

Science Academy's Refresher Courses

Science is progressing at a fast pace. Teachers, Research Scholars and PG students in colleges are unable to keep themselves abreast with the state-of –art in their various science disciplines. To overcome this lacunae DSCL has been conducting 2 week **National Level Refresher Courses** in basic sciences for teachers, research scholars and PG students Refresher courses since 2016. The two weeks refresher courses are aimed at capacity building of teaching community. The primary focus is to enhance the quality of science education at graduate and postgraduate levels. Refresher courses are thus, primarily aimed at helping teachers to add value in their teaching. These are supported by the Joint Education Panel of the three Science Academies; Indian National Science Academy, New Delhi, Indian Academy of Science, Bengaluru, National Academy of Science, Allahabad. Indian Academy of Sciences fellows, Sr. Scientist, Eminent Professor, Bhatnagar Awardees from different scientific Institutions are invited to deliver lectures on the course content. Such refresher courses are eligible for CAS promotion of teachers. The courses conducted up till now are given below.

Sr. No	Name of Course	Funding Agency	Year	From date	To date	Budget sanctioned
1)	Refresher Course on Quantum Mechanics and Nuclear Physics	Indian Academy Of Sciences, Bangalore	2015-2016	15.04.2016	30.04.2016	807000.00
2)	Refresher Course on Theoretical Chemistry	Indian Academy Of Sciences, Bangalore	2017-2018	21.06.2017	05.07.2017	865500.00
3)	Refresher Course on Mathematics	Indian Academy Of Sciences, Bangalore	2018-2019	11.06.2018	25.06.2018	885500.00
4)	Refresher course in Biological Sciences- Botany	Indian Academy Of Sciences, Bangalore	2019-2020	10.06.2019	24.06.2019	768250.00
Total -						3326250.00

1] Refresher Course on Quantum Mechanics and Nuclear Physics

Coordinator – Dr. R. H. Ladda and Dr.L.V.Thakre

Director – Prof. Dr. Sulbha Kulkarni, IISER, Pune

Curriculum –

- 1) **Nuclear Systematic :-** Nuclear binding energy, Nuclear stability α , β , γ decays, Nuclear reactions, fission and fusion.
- 2) **Quantum Physics :-**
Uncertainty Principle :- Heisenberg Microscope, Time energy uncertainty wave particles to incorporate uncertainty principle using de-Broglie relation.
- 3) **Schrodinger Wave Equation :-**
Heuristic derivation, Operators associated with momentum and energy, Time independent schrodinger equation, elementary notions of operators Eigen functions and Eigen values.
- 4) **One dimensional problems :-** particle in box, Particle in a square well potential scattering in a barrier potential, linear harmonic oscillator, expectation values of X, P in the ground state oscillator.
- 5) **Hydrogen atom Problem :-** Schrodinger equation bound state solution in Coulomb potential, concept of degeneracy, angular momentum Eigen function and Eigen values, The fundamental commutator between position and momentum atom in spherical polar coordinates, separation of variables.

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Report –

Registration: - On 15th April, 2016 at 10 am Registration of the participants started. Bag, Pen, Register and timetable were issued to all the registered participants in all 22.

All India Science Academies Refresher course in Quantum Mechanics and Nuclear Physics. The Two week Science Academies Refresher Course in Quantum Mechanics and Nuclear Physics was held at Dayanand science college, Latur from 15th April to 30th April, 2016.



The refresher course was inaugurated by the course Director Prof. Dr. Sulbha Kulkarni IISER, Pune and Principal of Dayanand Science College, Latur Dr. J. S. Dargad, on 15th April at 11.00 am.

Dr. Sulbha Kulkarni expressed the importance of refresher courses and the participation of ladies in higher education and has given the key note address on the subject of Physics in general and Nanotechnology in particular. Principal Dr. J. S. Dargad has explained about the college activities about the academic programmes. The college has an excellent track record in academic development. The college got 'A' grade in NAAC Reaccreditation. The college has got best college award of S.R.T. M. University Nanded. The College is DST-FIST recognized. The college also has organized 11 Inspire Internship Science Camps for meritorious 11th class students funded by Department of Science and Technology, New Delhi.





Academic Programme

1. Afternoon at 2.30 Dr. Atul Mody one of the resource person has delivered lecture on module III up to 5.30. He has delivered in all 17 lectures on 'Schrodinger Wave Equation.' Elementary notions of operators Eigen functions and Eigen values and given notes which were Xeroxed and circulated to the Teacher – Participants.



2. Dr. Avinash Khare 8 lectures on Peripheries of Quantum Mechanics in General.



3. Dr. P. Durganandini :- 8 lectures on module V Hydrogen atom problem in Detail.



4. Dr. Anuradha Misra :- 9 lectures on uncertainty Principle, Heisenberg Microscope etc..



5. On Sunday 24.04.2016 seminar on different topics given by five teacher participants and chairman of seminar secession was Principal Dr. J. S. Dargad and in the afternoon excursion tour was arranged to Chakur an Amusing Park and Water Park etc.

