



MHRD
Ministry of Human
Resource Development
Government of India

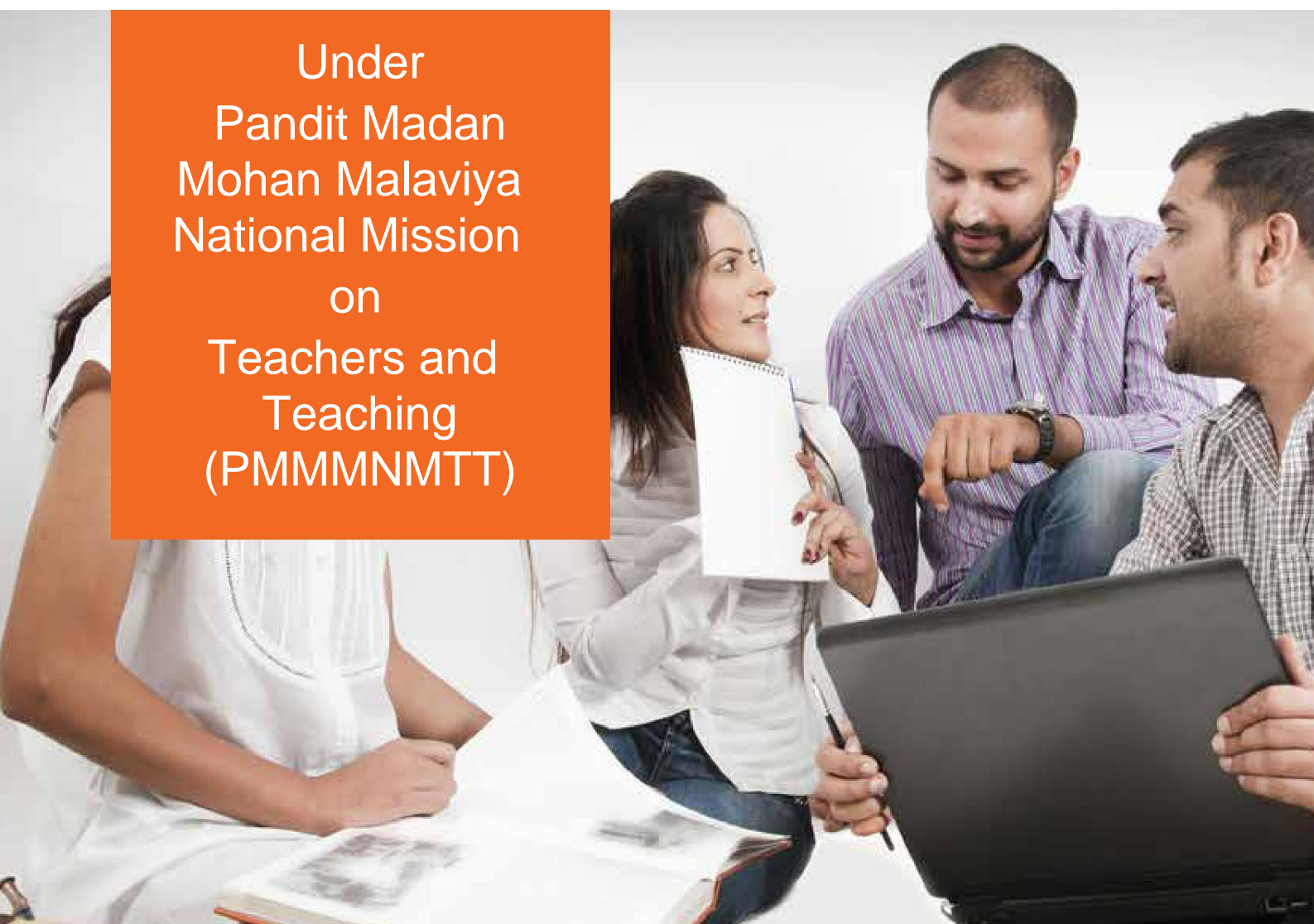


ARPIT

2019

Annual Refresher Programme in Teaching

Under
Pandit Madan
Mohan Malaviya
National Mission
on
Teachers and
Teaching
(PMMMNTT)



Introduction

Teachers are at the core of any education system and empowering them with access to latest developments, familiarizing them on the new & emerging trends, encouraging pedagogical improvements and methodologies is both a significant and critical need. To meet this critical need, the Ministry of Human Resource Development launched Annual Refresher Programme in Teaching (ARPIT) in November, 2018.

ARPIT is a major and unique initiative of online professional development of 1.5 million higher education faculty using the MOOCs platform SWAYAM. For implementing ARPIT, discipline-specific National Resource Centres (NRCs) are identified which are tasked to prepare online training material with focus on latest developments in the discipline, new & emerging trends, pedagogical improvements and methodologies for transacting revised curriculum.

In the inaugural year 2018, 75 NRCs were notified to cover a range of courses in different disciplines of Social Sciences, Sciences, Engineering and Technology, Design & Manufacturing, Humanities, Language Teaching, Commerce, Management, Education Planning and Administration, Public Policy, Leadership & Governance, Library & Information Science, Astronomy & Astrophysics, Assessment and Evaluation, Pedagogy and research methods, cutting edge areas of Nano-sciences, Internet of Things, etc.

Through ARPIT all in-service teachers, irrespective of their subject and seniority have been given an enabling opportunity to keep abreast of the latest developments in their disciplines through the technology based online refresher courses. Faculty can benefit from this initiative as it is highly flexible and can be done at one's own pace and time. The NRCs will revolutionize professional development of faculty by catering to massive numbers by leveraging ICT and online technology platform of SWAYAM.

The NRCs initially develop a 3 minute video(s) which is assessed technically by AICTE and after having met the MOOC guidelines; the same have been approved and uploaded on SWAYAM

Portal. The course is a 40 hour module with 20 hours of video content and 20 hours of non-video content. They are offered in a highly flexible format and can be done at one's own pace and time. There are built-in assessment exercises and activities as part of the academic progression in the course. At the end of the course, they will be a terminal assessment which will be an online examination in a proctored environment conducted by the National Testing Agency. All faculties who have successfully completed the online refresher course will be certified.

All in-service teachers, irrespective of their subject and seniority are requested to register and complete these refresher courses which will help them in career advancement. ARPIT course of 40 hours/duration is treated as equivalent to one Refresher Course for Career Advancement Scheme (CAS) for promotion (UGC communication No. F.2-16/2002(PS) Pt.fl.II dated 3rd December, 2018)

A varied set of institutions such as, Centres under the Ministry's Pandit Madan Mohan Malviya National Mission on Teachers and Teaching (PMMMNTT) located in Central Universities, IISc, IUCAA, IITs, IISERs, NITs, State Universities; UGC's Human Resource Development Centres (HRDCs), National Institutes for Technical Teachers Training (NITTTRs), IIITs have been notified as NRCs.

The First round of ARPIT 2018 stands completed in which there were 51000+ enrolments, 6411 faculty registered for examination. A total of 3807 faculty qualified.

For ARPIT 2019, 51 discipline specific NRCs have been notified covering 46 disciplines, such as, Agriculture, Law, Architecture, Social Sciences, Sciences, Engineering and Technology, Geography, Home Science, Tribal studies, Commerce, Library and Information sciences, Curriculum development, Humanities, Language Teaching in Sanskrit, Urdu, Hindi and English, Pharmacy, Skill development, Textile Technology, Management, Public Policy, Leadership & Governance, Library & Information Science, Astronomy & Astrophysics, Assessment and Evaluation, Pedagogy and research methods, Climate Change etc.

Details of discipline specific courses through ARPIT

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|------------------|---|
| Name & Address: | School of Planning & Architecture New Delhi, I.P. Estate, New Delhi-110002 |
| Course Name: | Emerging Areas in Hospital Planning, Design, Construction and Facilities Management. |
| Discipline: | Architecture |
| NRC Coordinator: | Prof. Aruna Ramani Grover Professor (Architecture) & HOD (Building Engineering & Management) a.dewan@spa.ac.in +91 9868120869 |



About the Course:

This is a 16 weeks, 40 modules program on the 'Emerging areas in Hospital Planning, Design, Construction and Facilities Management' This is designed as an Annual Refresher programme for training of teachers but it has a wide scope for architects, architecture students, facility managers, Hospital Administrators, students of Hospital administration, construction managers, project managers, doctors, nurses and all the other stakeholders. This course has been designed to give you a complete overview of the various aspects of sound hospital infrastructure design and planning. From a very macro level approach of healthcare delivery systems in a country to the departmental planning and detail at the micro level, this course is all inclusive. It is diverse by means of its interdisciplinary approach where it includes Regional planning, urban planning, urban design, architecture, health facilities planning and design, interior design, signage and way finding systems, product design and equipment planning. This also focuses on service oriented planning for hospital planning. This course follows a four-quadrant approach which includes video based learning, assessments, reference materials and a forum for interactive discussion for a comprehensive exposure and learning. We are looking forward to have you on board for this exercise of Nation Building.

