NATION. ACHARYA SHIVPUJAN SAHAY (1893-1963) WAS NOT ONLY A POET AND ESSAYIST BUT ALSO A SANSKRIT SCHOLAR AND A DISTINGUISHED LITERARY FIGURE IN HINDI LITERATURE. BORN IN A VILLAGE IN UTTARPRADESH, SAHAY SHOWED EARLY INTEREST IN LITERATURE AND PURSUED EDUCATION IN SANSKRIT. SAHAY SERVED AS PROFESSOR AND LATER AS THE HEAD OF THE HINDI DEPARTMENT AT ALLAHABAD UNIVERSITY. HIS DEEP KNOWLEDGE OF SANSKRIT AND HINDI LITERATURE CONTRIBUTED TO HIS ACADEMIC ACHIEVEMENTS.

SAHAY WAS A KEY FIGURE IN THE CHHAYAVAAD LITERARY MOVEMENT, WHICH EMERGED IN THE EARLY 20TH CENTURY. THIS MOVEMENT FOCUSSED ON ROMANTICISM, NATURE, AND INTROSPECTION IN POETRY.

SAHAY' POETIC WORKS EXEMPLIFY THE ESSENCE OF CHHAYAVAAD. APART FROM " SATRANGE PAR SAJATI HAI" SAHAY'S OTHER NOTABLE WORKS INCLUDE "CHHAYAVAAD" AND "HINDI SAHITYA KA ITIHAS" THESE WRITINGS REFLECT HIS CRITICAL INSIGHTS INTO HINDI LITERATURE AND THE CHHAYAVAAD MOVEMENT. SAHAY RECEIVED SEVERAL HONORS FOR HIS CONTRIBUTIONS TO LITERATURE. HE WAS AWARDED THE SAHITYA AKADEMI AWARD FOR HIS WORK "CHHAYAVAAD". ACHARYA SHIVPUJAN SAHAY IS REMEMBERED AS A LEADING FIGURE IN THE HINDI LITERARY WORLD. HIS POETRY IS CHERISHED FOR ITS EMOTIONAL DEPTH, AESTHETIC APPEAL, AND PHILOSOPHICAL REFLECTIONS. 195 PARTICIPANTS PARTICIPATED IN THIS SEMINAR.

Seminar on Creativity and Entrepreneurship

Date: 11.01.2019

The IQAC of the college organized a seminar dt. 11.01.2019 on the topic "creativity and entrepreneurship" on the occasion of National Youth Day. Chief speaker was Sri Vijay Prakash (Retd. I.A.S.) said that creativity is a skill that can be learned and nurtured. Many people believe that creativity is innate, but this isn't true. Creativity is an important part of the entrepreneurial process because it helps entrepreneurs to solve problems in new ways and come up with original ideas for products or services. He further discussed that how entrepreneurship promotes economic growth, provides access to goods and services, and improves the overall standard of living. Prof. Tapan Kumar Shandilya (Principal, COCAS) said in his presidential address that many entrepreneurs are making positive impact on their communities and improve their well-being by catering to underserved areas and developing environment-friendly products. Overall, 189 participants were participated in this seminar.

IQAC संगोष्ठी

सृजनात्मकता और उद्यमिता

मुख्य वक्ता - श्री विजय प्रकाश
भा. प्र. से. (से.नि.)

अध्यक्षता - डॉ० तपन कुमार शॉडिल्य, प्राचार्य, COCAS, पटना

दिनांक - 11-01-2019

स्थान - कॉलेज ऑफ कॉमर्स, आर्ट्स, एण्ड साइंस, पटना

Seminar on Personality Development and Character Building

Date: 22.05.2019

The college organized one-day seminar on Personality Development and Character-Building. The resource person was Sri. Atul Kothari, New Delhi. Prof. G.C.R. Jaisawal, Vice Chancellor, Patliputra University, Patna presided over the seminar. The chief Guest was pro. Vijay Kant Das, Member, University Service Commission, Patna. Sri. Atul Kothari discussed in the seminar that an individual's character is actually an amalgamation of his/her qualities which makes him unique and helps him stand apart from the rest. The personality development is not only about looking good and wearing expensive brands. It is also about developing one's inner self and being a good human being. Overall, 183 participants participated in this seminar.