Name & Address: Sri Guru Tegh Bahadur Khalsa College, Delhi,
I.P.Estate, New Delhi-110002

Course Name: Online Refresher Course in Chemistry for
Higher Education Faculty- 2019

Discipline: Chemistry

NRC Coordinator: Dr. Vimal Rarh
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About the Course:

This online course has been designed and developed by National Resource Centre of MHRD at Guru Angad Dev Teaching Learning Centre, a centre under PMMMNMTT scheme of MHRD, Govt. of India at SGTB Khalsa College, University of Delhi with the help of expertise from all over the country. The NRC of Chemistry is guided by Academic Council consisting of eminent Chemist from the leading institutes of the country.

This is a Refresher Course for Chemistry Teachers teaching in Higher Education Institutions at Under-Graduate and post-Graduate level. As per MHRD & UGC, this will be treated equivalent to face-to-face Refresher Course in Chemistry as required under Career Advancement Scheme (CAS) of UGC.

This course has been designed to provide insight into a variety of interesting and meaningful chemistry topics as modules of different types, so that it is useful for all the chemistry teachers irrespective of their specializations.

The different type of modules covered in this course have been categorized based on the type their content like ChemNews module which will bring the latest news from the world of chemistry. ChemTalks focus on the Latest Developments as well as new and emerging areas of Chemistry. The ChemSafeLabs modules will emphasize various measures to prevent accidents in chemistry labs. ChemNobelLaureate will take you down the memory lane to discuss the life and contributions of Ernest Rutherford. ChemPedagogy modules will highlight on improving curriculum development and question paper setting. ChemSimplified aims to simplify some difficult concepts of chemistry. ChemICTTools focus on ICT tools which can be embraced by chemistry teachers. To commemorate 150th anniversary of periodic table in 2019, one module is entitled ChemHistory. In ChemError module, emphasis will be on the correct usage of SI units and their recently modified definitions. ChemIndustry modules will focus on the Pharmaceutical industry and career options for chemistry students.

ChemMisconceptions will try to clarify some chemistry misconceptions. ChemApplications modules will provide some real life examples to make chemistry teaching interesting in the classrooms. ChemQuest will make you learn chemistry through question and answers in an exciting manner.

The course has highly multimedia enriched videos along with text, reading material, references and online Quizzes.

Target Audience:

Chemistry Teachers teaching in Higher Education Institutions at Under-Graduate and post-Graduate level. (Equivalent to Refresher Course as well as for self-learning)
Chemistry School Teachers (For self-learning)
UG & PG Chemistry Students (For self-learning)



Name & Address: Indian Institute of Technology Patna, Bihta,
Patna -801106 (Bihar)

Course Name: Components and Applications of Internet
of Things

Discipline: Internet of things

NRC Coordinator: Dr. Sanjoy Kumar Parida
Associate Professor Department of
Electrical Engineering
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+91 9631656188

About the Course:

Decades ago, we connected computers and got today's powerful Internet. Now we have started to connect everyday objects using internet, to create the Internet of Things. World will have 50 billion connected devices by 2020. As these IoT devices come online, the industry will face some formidable challenges, such as ensuring the security of its devices, powering billions of sensors and analyzing the data generated by these devices. Therefore it is important to understand underlying components and the entire eco- system and integration issues , various use cases or applications of

IoT and its data analytics.

The objectives of this course is to learn about Basics of IoT, Components of IoT including Sensors and actuators, computing and communication systems. It will also cover IoT Protocols, Security of IoT, Cloud based design and AI/Deep learning based analytics.

Name & Address: Banasthali Vidyapith, Banasthali, Dist. Tonk,
Rajasthan - 304022

Course Name: Online Refresher Course In Management

Discipline: Online Refresher Course in Management

NRC Coordinator: Prof. Harsh Purohit
Dean, Faculty of Law and Faculty
of Management
deanwisdom@banasthali.in
+91 9887886320



About the Course:

Banasthali Vidyapith has developed this course keeping in view the diverse needs of faculty members in management and commerce fraternity. The course covering 40 modules has been developed with thorough research by more than 30 experts from the academics as well as corporate. Extensive reading material has also developed for overall learning of the participants.

Management, Integrated Reporting, Business Simulation, Leadership, Neuromarketing etc. Apart from this course covers innovative teaching approaches, indigenous research methods, insights from Indian ethos, shastrarth as mode of teaching etc. The participants are strongly suggested to join blogs and interact for enhanced learning experience.

The participants will get to learn emerging trends in management domains like Social and Emotional Intelligence, Personal Finance, Artificial Intelligence in

Name & Address: UGC-Human Resource Development Centre,
Jamia Millia Islamia,
Jamia Nagar, New Delhi-110025 India

Course Name: Gender/Women studies

Discipline: Gender/Women studies

NRC Coordinator: Prof. Anisur Rahman
Course Coordinator & Director
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Ms. Shahla Tarannum
Assistant Coordinator
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About the Course:

Human civilization has always aspired to establish an egalitarian society free from exploitation, violence and oppression. Despite the fact that the achievements of women are being recognized and celebrated everywhere and LGBTQs are gradually getting recognition in contemporary world, gender discrimination is still prevalent in our society. It is legitimized through our traditions, economy, religion and society. This is a kind of structural violence which thrives on the foundations of patriarchy and prejudices that are justified, sustained and passed on from one generation to the next.

percent of the world's population i.e. women and LGBTQs remain in a subordinate and subservient position. Consequently, societies world over have failed to fully realize their capabilities and potentialities. The proposed course on gender studies is an effort to comprehend the power relations--- historical, structural, economic and political, defining the male and female relationship in a socio-cultural context, flowing from deeply entrenched patriarchy and age-old systems of dominance.

Owing to gender discrimination, more than fifty

Name & Address: Indian Institute of Science Education and
Research (IISER), Pashan, Pune,
Maharashtra 411008

Course Name: Climate Change: A Guide for Teachers of
All Disciplines

Discipline: Climate Change

NRC Coordinator: Dr. Rahul Chopra
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+91 9604132352



About the Course:

Climate Change is one of the most significant issues of our times and a key impeding factor affecting the pace of sustainable and equitable development of every country. Educating forthcoming generations about the

causes and effects of global climate change is imperative as implementing solutions depends on their scientific, technical and leadership abilities. In this context, there is an urgent need to develop new

education modules and pedagogical methods to inculcate environmental understanding in today's students, in such a way that, every future citizen would be better equipped to identify appropriate solutions to mitigate climate change and reverse its impacts.

As part of the ARPIT 2019, the National Resource Centre on Climate Change at IISER Pune will present a number of educational resources including customized lesson plans to teach climate change topics at undergraduate level. As climate change is the most pressing problem humanity is facing, it is imperative that all teachers should have an understanding of the science of climate change and how their discipline-specific knowledge can increase awareness of the issue. This course will focus on providing teachers with training in the use of new pedagogical methods to introduce climate-change related content in their classrooms while teaching their discipline-specific topics. These pedagogical resources are developed

such a way that a teacher representing any discipline would be able to gain new knowledge and can actively integrate climate science with topics in their curriculum.

It will include video lectures, associated ppts, educational resources including lesson plans and digital pedagogical tools, and assessment material on both the science of climate change and on discipline specific climate change education.

This course is suitable for teachers of all disciplines.

Name & Address: Saurashtra University, Rajkot, Saurashtra University, Rajkot, Gujarat, India

Course Name: The Trends Of Modern Gujarati Literature

Discipline: Language & Literature (Gujarati-Hindi)

NRC Coordinator: Prof. Kaladhar Arya Professor Director
kaladhar@ascrajkot.org
+91 9099974757



About the Course:

ઈ.સ. ૧૮૪૫ થી ઈ.સ. ૧૯૪૪, એકસો વર્ષની સાહિત્ય સાધનાનો રસથાળ લઈને અર્વાચીન ગુજરાતી સાહિત્યની યુગલક્ષી વિભાવના સાથે પ્રથમ ત્રણ યુગ સુધારક: યુગ ૧૮૪૩ (થી ૧૮૯૦), પંડિત યુગ ૧૮૫૦ (થી ૧૯૧૪) અને ગાંધી યુગ ૧૯૧૫ (થી ૧૯૪૦) દરમિયાન યુગ પ્રવર્તક કહી શકાય તેવા સર્જકો અને સર્જનો પૈકી સિમાસ્તંભરૂપ સાહિત્યકારો તથા સાહિત્યની ગહનતા પૂર્વક છણાવટ સાથે એક શતકનું ઉત્તમોત્તમ સાહિત્યિક ભાણું લઈને પ્રવાહિત થનાર ARPIT-2019 ની સાહિત્યધારાથી ગુજરાતી ભાષા-સાહિત્યના અધ્યાપકો નવપલ્લવિત થશે અને વાસ્તવિક શિક્ષણકાર્ય દરમિયાન વિદ્યાર્થીઓના ભાવવિશ્વને પરિશુદ્ધ કરવા ઉપરાંત પોતાના ચૈતસિક વિશ્વને પણ વધારે સમૃદ્ધ કરી શકશે. એટલું જ નહીં પરંતુ "અર્વાચીન ગુજરાતી સાહિત્યધારા" શિર્ષક અંતર્ગત પ્રસારિત થનાર પ્રસ્તુત કાર્યક્રમથી પંચાનન પ્રક્રિયાનો આરંભ થઈ શકશે:

ત્રણ યુગના સાહિત્ય સર્જનની ઓળખ કેળવાશે. સાહિત્ય અને સમાજના આંતરસંબંધો સ્પષ્ટ થઈ શકશે. અર્વાચીન ગુજરાતી સાહિત્યધારાથી નવપલ્લવિત થયેલાં અध्येતેમજા અધ્યાપકને ચિંતનાત્મક ભૂમિકા પ્રદાન કરી શકાશે.

સર્જક અને વાંચકના ભાવવિશ્વનું એક્ય સ્થાપિત કરતી રચનાઓના માધ્યમથી સાહિત્યનો સર્વોપરિતાલક્ષી વિચાર વહેતો મુકી શકાશે.

સુધારક યુગ પંડિત, યુગ અને ગાંધી યુગના મુઠ્ઠી ઊંચેરા સર્જનો અને સર્જકો પર ત્વેકૃત જ્ઞતા વ્યક્ત કરવા અध्येતેમજા અધ્યાપકને અભિપ્રેરિત કરી શકાશે



Name & Address: National Institute of Technical Teachers
Training and research, Chandigarh, Sector 26,
Chandigarh, 160019

Course Name: Big Data Analytics For Smart Grid

Discipline: Electrical Engineering

NRC Coordinator: Dr. Ritula Thakur
Assistant Professor, Electrical
Engineering Department
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+91 9888520284

About the Course:

With the fast development of digital technology and cloud computing, more and more data are produced through digital equipment and sensors, as well as through human activities and communications. The collected data are mounting at an exponential rate and the structure of them is also becoming much more complicated. The processing and analysis method of these large volume data is a new challenge but also an opportunity with the concept of "big data".

This course explores the usage of open source software python for demonstration of usage of big data in smart grid. It begins with the importance of big data analysis in smart grid, intelligent data collection devices followed by machine learning and deep learning algorithms used in data analytics for smart grid.

Name & Address: Mahatma Gandhi Antrarashtriya Hindi
Vishwavidyalaya, Gandhi Hill, Wardha,
Maharashtra 442001

Course Name: Ritikalain Hindi Sahitya

Discipline: Hindi

NRC Coordinator: Prof. Avadhesh Kumar
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About the Course:

रीतिकालीन हिंदी कविता की शुरुआत केशवदास की 'कविप्रिया' और 'रसिकप्रिया' से होती है बाद में 'चिंतामणि' के लक्षण ग्रंथों की अखण्ड परंपरा चली उसके बाद तो लक्षण ग्रंथों की बहुतायत सी होने लगी। इसी बीच कविता लिखने की एक विशिष्ट परिपाटी बन गई। इस समय के आचार्य कवि संस्कृत साहित्य की जिस उत्तर कालीन परंपरा के अनुयायी थे उनमें भी बहुत सूक्ष्म विश्लेषण अनुपस्थित था। चिंतन का धरातल यहाँ इसलिए भी बहुत विकसित नहीं था कि गद्य की विवेचन शैली इन आचार्य कवियों के पास नहीं थी इनका शास्त्र ज्ञान अपेक्षाकृत सीमित और अपरिपक्व था इनकी पहुँच 'चंद्रालोक', 'कुवलयानंद', 'रसतरंगिणी', 'रसमंजरी' अधिक से अधिक 'काव्य प्रकाश' और 'साहित्य दर्पण' तक थी।

'ध्वन्यालोकलोचन' , 'वकोक्तिजीवितम' , 'काव्यालंकार सूत्रवृत्ति' जैसे ग्रंथों तक प्रायः यह नहीं गये। कुलपति मिश्र जैसे एकाध आचार्य कवियों में काव्यांगों के अंतर्सम्बन्ध का प्रश्न चाहे उठाया हो, अधिकतर कवि काव्य लक्षणों की सामान्य चर्चा तक ही सीमित थे। हिंदी के रीति ग्रंथों में प्रायः तीन प्रकार की निरूपण शैली दिखाई पड़ती है – **1.** काव्य प्रकाश की निरूपण शैली-जिसमें सभी काव्यांगों पर विचार किया गया। जैसा सेनापति का 'काव्य कल्पद्रुम' चिंतामणि का 'कविकुल कल्पतरु' 'काव्य विवेक' , कुलपति मिश्र का 'रस रहस्य' , **2.** श्रृंगार तिलक, रसमंजरी आदि की श्रृंगार रसमयी नायिका भेद वाली शैली जिसमें श्रृंगार अंगों का विवेचन तथा नायिका भेद निरूपण व्याख्यान है- जैसे केशवदास की 'रसिक प्रिया' , मतिराम का 'रसरज' , देव का 'भाव विलास' , 'रसविलास' , भिखारीदास का 'रस निर्णय' , **3.** तीसरी शैली जयदेव के 'चंद्रालोक' और अप्पय दीक्षित के 'कुवलयानंद' के अनुकरण पर चलने वाली अलंकार निरूपण शैली जैसी करनेस का 'श्रुतिभूषण' महाराज जसवंत सिंह का 'भाषा भूषण' , सूरति मिश्र का 'अलंकार माला' आदि। इसी काल में वीर रस के ओजस्वी कवि भूषण भी अपनी विशिष्ट पहचान बनाते हैं।

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| Name & Address: | National Resource Centre Central University of Kerala, Tejaswini Hills, Periyar (PO), Kasaragod (DT), Kerala, 671320, INDIA |
| Course Name: | Curriculum, Pedagogy And Evaluation For Higher Education |
| Discipline: | Curriculum design and e-content development |
| NRC Coordinator: | Prof. (Dr) M.N.Mohamedunni Alias Musthafa Professor and Dean, NRC Coordinator School of Education musthafaedn@gmail.com +91 9447596952 |



About the Course:

Curriculum is an essential element in robust education. It consists of continuous series of activities required to translate educational goals into concrete activities, materials and observable change in behavior. An effective curriculum provides teachers, students, administrators and other stakeholders with a measurable plan and structure for delivering a quality education. Pedagogical approaches navigate to the fulfillment of objectives and evaluation helps to check the accomplishment of these outcomes. The course consists of 40 modules coming under three major dimensions: Perspectives of curriculum for higher education, Conceptual framework on effective pedagogy for higher education, Tools and techniques of formative and summative evaluation

The course aims to provide a systematic understanding of the theoretical basis of curriculum, various pedagogical approaches and perspectives, and evaluation techniques. Development of a firm understanding on these areas would definitely contribute to the professional development of the aspirants. The course can be well utilized for all faculties across the country as an inevitable irrespective of the subject. The structural frame work of the course will benefit to other fields. After completing the course, the aspirants can surely master in different perspectives of curriculum, pedagogical advancements and evaluation techniques that can be applying in various spheres of professional progress.

Name & Address: National Resource Centre of Philosophy
UGC-Human Resource Development Centre
Bhagat Phool Singh Mahila Vishwavidyalaya
Khanpur Kalan (Sonipat) Haryana

Course Name: Online Refresher Course In Philosophy

Discipline: Philosophy

NRC Coordinator: Dr.Shafali Nagpal
Director HRDC, BPS Mahila Vishwavidyalaya,
Khanpur Kalan, Haryana
bpsnrcphilosophy@gmail.com
+91 9050111759
Dr.Mahesh Kumar Sharma
(Course Co- Convener)
Dept. of Sanskrit,Samhita &
Siddhant (Ayurveda),
Bhagat Phool Singh Mahila Vishwavidyalaya,
Sonipat, Haryana

About the Course:

Philosophy is a part of everyday life and we use it to give reasons & explain logically about things and Events that happens every day. Philosophy is The Study of Existence, Study of Knowledge , Study of Behavior , Study of Governance & Study of Art.Participants will be able to learn how to describe theories, principles, and concepts representing a wide range of the history of philosophy. Based on the objective, the course is divided into three parts

1. Indian Philosophy

In context of Indian Philosophy it is the journey from Adhiboot to Adhyatam experiencing this materialistic world on the basis of various aspects such as Vedanta, Nayaya, Shankhya, etc

2. Western Philosophy

Western philosophy is principally based on reason in which why , who and whom are answered with reason which is making it scientific and outward looking. Western Philosophy is studied in this course in comparison to Indian Philosophical concepts like Realism, Idealism, Knowledge, Metaphysics etc.

3. Feminism

It has many different views as per individual. Feminism term thinks in both ways which is intellectual commitment and a political movement that seeks justice for women and the end of sexism in all forms. We include both Indian Feminist & Western Feminist

Name & Address: Shri Ram College of Commerce, Maurice Nagar,
North Campus, University of Delhi, Delhi- 110007

Course Name: Refresher course in Commerce

Discipline: Commerce

NRC Coordinator: Dr. C. S. Sharma
Associate Professor
cssharma.srcc@gmail.com
+91 9311333303

About the Course:

In pursuance of the philosophy that Refresher Courses

should focus on personal and professional growth of

teachers of Institutions of Higher Learning the current Refresher Course in Commerce is designed to provide the faculty members an exposure about the latest developments in the frontiers of knowledge in the subjects spanning the field of commerce. Also it will focus on certain aspects of research methodology besides the tools, techniques and approaches for managing the classroom environment and pedagogy.