Seminar on Sarthak Jeevan

Date: 26.08.2019

A seminar was organized by IQAC on Sarthak Jeevan. The speaker was Shri. D.N. Gautam, Former D.G.P. The session was chaired by Prof. Tapan Kumar Shandilya, Principal, COCAS. The resource person said that a meaningful life is a construct having to do with the purpose, significance, fulfilment, and satisfaction of life. Living a meaningful life requires challenging oneself, slowing down, deep thinking, and deliberate actions. Giving time or resources to others can also provide meaning. Total 156 participants participated in the seminar.





Workshop on Student Mental Health

Date: 13.09.2019

A sensitization workshop was organized by the Department of Psychology and Department of Counselling and Rehabilitation on dt. 13.09.2019. The resource person was Ms. Nidhi Singh, Assistant Professor, Magadh Mahila College, Patna University was a qualified Clinical Psychologist. Guest of honour was Prof. Vijaya Lakshmi, Dean, Social Sciences, Patliputra University, Patna. The resource person said that mental health includes our emotional, psychological, and social well-being. It affects how we think, feel, and act. It also helps determine how we handle stress, relate to others, and make choices. She further suggested way to minimize the stress and other mental health issues. 58 participants participated in this workshop.





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Website : www.cccspatna.ac.in

College of Commerce, Arts & Science

Kankarbagh, Patna - 800020
(A Constituent unit of Patliputra University, Patna)
NAAC RE-ACCREDITED 'A' Grade, with CGPA 3.10

OFFICE OF THE PRINCIPAL

Ref.:

Date: 05/07/2019

NOTICE

All the students are hereby informed that our college is conducting a career guidance program on " **Importance of Legal Knowledge** " on 09.07. 2019 at 11:00 AM. |

Venue: Vanijya Sabhagar.

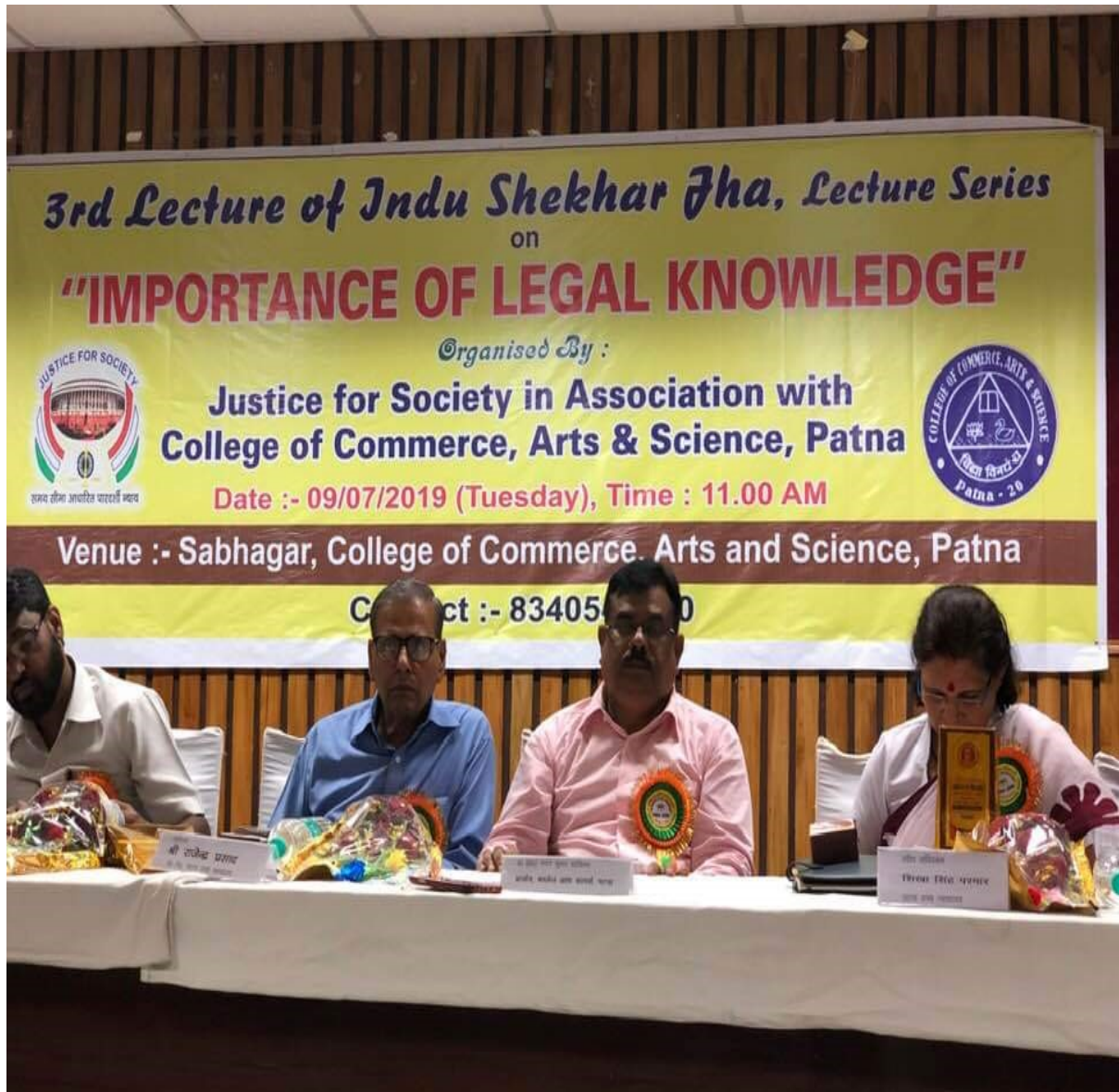
Resource person: Hon'ble Justice Rajendra Prasad (Retd. Justice, High Court,
Patna)