LEARNING OBJECTIVES

- Introducing participants to fast emerging areas that require further research

- Familiarising participants with topics with futuristic strategic significance
- Introducing Qualitative Research Methods
- Learning to Manage Changing Classroom Environment
- Managing self and Student Communication
- Learning Case Study Method of Teaching
- Understanding Financial Modelling through Computer Simulation
- Appreciating Artificial Intelligence in Commerce and Business

Name & Address: Shri Ram College of Commerce, Maurice Nagar, North Campus, University of Delhi, Delhi- 110007

Course Name: Refresher Course in Economics

Discipline: Economics

NRC Coordinator: Dr. Mallika Kumar
Associate Professor & Coordinator-Office of International Programmes
drmallika.kumar@srcc.du.ac.in
+91 9810580849



About the Course:

The National Resource Centre, Shri Ram College of Commerce is delighted to offer the Online Refresher Course for the discipline "Economics" under ARPIT 2019, Ministry of Human Resource Development (MHRD). The theme of the course is, "Contemporary issues in Economics".

The process of unprecedented global transformation in the past few decades has entailed threats to Prosperity, Inclusive Growth and Sustainable Development. The Online Refresher Course is geared to deliberate on policies and programmes, while adding new perspectives to contemporary issues.

The MODULES include topics from Micro-Macro economics - Growth, Development, Sectoral issues, Fiscal, Monetary, Trade policies to Contemporary issues -Artificial intelligence, Data analytics and the Nobel laureates in Economics. The lectures are on theoretical economic issues and also practical aspects-analysis & application of data, writing research papers ,latest research methodologies, book reviews and teaching pedagogies.

Thirty-three highly competent subject experts & practitioners from diverse fields have been invited. These include academicians, researchers, policy-makers, experts, analysts, advisors,

administrators, corporate professionals and practitioners. Resource persons include SRCC Principal, Prof. Simrit Kaur, the faculty and a few prominent external speakers are:

- Mr Sanjeev Sanyal, Principal Advisor, MoF.
- Prof Anand, Former Prof. IIM Ahemdabad
- Prof Ram Singh, Delhi School of Economics
- Ms. Mythili Bhusnum, Economics times
- Dr. Rajan Sudesh Ratna, UNESCAP
- Mr Rajiv Chandra, United Nations information Centre.
- Mr Nirankar Saxena, Dep Secy General, FICCI
- Dr. DK Tyagi, CEO, E Governance, Ministry of Electronics.
- Prof GP Thakur, Former Head, Psychology, BHU.

In the 16 weeks online course, there would be assessment at the end of every week(MCQs) and assignment to be submitted at the end of every month. We look forward to engaging with all the participants in a continuous process of learning, growing, evolving and inspiring each other and in making this course truly refreshing and meaningful.



Name & Address: Gujarat University, Tejaswini Navrangpura,
Ahmedabad, Gujarat 380009

Course Name: Annual Refresher Programme In English
Language Teaching

Discipline: English

NRC Coordinator: Prof (Dr) Jagdish S Joshi
joshijagdish@gmail.com
+91 9426587963

About the Course:

"We are adding one more golden chapter to the history of Higher Education in India. This is for the second time that a refresher course is being offered online as ARPIT SWAYAM MOOCs. Under the guidance of MHRD, Govt of India UGC HRDC of Gujarat University is coming to you with Annual Refresher Program in English

Language Teaching. When you hear the name of Human Resource Development Centre or Academic Sta College it makes you recollect 28 days or 21 days of face to face Orientation Program, Refresher Course, Faculty Development Program or Short-Term Course scheduled on pre decided dates and venues which may have been inconvenient but had to be completed as it is professionally mandatory. We are presenting a refresher course at your place, your time and your pace. Annual Refresher Program in English Language Teaching.

We have very successfully organised the first of its kind Online Refresher Course in English Language Teaching last year. I am proud to share that about 2000 college and university professors from across India have joined the course. Their feedback motivates us to come out with the second such initiative in the series. These

teachers not only learnt from the well-designed course, but were also able to apply the practices adapted from the course in their classroom teaching.

This pioneering effort is being undertaken to train the trainers and to enhance the skills and Competences of in-service academic faculty members. This course is intended to transform us from good teachers to effective teachers and is specially designed for you if you are an Assistant Professor, Associate Professor, Professor or aspiring to be on such positions related to language teaching and learning, especially English Language. We know that English is an international language and the skills of English Language are a passport to global success.

Learning outcomes or objectives

The course is not planned on the assumption that we, professors do not know how to teach. We, being in the teaching profession for years, very well know that we need to learn, unlearn and relearn as the society, knowledge and technology around us is constantly evolving. The course is to help us keep ourselves updated.

Name & Address: Savitribai Phule Pune University, Ganeshkhind
Rd, Pune, Maharashtra 411007

Course Name: Refresher Course on Teacher and Teaching in
Higher Education

Discipline: Education

NRC Coordinator: Dr. Vaibhav Jadhav
vaibhavjadhav07@hotmail.com
+91 9421503397



About the Course:

"This is an inter-disciplinary Refresher Course focusing on teacher and teaching in higher education.

This course explores the theoretical background of teaching and practical knowledge for teachers in higher

education. This course designs various activities for teachers and they have opportunity to apply in their workplace. During this course, teacher acquires various teaching skills, methods and models in higher education institutes. Therefore, the prospect of higher education is increasing continuously.

This course helps learners to understand the objectives and development of higher education. It is trying to focus on various policies and commissions of higher education along with all concern bodies and councils.

This course helps learner to realize the role of teacher

in making digital India.

This course is initially design for the professional development of teachers working in the higher education institutions/ colleges/ university departments.

Intended Audience:- faculty members of any subject or discipline in graduation and post graduation colleges/ institutions and/or University can join this course. As per the guidelines of MHRD and UGC, participation in this course will be considered as one refresher for the CAS. "



Name & Address: Savitribai Phule Pune University, Ganeshkhind Rd, Pune, Maharashtra 411007

Course Name: Leadership And Governance In Higher Education. Level 2

Discipline: Leadership and Governance

NRC Coordinator: Prof. Sanjeev Sonawane
sonsanjeev63@gmail.com
+91 9890178190

About the Course:

This is an inter-disciplinary Refresher Course focusing on leadership and Governance in Indian higher education.

In case you are thinking and looking beyond the benefits of CAS (Career advancement Scheme), If you think you have it in you to be a leader in the higher education system and to held higher positions in the system.

If you think you deserve to grow up in the system, this course is made for you.

This course will help you to understand the basics, eligibility and requirements for leadership roles in higher education. This also will help you to understand and improve yourself as an Academic Leader, Administrative leader or Organisational leader.

This course also introduces you to the different aspects of governance in Indian Higher Education system, which will be essentially helpful for every emerging leader in the system. This will help you to be a better leader and effective administrator along with a good academician.

Intended Audience:- Faculty members of any subject or discipline from Senior College, institutions and/or

University can join this course. As per the guidelines of MHRD and UGC, participation in this course will be considered as one refresher for the CAS.



Name & Address: Pt. Ravishankar Shukla University, Raipur

Course Name: Online Refresher course in Psychology

Discipline: Psychology

NRC Coordinator: Dr.Promila Singh
Prof.of psychology.RSU Raipur
singhpromi@gmail.com
+91 9826810196 /+91 8839245902

About the Course:

This course focuses specifically on the use of psychological theories and practices to provide solutions to real-world problems. We have selected 40 very interesting and important research topics. A team of Psychologists from the discipline spanning the full spectrum of our field are designing this course. The topics are related to Clinical Psychology, Positive Psychology, Research Methodology, Organizational Psychology, and Sports Psychology. This course will help you to learn about research and trends in

Psychology and will improve your skills and deepen your knowledge to further your career. This course includes video-based lectures and demonstrations, learning resources and media clips. The course content will help to stay apprised of important developments across subfields beyond your areas of expertise. Regular assignments related to the topics will be given to the assessment will be done. The full course will be uploaded in sixteen weeks time.

Name & Address: Guru Jambheshwar University of Science & Technology, Hisar Haryana

Course Name: Pedagogical Innovations and Research Methodology (Interdisciplinary)

Discipline: Pedagogical Innovations and Research Methodology (Interdisciplinary)

NRC Coordinator: Prof. Vandana Punia
Development Centre, Guru Jambheshwar University of Science & Technology, Hisar Haryana
vbpunia@gmail.com
+91 9896085433
Dr. Neeraj Dilbaghi, Director (UGC- Human Resource Development Centre), Professor, Department of Bio & Nano Technology, Guru Jambheshwar University of Science & Technology, Hisar- 125001
ndnano@gmail.com
+911662-263500,



About the Course:

The utmost requirement of twenty 21 century pedagogy is digital learning experiences. UNESCO stated that Education systems need to regularly update and reform teacher preparation and professional

development according, ensuring that all teachers can harness technology for teaching excellence. In this era, Pedagogy, Transaction and Evaluation along with Flip class rooms Approach is equipped with technological

supported pedagogical innovations. Digital skills and competencies will always be the ground which education of 21st century will grow and thrive. So this is need of the hour that teachers should focus on digital competence to explore new pedagogical innovations and new endeavors of Research methodology. We teachers have to welcome technology into our class rooms equipping students with new experiences. Technology helps make teaching, learning and research more meaningful and enjoyable. There are number of powerful technology tools in the class room learning that teachers can use in the classroom that go beyond to the text books. Keeping in view the vital importance

of these issues, an idea has been conceptualized to prepare a course that enables teachers to acquaint them with knowledge, skill and attitude for technology integration in pedagogical decisions and research methodology. The major thrust of this course is to explore Pedagogical Innovations to guide teachers and policy makers for quality concerns in higher education. After completion of this course, teachers feel more confident and competent in using digital technology in their academic and professional endeavor. At last, in this course, our main focus is learning technology along with Pedagogy.

Name & Address: Inter-University Centre for Astronomy and Astrophysics (IUCAA) Meghnad Saha Road, Savitribai Phule Pune University Campus Ganeshkhind P.O., Post Bag 4, Pune 411007, Maharashtra



Course Name: Stars And Stellar Systems

Discipline: Astronomy and Astrophysics

NRC Coordinator: Prof. Dhruva J Saikia
Head, Teaching Learning Centre and National Resource Centre
Astronomy Centre for Educators, IUCAA
dhrubasaikia@iucaa.in /
dhrubasaikia.tifr.ccsu@gmail.com
+91 9401034386, +91-20-25604100

About the Course:

The ARPIT 2019 course on Astronomy and Astrophysics is titled "Stars and stellar systems". An understanding of this field, which draws upon our knowledge of different branches of Physics, is fundamental to our understanding of the Universe. The course is made up of 10 modules addressing different aspects of the field: Stars and stellar evolution; Variability of stars; Low-metallicity stars and cosmology; Star clusters and star formation; Physics of compact objects; Astrophysics of neutron stars; Binary systems; the Sun; Helio- and astro-seismology; Planets around stars. Besides refreshing oneself on the basics and recent developments in the field, the material would also be helpful for teachers of Physics wishing to learn the subject to teach.



Name & Address: Indian Institute of Technology Bombay, Powai
Mumbai 400076

Course Name: Numerical Methods in Civil Engineering

Discipline: Civil Engineering

NRC Coordinator: Professor Yogesh M Desai
JK & MJ Mehta Chair Professor of Structural
Engineering
Department of Civil Engineering
IIT Bombay, Powai, Mumbai 400076
desai@civil.iitb.ac.in
022 2576 7333 / 022 2576 7301
Professor T I Eldho
Institute Chair Professor
Department of Civil Engineering
IIT Bombay, Powai, Mumbai 400076
eldho@civil.iitb.ac.in
022 2576 7339 / 022 2576 7301

About the Course:

In this Post Graduate level refresher course, essential concepts useful for undertaking numerical computations will be covered. In order to facilitate learners to refresh and review topics of their interest, the course will be offered in a modular format.

In the first Module, Mathematical Modeling encompassing various mathematical tools and techniques along with advanced modeling applications will be discussed. On the other hand, topics related to numerical approximation, error analysis, curve fitting, interpolation and extrapolation, numerical differentiation and integration as well as solution of linear and nonlinear equations will be covered.

With the above background, numerical solution of Ordinary and Partial Differential Equations will be discussed. In order to appreciate relative merits and demerits of various numerical methods, a primer on classification of differential equations and analytical solution of differential equations will be provided, followed by numerical solution of various types of differential equations pertaining to Initial Value Problem, Boundary value Problem, Boundary Initial Value Problem and Eigenvalue Problem through various methods. Popular finite difference schemes, implicit and explicit methods, method of weighted residuals, Collocation methods, Method of Least squares, Method of Galerkin, Raleigh-Ritz methods, etc will be covered in the course for numerical solution of differential equations.

Few advanced numerical methods like Finite element method, Boundary Element Method and Meshfree Methods will also be discussed with applications to various civil engineering problems.

It is envisaged that the Postgraduate students, teachers and practicing engineers will find the course useful in their research as well as day-to-day work.



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| Name & Address: | Indian Institute of Technology Delhi |
| Course Name: | Emerging Trends & Technologies in Library & Information Services |
| Discipline: | Library and Information Services |
| NRC Coordinator: | Dr. Nabi Hasan nabihasan@gmail.com + 9560978667 |

About the Course:

Libraries are universally recognized as important social institutions and no community is considered complete without a library system. However, libraries are facing change due to impact of ICT, changing patron needs, changing information environment or Web/Google that is trying to replace Reference Librarians. Use of Disruptive technologies is resulting in transition from Print to Digital, Changes takes place from Forms to Formats, Delivery systems, and it is inevitable.

There is a transformation in the need of library users and due to ICT, there is a change in the resources, services and products of the libraries. Every institution is now trying to compete in the national and international rankings and with the changed roles and services; the libraries and librarians are playing key role.

So the purpose of this ARPIT course is to impart knowledge regarding emerging trends and technologies in library and information services like Library Automation, Digitalization, Institutional

Repository and Digital Library Services, Consortia based Services, QR Code, EM and RFID implementation, Open Access, Outreach programs, Reference Management, Open Science, Virtual/Digital Reference Services, Ask the Librarian, Content Management, CAS/SDI services, Profiling System, Discovery Services, Web 2.0 and 3.0 based Services, Use of Social Media, Green Library Concept, to help in Ranking/Accreditation, Remote Login, Cloud computing, Mobile based Library Services, Use of Expert Systems and Robotics, Internet of Things, Augmented Reality Tools and Virtual Reality Tools, Semantics, Artificial Intelligence and Machine learning and How to be a Smart Librarian by Smart Involvements etc.

People are thinking that the role and future prospects of library professionals are decreasing rather we can say that they are becoming more important provided they are keeping pace with emerging trends & technologies in LIS and willing to go out of box.

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| Name & Address: | University of Hyderabad |
| Course Name: | Data Analysis For Social Science Teachers |
| Discipline: | Research Methodology for Social Sciences |
| NRC Coordinator: | Prof B. RajaShekhar School of Management Studies University of Hyderabad Central University (Po) Hyderabad- 500 046, India nrcsc.uoh@gmail.com 9866699983 |



About the Course:

Statistical analysis is playing a major role in social science research. In the present era the top tier journal editors are expecting the researchers to use scientific approach to analyse the data collected through primary or secondary sources. This course will help the

social science researchers and teachers to understand the process of analysing the data and reporting the results in their research projects using different software's.

Learning Objectives:

1. To classify the construct measurement process in social science research.
2. To demonstrate the Univariate, Bivariate and Multivariate data analysis techniques.
3. To perform the data analysis using various software packages (MS Excel, IBM SPSS and AMOS).
4. To learn the process of reporting the results.

Intended Audience: Research Scholars and faculty members from social sciences.

Prerequisite: Nil. However prior knowledge on basic statistics and research methodology is an added advantage.

Name & Address: UGC-HRDC, Sant Gadge Baba Amravati University, Amravati (Maharashtra)

Course Name: Skills For New Educational Architecture

Discipline: Skill Development

NRC Coordinator: Prof. Suhas D. Pachpande
Assistant Professor Department of Computer
Sant Gadge Baba Amravati University
suhaspachpande@sgbau.ac.in
95454 48062 / 94231 62448



About the Course:

The world is expecting huge number of employment opportunities for skilled jobs of creative and multidisciplinary nature through forthcoming industrial revolution. Indian youth equipped with knowledge, skills, attitude and values will certainly lead this revolution. They need to be expert in some specialised areas; acquiring abilities of independent, logical, and scientific thinking along with creativity, problem solving, and decision-making skills.

The MHRD through pathbreaking reforms proposed in draft National Education Policy 2019, is all set to change the educational landscape to match the changing dynamics of requirements of these learners. New educational architecture is proposed that is aligned with aspirational goals of 21st century education and is centered on empowered faculty with high competence and deep commitment, energised for excellence in teaching and research.

Focusing on this new architecture, this NRC has designed online refresher course on "Skills for New Educational Architecture". The learners of this course would be trained to acquire skills needed in this new architecture. The course would cover new essential skills for teaching and learning broadly categorized into eight components: Academic professionalism, Critical and analytical skills, Life flourishing skills, Collaborative skills for transdisciplinary research development, Blending technology for efficient teaching, Teaching and learning skills, Teaching skills for differently-abled learners, Research.

The contents of the course are designed and delivered by experts from various renowned institutions and universities across India.

This course being interdisciplinary in nature is open for all in-service faculty of higher education.