Principal

Seminar on Importance of Legal Knowledge

Date: 9.07.2019

One day seminar was organized by College of Commerce, Arts & Science in association with Justice for Society on the topic "Importance of Legal Knowledge" dt. 09.07.2019. Hon'ble Justice Rajendra Prasad (Retd. Justice, High Court, Patna) was the resource person. He said that legal knowledge empowers individuals to understand their rights and responsibilities within society. It allows people to make informed decisions and take appropriate actions to protect their interests. He concluded that legal awareness helps to promote consciousness of legal culture, participation in the formation of laws and the rule of law. 186 participants were participated in the seminar.



IQAC Seminar on Globalization and Indian Economy

Date: 30.07.2019

A one- day seminar on the topic ‘Globalization and Indian Economy’ was organized by IQAC of the College dt. 30.07.2019. The chief Speaker was Dr. Ravindra Brahme, Professor & Head, School of Studies in Economics, Pt. Ravishankar Shukla University, Raipur. He explained that globalization is the growing interconnectedness of countries and economies, facilitated by advancements in technology, transportation, and communication.

He narrated that globalization, facilitated by technology, transportation, and communication, has significantly impacted the Indian economy, attracting foreign investment, expanding market access, fostering technological advancements, creating job opportunities, and improving infrastructure. It has also led to increased competition, reduced unemployment rates, and increased foreign exchange reserves, while fostering a skilled workforce and generating revenue. In the presidential remarks Prof. T.K. Shandilya, Principal COCAS, said that globalization has enhanced competitiveness, encouraging Indian businesses to improve their products, services, and operational efficiency. Total 59 participants participated in this event.





**UGC Cell in Collaboration
with IQAC,
College of Commerce, Arts & Science,
Patna**



By Mrs. Setika
Founder & Director



दंगीन BIHAR

**Invites you on a Special Talk
Entitled**

**“Women
Entrepreneurship:
Opportunities,
Challenges and
Potential Avenues”**

Patron



Prof. Indrajit Prasad Roy
Principal, College of Commerce, Arts
& Science

IQAC Coordinator



Dr. Santosh Kumar
Associate Professor
Dept. of Physics

UGC Coordinator



Dr. Ayan Mukherjee
Assistant Professor
Dept. of Physics

📍 Vanijya Sabhagar, College of Commerce, Arts & Science, Patna



August 09, 2023



10:30 AM





महिला उद्यमिता अवसर और चुनौतियां पर व्याख्यान का आयोजन

पटना (आससे) । कालेज आफ़ कामर्स आर्ट्स एण्ड साइंस पटना में आईक्यूएसी और युजीसी प्रकोष्ठ के संयुक्त तत्वावधान में बुधवार को महिला उद्यमिता अवसर और चुनौतियां विषय पर व्याख्यान का आयोजन किया गया । व्याख्यान में मुख्य अतिथि के रूप में बोलते हुए सबरंगी संस्था बिहार की संस्थापक निदेशक सुश्री सेतिका ने कहा कि राज्य में महिला उद्यमिता की आपार संभावनाएं हैं और यह महिलाओं के जीवन स्तर को बेहतर बनाने के में मददगार साबित हो सकता है लेकिन इसके लिए युवा वर्ग को आगे आकर अपनी भूमिका निभानी होगी ।