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| Name & Address: | National Institute of Technical Teachers Training & Research, CSIR Road, Taramani, Chennai - 600113. |
| Course Name: | Sustainable Construction Materials & Techniques |
| Discipline: | Civil Engineering |
| NRC Coordinator: | Dr. K.S.A. Dinesh Kumar, Assistant Professor, 9443737315, dr.ksadinesh@gmail.com Dr. G. Janardhanan, Associate Professor, 9445520968, dr.gjanardhanan@gmail.com Dr.E.S.M.Suresh, Professor & HoD, 9444284464, esmsuresh@gmail.com |

About the Course:

This course explores the concept of sustainability and dwell in detail to the growing popularity of sustainability and its implications for the practice of engineering, particularly for the built environment (civil engineering). At present there is a great boom in the infrastructure industry. An Economy of the nation is also based on the infrastructure of the country. The Government of India focuses towards transforming the country's infrastructure through various projects and mission such as, smart city mission, ATAL with the sustainability as the propelling principles. The current scenario in the booming construction industry has posed many challenges due to some unsustainable aspects of the highly polluting and the exhaustive nature of building materials. Globally it consumes 50% of all-natural resources and 40% of energy, and generates 50% of all waste. To build a square meter we need 2 tons of raw materials. India's building energy use accounts for 33% of the nation's energy use, and this is growing by 8% annually. The built environment has a significant impact on the earth, due to the high consumption of energy and raw materials such as steel, natural fine and coarse aggregate, cement, water, etc... and if left unchecked, buildings become sources of pollution, excess energy consumption, and even deforestation. Fortunately, research and development has achieved significant progress in construction and today it is possible to build sustainable infrastructure. It has also created opportunities for innovative and unconventional resources to emerge due to the widening gap in demand and supply of building materials, as well as the need for energy efficient and economical methods of construction. The key in promoting sustainability is to integrate it into the normal course of life for citizens, builders, developers, industrialists, decision makers, students and the teachers who are the torchbearers for the future.



Name & Address: Indian Institute of Technology Bombay, Powai
Mumbai 400076

Course Name: Fourier Analysis and its applications

Discipline: Mathematics

NRC Coordinator: G. K. Srinivasan, Professor, Department of
Mathematics
gopal@math.iitb.ac.in
+91 9819807454

About the Course:

Fourier Analysis continues to be an active area of research in Mathematics with numerous applications in the field of both pure and applied mathematics. The principles of Fourier analysis are applied in diverse areas of physics and engineering such as celestial mechanics, wave propagation, image processing and modulation problems to name a few. Thus Fourier analysis forms an essential component in the tool-kit of scientists and engineers.

In this course we shall focus on the basic theoretical aspects of the subjects relegating computational issues to exercises. The latter are adequately covered in most standard curricula while issues of convergence are seldom addressed. Here we shall prove rigorously some of the basic theoretical results that are accessible with a rudimentary knowledge of mathematical analysis and linear algebra.

The novel feature of the course is the type of applications presented coming from diverse areas of mathematics. We shall look at three applications namely the isoperimetric theorem in geometry, a problem in celestial mechanics namely, the inverting of

the Kepler's equation in planetary orbit theory. The third application is a proof of Weyl's equi-distribution theory that is of immense use in number theory. We shall also derive the transformation formula for the Jacobi theta function which is another "avataar" of the famous functional equation of Riemann for the function bearing his name. It must be mentioned here that one of the most celebrated open problems today in mathematics concerns the zeta function of Riemann.

We shall be looking closely at the Fourier transform proving its basic properties and its applications to differential equations. We shall derive an integral form for the solution of Airy's equation which plays an important role in optics. For problems involving radial symmetry the Fourier transform of radial functions come into play. The transform then reduces to a one variable Bessel transform. We shall end the course by proving an important formula on Fourier transform of the square of the absolute value of the gamma function along vertical lines in the right half plane. This formula was originally obtained by Srinivasa Ramanujan but we shall provide here an alternate proof via Fourier analysis.

Name & Address: National Institute of Technical Teacher's
Training and Research Bhopal (NITTTR,
Bhopal). Shanti Marg, Shamlu Hills, Bhopal -02

Course Name: Assessment of Practical and Social Skills

Discipline: Student Assessment and Evaluation

NRC Coordinator: Dr. Shashi Kant Gupta, Professor (Assessment
and Evaluation)
skgupta@nitttrbpl.ac.in
+91 8347752980



About the Course:

"Employers highly value practical and social skills such as ability to work with hands in the related field of profession, planning and decision making, time management, communication, initiative, resourcefulness, ability to work as a member and leader in team and so on. However, in educational institutes these abilities are either neglected or assessed casually. Since these abilities are not assessed systematically, students do not get feedback for improvement and because of this shortcoming students are not able to develop their practical and social skills. One reason for this negligence is lack of awareness at faculty level about proper methods and technique for assessment in psychomotor and a ective domain. This course intends to develop abilities in faculty members to assess students reliably and validly in a ective and psychomotor domain so that students may get feedback to develop and improve their practical and social skills along with their attitudes. After doing this course teachers in higher education sector will be able to do assessment of practical and social skills and provide feedback to students in such a

way that they will be able to develop these skills and confidence of the employers will improve in the assessment system."

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| Name & Address: | Department of Urdu, Aligarh Muslim University, Aligarh |
| Course Name: | Urdu refresher Course |
| Discipline: | Urdu |
| NRC Coordinator: | Prof. Zia ur Rehman Siddiqui (Professor), skgupta@nittrbpl.ac.in +91 7018979058 / +91 9418197673 |



About the Course:

First Phase of Urdu Refresher Course 2018 has been completed successfully for University and Colleges Urdu teachers consist on 26 lectures and 24 modules. 126 students registered and approximately 50 appeared and attempted examination and got success. On the demand of deprived students the NRC MHRD has introduced and commenced the second phase of Urdu Refresher Course, 2019 by the NRC, Department of Urdu, A.M.U., Aligarh.

After completing over the course the students in term of University and colleges teachers will be distributed certificates issued by MHRD, AICTE(UGC) that will be supporting to their API, scoring and di erent academic promotion. With regards to online courses specifically Urdu Refresher Course to be introduced by MHRD Govt. of India is very much fruitful and beneficent for University teachers.

of Course Content related to Urdu Language and literature has been included and discussed to be delivered lectures by the eminent Urdu professors and senior scholars of their coherent field of national repute.

Further the second phase of 2019 to be commenced since September 2019, comparatively for better situation. Coordination of competent authorities and agencies deputed by the Ministry was found satisfactory and arrangement of videos conferencing is for supporting to maintain coordination and remain in contact day to day programme through mail and telephonically.

In second phase of the Urdu Refresher Course that will be consisted on 32 Module including lectures will delivered by eminent scholars of national repute such as Vice Chancellor, MANUU, BHU, Allahabad, DU, JNU, etc

This is also important to mention that maximum topics



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| Name & Address: | Nalsar University of Law |
| Course Name: | Online Refresher Course in Law |
| Discipline: | Law |
| NRC Coordinator: | Prof.Amita Dhanda and Prof Vasanthi Nimushakavi vasanthi.nimushakavi@gmail.com +91 9849983974 |

About the Course:

The refresher course in law will be titled evolutions in legal pedagogy. It will trace the evolutions in pedagogy and technical innovations that have emerged in the field of legal education. The course will provide a holistic understanding of recent developments and controversies in the legal field and will be accessible to persons specialising in any field of law. The rapid

growth of specialisations in law have resulted in a fragmented understanding of the legal field and this course will provide inputs on the inter-disciplinary approach towards legal education wherein developments in one field have impacts on allied fields as well.

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| Name & Address: | Indian Institute of Technology Bombay, Powai Mumbai 400076 |
| Course Name: | Convective Heat Transfer: Fundamentals and Applications |
| Discipline: | Mechanical Engineering |
| NRC Coordinator: | Prof. Arunkumar Sridharan, Professor, 022-25767580, arunsri@iitb.ac.in Prof. S.V. Prabhu, Professor, 91 836 2212 842, svprabhu@iitb.ac.in Prof. Shankar Krishnan, Assoc. Professor, 022-2576 9354, kshankar@iitb.ac.in |



About the Course:

Convective Heat Transfer is one of the most common modes of heat transfer in nature and in various engineering applications. The applications range from small (micro or nano) scale to mega scale, as seen in electronic cooling and in nuclear industry. Most process industries employ heat exchangers of some heat transfer happens by convection. Many complex thermal systems are designed and fabricated for use in various industries.

The design of these require good knowledge of convection

This course starts with the basics of convection - presenting both the physical and mathematical aspects simultaneously. Derivation of the conservation equations are presented in detail followed by

non-dimensionalisation of the same which yield important physical insights into the nature of correlations for forced and natural convection. The concept of scaling is presented and applied to the energy equation to extract the exact form of the correlations for case with small and large Prandtl number. Concept of boundary layers is introduced and the equations simplified and solved for the same.

Internal flow is studied with an aim to understand the idea of fully developed condition - both hydrodynamically and thermally fully developed. Solutions for constant wall heat flux and constant wall temp are presented. Couple of lectures are spent on the topic of Boiling heat transfer, where the general terms involved in this topic are introduced. The basics of pool and flow boiling are covered.

The topic of Thermal System Design is presented in detail to give a feel for the practices used in the Industry.
Advanced topics based on applications of Convection

are taken briefly, these include few lectures on Enhanced Heat Transfer, Nuclear Reactor Thermal Hydraulics etc.

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| Name & Address: | IIT Delhi, New Delhi |
| Course Name: | Refresher Course in Advances in Textile Engineering |
| Discipline: | Textile and Fibre Engineering |
| NRC Coordinator: | Manjeet Jassal manjeet@textile.iitd.ac.in, +91 9891369209 |



About the Course:

Today, the TEXTILES have made inroads in all sectors of life starting from conventional apparel to High performance and Functional Textiles in Defence. To develop such innovative Textile Materials, the understanding of basic concepts in their engineering play an important role. This course has been designed to provide insight into ADVANCES IN TEXTILE ENGINEERING through ten different independent modules. These cover wide spectrum of recent advances in the area of Textile Engineering.

The module on "Next Generation Fibres" gives an overview of approaches used to design high performance and Smart fibres. The emerging area of Nanotechnology and its applications in developing textiles with innovative functional properties is discussed in another module. Two modules on Yarn, deal with "Static and dynamic tensile failure of spun yarns" and "Mechanics in yarn manufacturing". An overview of the fundamental principles that lead to the development of theory of fibre-fibre contacts are included in a module on "Engineering Fibrous Materials via Theory of Fibre-Fibre Contacts".

The module on "Textile structural composite materials" deals with the design engineering, manufacturing, characterization and applications of these composites. The advancement in the field of textile finishing by using natural substances which are easily degradable and not harmful to ecosystem are included in a module on "Textile Finishing". The module on "Ink-jet printing onto textiles" has been designed to explain the difference in concept and technology of digital printing vis-à-vis the conventional printing.

The course also includes two modules on characterization and testing of textiles. The module on "Evaluation of Textile Materials" deals with the principles of evaluation of conventional as well as functional and technical textiles, while the module on

Advanced Surface Characterisation techniques will include fundamental concepts related to these techniques.

It is expected that this course will help in keeping abreast with newer technologies being developed in the area of Textiles.

This refresher Course is designed for the Faculty of Textile Engineering as well as Professionals working in Textile industry.



Name & Address: Indian Institute of Technology Bombay, Powai, Mumbai 400 076.

Course Name: Introduction to Quantum Physics

Discipline: Physics

NRC Coordinator: Prof. S. Uma Sankar, Professor,
uma@phy.iitb.ac.in
9867224448,
Prof. Aftab Alam, Associate Professor,
aftab@phy.iitb.ac.in
7506265564,

About the Course:

This course has three themes. In the first theme, we describe the experiments which could not be explained using classical physics and which required the development of quantum ideas. We will also explain how the quantum ideas differ from the classical ideas. In the second theme, we introduce the dynamical

equation of quantum mechanics and use it to solve some problems involving one particle. In the third theme, we apply these quantum dynamical techniques to a system containing many particles and show how some of the puzzling properties of materials can be understood.

Name & Address: UGC-HRDC, University of Kerala, University Golden Jubilee Building Kariavattom – 695 581 Thiruvananthapuram, Kerala, India

Course Name: FINANCIAL MARKETS AND EMERGING BUSINESS MODELS

Discipline: COMMERCE

NRC Coordinator: Prof. Dr. J. Rajan, Former Director and Dean, Management Studies, University of Kerala
jrajanmk@gmail.com
+91 9447097116



About the Course:

Relevance

The course is relevant considering the following dimensions of the market and economy:

- Funds are available for new and emerging business
- Innovative financial products and services
- Financial market Integration and Business Models
- Use of E commerce, Fin Tech Services for Emerging business models
- Scope and Coverage

Course shall be delivered in 5 modules, with each module consisting of 3-4 units

Modules – Each module will contain 3-4 units

I: Introduction to financial systems- financial

institutions- financial markets- financial services –

Global financial markets- relevance- implications in the globalised world- inwards outward movement of capital – Indian Financial Markets – Money market and Capital market- Primary market and Secondary market – Segmented market to integrated market- functions – role of markets in supporting business growth to industrial growth and economic development – financial markets and the economy- implications of robust financial markets and emerging business models using electronic platforms for trade and payments.

II: Financial Services – Venture Capital – Mutual Funds – Crowd Finding – Angel Financing – Finance for Innovative Models and Start ups – Stock Market and MSMEs – Commodity Markets: Agro and others – Merchant Banking, Underwriting and Financial services

for emerging business models –NBFCs.

III: E-Commerce and E-Finance – Business Models in the e-space – use e-finance as a critical link to make business possible – breaking barriers of time and space. IV: Ethical issues in Corporate finance – Problems and challenges in managing finance – Governance of finance by bank and financial institutions – Ethics and Governance: MSME finance – Ethics in Finance followed by Entrepreneurs – Ethics followed in Governance of Venture Capital – Techniques followed to overcome new venture finance – Recovery of loans: transparency and accountability.

- scenario in particular
- Learning how financial markets operate with its segments and in specified sectors
- Understand the support and financial synergy the Financial market provides for various business models ranging from MSMEs to Trans -National Corporations
- Examining potential for new business models in the back drop of a well developed financial market

V. Case Studies, Projects and Demonstrations

Outcomes

- Understanding the relevance of financial market in general and its scope in the Indian

Name & Address: Indian Institute of Technology, Delhi, Hauz Khas, New Delhi 110 016

Course Name: Introduction to Mass Transfer

Discipline: Chemical Engineering

NRC Coordinator: Prof. Ashok N.Bhaskarwar
ashoknb@chemical.iitd.ac.in
+91 7042457393



About the Course:

This is the first course in mass transfer, and primarily an introduction to its fundamental concepts. The focus is on developing an understanding of the basic mechanisms of mass transfer, after establishing the position of mass-transfer operations in the broader perspective of chemical engineering. The thrust will be on establishing the connections of different parts of mass-transfer analysis, in view of their relationships with each other, conceptually as well as mathematically. The idea is to shape and train the thinking in order to understand the mass transfer in all its complexities. Thought experiments coupled with a mathematical-modelling perspective should fetch unique insights into the subject so important to the practice of chemical engineering. Tools such as visualization, dimensional analysis, analogies, basic approaches of Transport Phenomena, and differential equations and their solution techniques would all be developed as a part of the course, with the help of examples chosen to build an in-depth understanding of and insights into the concepts and applications of mass transfer. Design for an illustrative mass-transfer operation (i.e, gas absorption) would be uncovered in a precise manner. A broad overview of fundamental cornerstones of mass-transfer theory and practice would be targeted, based on the history of scientific

experimental and analytical approaches alongside the every-day examples and observations in nature and within our activities and ourselves.



Name & Address: Central University of South Bihar, Gaya SH-7,
Gaya- Panchanpur Road, Village- Karhara,
Post - Fatehpur P.S- Tekari, District- Gaya
(Bihar) PIN- 824236

Course Name: Online Refresher Course in Education
(Concerns in Educational Research and
Assessment)

Discipline: Education

NRC Coordinator: Professor Kaushal Kishore Dean,
School of Education
Head, Department of Teacher Education
&
Coordinator, National Resource Centre for
Education
Central University of South Bihar, Gaya
klkr78@gmail.com, nrceeducation@cusb.ac.in
+91 9473294769

About the Course:

Central University of South Bihar, Gaya has been given a responsibility by the MHRD, Govt. of India to develop and run open online refresher course for the teachers working in the field of Education through its National Resource Centre (Education). And, to cater this responsibility the centre has already completed one course successfully under Annual Refresher Programme in Teaching (ARPIT)-2018. Now, to go ahead, the Centre is launching through SWAYAM platform, an open online Refresher Course entitled 'Concerns in Educational Research and Assessment' under ARPIT-2019.

Actually, Research in any discipline not only contributes to knowledge and progress of the discipline but it also works as a tool for facilitating learning and a means to understand various issues. In fact, to be a good teacher at higher education, it is mandatory to be a good researcher. But, being a behavioural research in nature, educational research contains many complexities which are to be taken-care by a researcher carrying out educational research. Measurement and assessment of educational variables provides a base for educational research but it is sensitive and context specific in itself. Thus, this combination becomes crucial for every higher education teacher working in the discipline of Education.

Thus, considering these issues and challenges, this course of NRC for Education will be focussing on topics like, Concerns in qualitative research such as ethnography, phenomenology, naturalistic inquiry, inductive analysis etc., causal comparative research, experimental designs, central limit theorem, taking decisions in inferential research, standard errors, type I and type II errors, choosing an appropriate statistics, measurement and assessment of various educational

variables, constructing tools for data collection and their standardization etc.

This course will be of forty hours duration and it will be a non-credit course. The methodology to transact the course shall include all the four quadrants of a MOOC (Massive open online course) i.e. e-tutorial and e-content, web resources, discussion forum and self-assessment. This forty hours duration of the course will be divided into two segments: one is twenty hours video lectures and another twenty hours will be covered in the form of text, web resources and assessment.