व्याख्यान में बोलते हुए प्रधानाचार्य प्रो इंद्रजीत प्रसाद राय ने वर्तमान समय में महिला उद्यमिता को स्वरोजगार और आत्म स्वावलंबन का एक महत्वपूर्ण साधन बताया । व्याख्यान में अन्य लोगों के अलावा आईक्यूएसी के समन्वयक डॉ संतोष कुमार और युजीसी प्रकोष्ठ के समन्वयक डॉ आयान मुखर्जी ने भी अपने विचार रखे । मंच का संचालन डॉ विद्या यादव ने किया जबकि धन्यवाद ज्ञापन आकांक्षा प्रिया ने किया । इस अवसर पर अन्य लोगों के अलावा प्रो जय मंगल देव, प्रो मृदुला कुमारी, डॉ संजय पांडेय समेत बड़ी संख्या में शिक्षक और छात्र छात्राएं उपस्थित थे ।



DEPARTMENT OF GEOGRAPHY
&



DEPARTMENT OF ZOOLOGY

in collaboration with

IQAC, COLLEGE OF COMMERCE, ARTS & SCIENCE

Celebrates

World Population Day - 2023

on

11th July, 2023

Special Lecture

by:



Dr. Smriti Sparsh

Fertility Expert, Centre Head & Chief Consultant

WINGS IVF, Patna

📍 Vanijya Sabhagar, College of Commerce, Arts & Science, Patna

📅 July 11, 2023

🕒 1:00 pm

PATRON

Prof. (Dr.) Indrajit Prasad Roy

Principal, College of Commerce, Arts &
Science

CO-ORDINATOR

Dr. Santosh Kumar

IQAC Co-ordinator

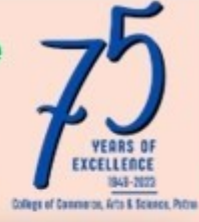
ORGANIZING DEPARTMENTS

Department of Geography

Department of Zoology



Mega Plantation Drive (सौजन्य LIC) Diamond Jubilee 2023-24



Join Hands Together
for
Mega Plantation Drive



On the Occasion of
World Environment Health Day

IQAC of College of Commerce, Arts & Science (Patliputra University), In Collaboration with Life Insurance of India (LIC)

योगक्षेमं वहाम्यहम्

“Your welfare is our
responsibility”

*Zindagi Ke Sath bhi,
Zindagi Ke Baad Bhi*

Clean & Green Earth:

'AN INITIATIVE TO SWACHH BHARAT'



Prof. Indrajit Prasad Roy

Principal,

College of Commerce, Arts & Science, Patna

College
Campus



**September 26,
2023**



**11:30
AM**



Vat Baba

Stage Performance

05 June, 2022 | Kilkari Bihar Bal Bhawan (Patna)

To celebrate World Environment Day the cultural cell of College of Commerce, Arts and Science in Collaboration with **Imagination** performed the play **Vat Baba** (वट बाबा) directed by **Kundan Kumar** and written by one of the most influential writers of modern Hindiliterature **Phanishwar Nath Renu**. The play was performed at Kilkari Bihar Bal Bhawan, Patna, Bihar.





Street Play For IndianOil Corporation

05 June, 2022 | IndianOil Corporation (Patna)

On the occasion of World Environment Day the cultural cell of College of Commerce, Arts and Science in Collaboration with **Imagination (Bihar)** and supported by IndianOil Corporation and Radio City performed the street play 'Dharti Hamari-Zimmedari Hamari'.

The event was inaugurated by Sh.Vibhash Kumar, Executive Director, Indian Oil Corporation, Bihar & Jharkhand.





World Sparrow Day Stage Performance

20 March, 2023 | Patna Zoo

On the occasion of World Sparrow Day the cultural cell of College of Commerce, Arts and Science in Collaboration with **Imagination (Bihar)** supported by **Sanjay Gandhi Botanical Garden (Patna Zoo)** performed the street play '**Gauraiya Bachao-Paryavaran Bachao**'. The street play highlighted the steps to be taken to save sparrow and why they are important part of our ecosystem.





Street Play For B.S.P.C.B

04-06 March, 2023 | Patna (Bihar)

The Cultural cell of College of Commerce, Arts and Science in Collaboration with Imagination Bihar performed Street Play 'Jogira Sara Rara Ra' for the Bihar State Pollution Control Board. The street play was performed to aware the people about the rise of air pollution across city during holika dahan.