It is expected that as an outcome of the course this course will significantly help in changing the existing practices in education particularly in the area of research and assessment. It will help in developing and sharpening professional skills and competencies of all the teachers working in the discipline of education.



Name & Address: UGC-HRDC, Sambalpur University, Jyoti Vihar, Burla, Odisha, Pin-768019

Course Name: Tribal Studies

Discipline: Social Sciences

NRC Coordinator: Dr. Suresh Chandra Murmu
Assistant Professor
smurmu10@gmail.com
+91 9937964151

About the Course:

The Online Refresher Course in "Tribal Studies" for Faculties in Higher Educational Institutions focuses on the diverse aspects of the tribal communities in India. In India, we have 705 types Scheduled Tribes and out of that 75 have been identified as the Particularly Vulnerable Tribal Groups (PVTG). The course has been designed in accordance with the contemporary developments that it covers almost all the aspects tribal life. The course begins with the conceptual meaning of the term tribe and its changes in nomenclature during the colonial and post-colonial phases. The tribes in India have been classified by several scholars according to geographical, racial, linguistic and economic differences. The socio-cultural institutions such as marriage, family, kinship and religion are extremely important elements of the each and every tribal community which differentiate one from another.

This course also emphasizes on different problems encountered by the tribal communities such as health, education, land alienation, economic problems, naxalism etc. Different government policies and programmes for the Scheduled Tribe communities since independence for overall socio-economic development have been included in the course content. Intangible cultural heritage of the tribal communities are rapidly declining due to modernization and acculturation. Efforts have been made to cover tribal

folklore, folktales, myths, legends, customs, traditions, rituals; tribal art and aesthetics; life cycle rituals as well as customary law. Tribal communities are known for different indigenous practices. For example; knowledge on forest and ethno-medicinal practices has great potential values in the contemporary societies. These knowledge systems are in verge of extinction because it is known to only few persons such as shamans and medicine men. The other important aspects of the course are gender issues in tribal societies, tribal ethnicity and identity, tribes and museum in India and impact of the globalization, modernization, and industrialization in the life of the tribal communities.

Eminent resource persons from Anthropology, Sociology and Experts in Tribal studies across the country have been identified as the Resource Persons for the development of modules for the Online Refresher Course in Tribal Studies.

Name & Address: Indian Institute of Technology Bombay, Powai, Mumbai 400 076.

Course Name: A Practical Refresher in Computer Science

Discipline: Computer Science

NRC Coordinator: Prof. Kameswari Chebrolu
chebrolu@cse.iitb.ac.in
+91 9920952736





Name & Address: Indian Institute of Technology Bombay,
Powai, Mumbai 400 076.

Course Name: A Practical Refresher in Computer
Engineering

Discipline: Computer Engineering

NRC Coordinator: Prof. Bhaskaran Raman
br@cse.iitb.ac.in
+91 9820082064

Name & Address: UGC-HRDC, Jawaharlal Nehru University
New Delhi.

Course Name: History of Indian Science and Technology

Discipline: History of Indian Science and Technology

NRC Coordinator: Prof. Madhav Govind
mgovind11@gmail.com,
m_govind@mail.jnu.ac.in
+91 9868732956



Name & Address: UGC-HRDC, Jawaharlal Nehru University
New Delhi.

Course Name: Online Refresher Course in Arts
(Literature & Culture)

Discipline: Arts (Literature & Culture)

NRC Coordinator: Prof. Dhananjay Singh
dhananjay@mail.jnu.ac.in
+91 96542 07266



Name & Address: UGC-HRDC, Jawaharlal Nehru University
New Delhi.

Course Name: Online Refresher Course in History

Discipline: History

NRC Coordinator: Prof. Heeraman Tiwari
htiwari@mail.jnu.ac.in
+91 98212 80081



Name & Address: UGC-HRDC, Jawaharlal Nehru University
New Delhi.

Course Name: Online Refresher Course in Political Science

Discipline: Political Science

NRC Coordinator: Prof. Ajay Kumar Dubey, Dr. Saumyajit Ray
akdubey@mail.jnu.ac.in,
saumyajitray@mail.jnu.ac.in
+91 98111 81656, +91 90135 98504



Name & Address: Indian Institute of Technology Bombay,
Powai, Mumbai 400 076.

Discipline: Electronics Engineering



Name & Address: Indian Institute of Technology Bombay,
Powai, Mumbai 400 076.

Discipline: Electrical Engineering



Name & Address: Indian Institute of Science, Bengaluru

Discipline: Chemistry



Name & Address: University of Delhi,
Benito Juarez Marg, South Campus, South
Moti Bagh, New Delhi, Delhi 110021

Discipline: Zoology



Name & Address: University of Delhi,
Benito Juarez Marg, South Campus,
South Moti Bagh, New Delhi, Delhi 110021

Discipline: Botany



Name & Address: Banaras Hindu University, Varanasi

Discipline: Pharmacy



Name & Address: Indian Institute of Technology Kharagpur,
Kharagpur, West Bengal 721302

Discipline: Agriculture



Name & Address: University of Delhi,
Benito Juarez Marg, South Campus,
South Moti Bagh, New Delhi, Delhi 110021

Discipline: Geography



Name & Address: University Of Jammu
University of, University of Jammu,
Gujarbasti, Jammu, Jammu and Kashmir 180006

Course Name: Professional Development of Home Science
Faculty

Discipline: Home Science



NRC Coordinator: Dr. Neeru Sharma, Professor, Coordinator
SWAYAM,
Coordinator NRC in Home Science Chairperson
Campus NSS Units,
University of Jammu. Jammu. J and K. 180006.
neerusha@gmail.com
+91 9419212010.

About the Course:

Overall and Specific Expected Learning Outcomes Home Science is an applied discipline .It contributes to the improvement of quality of living of individuals and families which ultimately results in national development. Interdisciplinary field of Home Science can contribute to the benefit of families and the community at micro and macro level to gear for change and development towards the desired direction. Teachers have an important role to play here. They have to work the development of students as well as their own professional development. They have to keep updated knowledge regarding not only of what is going on in their area of specialization but also the other five major specializations in Home Science too. Besides this they have to develop strategies for future proofing of the subject of Home Science. The specific learning outcomes to be delivered through this course are as follows:

1. To encourage Professional Development of Home Science Teachers at different levels.
2. To develop an understanding of the Paradigm Shift in Home Science
3. To deliberate on the aspects of teaching , learning and curriculum planning
4. To link the fields of Home Science to the Sustainable Development Goals
5. To have an understanding about the research methodology employed in the field of Home Science
6. To deliberate on the aspects of Writing for grants and Publishing in the field of Home Science

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| Name & Address: | Shri Lal Bahadur Shastri Rashtriya Sanskrit Vidyapeetha (Deemed to be University), B-4, Qutub Institutional Area, New Delhi-110016 |
| Course Name: | Online Refresher Course in Sanskrit Pedagogy |
| Discipline: | Sanskrit |
| NRC Coordinator: | Prof. Amita Pandey Bhardwaj Professor - Deptt. of Education & Project Head - Teaching Learning Centre +91-9811580640 amitapb2017@gmail.com |



About the Course:

यह ऑनलाइन पुनश्चर्या कोर्स उच्च शिक्षा के सभी सेवारत अध्यापकों एवं अध्यापक शिक्षकों के लिये है। यह कोर्स यू. जी. सी. की करियर एडवांसमेंट स्कीम के अंतर्गत प्रोन्नति में एक पुनश्चर्या कोर्स के समतुल्य माना जायेगा। इस कोर्स का मुख्य प्रयोजन विविध संस्कृतशास्त्रों के शिक्षणशास्त्रीय पद्धतियों एवं विधियों के प्रभावी प्रयोग हेतु अन्तर्दृष्टि एवं कुशलताओं का विकास करना है। कोर्स का मुख्य विषय संस्कृत वाङ्मय का परिचय, शिक्षण तथा उसमें निहित कतिपय महत्वपूर्ण शैक्षिक विषयों की प्रासंगिकता पर केन्द्रित है। कोर्स के मॉड्यूलस के विषयों के रूप में संस्कृत के प्रमुख शास्त्रों यथा साहित्य, व्याकरण, दर्शन, ज्योतिष, वास्तु एवं धर्मशास्त्र के परिचय तथा उनकी शिक्षणशास्त्रीय पद्धतियों से लेकर संस्कृत वाङ्मय में निहित शैक्षिक विषय यथा शैक्षिक प्रबंधन, नेतृत्व, पर्यावरण शिक्षा, जीवन मूल्य आदि समाविष्ट है। कोर्स में 40 मॉड्यूलस हैं जिनमें प्रत्येक मॉड्यूल विषयक सम्बन्धी ई-वीडियो, सन्दर्भ स्रोत एवं वेबलिक सहित ई-सामग्री, दत्तकार्य तथा आकलन प्रश्न है।





MHRD

**Ministry of Human
Resource Development
Government of India**

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