6. Dr. S. Kailas :- 8 lecture on module i.e. Nuclear Binding Energy, Nuclear Fission and Fusion.



7. Dr. Sunil Deshpande :- 7 lectures on module IV one Dimensional Problems in Quantum Mechanics.



8. Dr. B. S. Pujari :- 7 lectures on Simulation on Lap-Top with Different topics such as linear Harmonic oscillator etc.



:: Suggestions ::

There should not be restriction on Number of Resource Persons as is given in guideline 4 to 6 may be little bit more expenses on their Travelling expenses because many resource persons do not want to stay for more than 3- 4 days and hence in such case at least 8 - 10 resource persons are required. Better to approve in the beginning only list of resource persons so that there will be no need to consult the Director in which much time will be required and then reservation of tickets etc will be a problem.

The science panel may give the syllabus for different subjects so that the syllabus framed by the coordinator need not to be considered standard syllabi may be provided by the academy so that in every refresher course it will be useful as such in guidelines only it is mentioned that the syllabus need not be of an advanced level and there will be no comment on the syllabus which is being framed at the coordinator level, Director of the course can modify the syllabus if required. The Amount paid and Balance of 30% after receiving. The final statement of accounts becomes difficult it should be at the most 10-15%.

Valedictory Function :- Certificates, Books etc. were distributed to the Participants, President, Secretary of Dayanand Education Society were present for the function. Four Participants have expressed their views about the organization of the refresher course which were nice. It was pleasant occasion of valedictory function as on the same day the college received UGC's "College with Potential for Excellence" Award.















Non Academic Report

The Bags were also given to the resource persons etc. This science academies refresher course helped teachers to add value for their teaching there was interaction almost in every period by the Resource persons with Teacher Participants.



The publicity is given on Academy website and Indian association Physics Teachers Bulletin in the month of January 2016. And also 500 Brouchers were printed and posted to 500 Colleges and the response of 65 Applications were Received 25 outstation and 10 local Participants were Selected. Only 22 Participants have finally Reported.

Acknowledgement :-

We Sincerely Thank the Science Academies Particularly Dr. Mahabaleshwara the Coordinator of an Academy the Assistant Coordinator Geetha Madam for giving guidance and financial support and extending every possible help in time on phone and by e-mail as and when required.

Photo Gallery -

























2] Refresher Course on Theoretical Chemistry

Coordinator – Dr. R. H. Ladda and Dr. N. S. Korde

Director – Director Prof. Dr. Dilip Dhavale, Department of Chemistry,
Savitribai Phule University, Pune

Curriculum -

'Reaction Mechanism, Stereochemistry, Spectroscopy in Organic and Inorganic Chemistry'

- 1) **Organic Reaction Mechanism :-** Types of organic reactions, factors which influences a reaction, reactive intermediates, kinetic isotope effects, aromaticity in benzenoid, nonbenzenoid compounds, aliphatic and aromatic Nucleophilic Substitution reactions, neighboring group participation, aromatic electrophilic substitution reactions, addition to carbon-carbon and carbon-hetero atom multiple bond, free radical mechanisms, elimination reactions, rearrangement reactions.
- 2) **Inorganic Reaction Mechanism :-** Modern theories of metal-ligand bonds: VBT, CFT, MOT. Lability and inertness in octahedral complexes, Substitution reactions in octahedral complexes, Acid hydrolysis, Mechanism of acid hydrolysis when a) No inert ligand in complex is a π -donor or π -acceptor b) The inert ligand is π -donor c) The inert ligand is π -acceptor. Factors affecting to acid hydrolysis. Base hydrolysis, SN^1CB mechanism, evidences in favors of SN^1CB mechanism. Substitution reactions in square planar complexes : trans effect, theories of trans effect. Oxidation –Reductin reactions: through atom or group transfer and electron transfer. Mechanisms of outer sphere and inner sphere electron transfer reactions.
- 3) **Stereo chemistry :-** Elements of symmetry, chirality, enantiomeric and diastereomeric relationships, R and S, E and Z nomenclature. Molecules with more than one chiral center, Threo and Erythro isomers, Prochiral relationships, groups and faces, stereospecific and stereoselective reactions. Optical activity in the absence of Chiral Carbon (Biphenyls, allenes and Spiranes), Chirality due to helical shape. Methods of resolution, optical purity, stereochemistry of the compounds containing Nitrogen, Sulphur and phosphorous. Conformational analysis of cycloalkanes, Mono and disubstituted cyclohexanes, decalins, effect of conformation on reactivity.

Asymmetric Synthesis :- Chiral pool, Chiral auxiliary, Enantio- & Diastereoselective synthesis, Chiral reagent and chiral catalyst including CBS reagent, NADH, Asymmetric hydrogenation including BINAP,

Hydroboration- Ipc_2BH , IpcBH_2 , Asymmetric epoxidation- (+) DET & (-) DET, Sharpless, Jacobson, Asymmetric dihydroxylation- $(\text{DHQD})_2\text{PHAL}$ & $(\text{DHQ})_2\text{PHAL}$, Felkin-Anh model, Zimmermann-Traxler transition state model, Proline catalyzed asymmetric reactions.

- 4) **Pericyclic Reactions :-** Features and classification of pericyclic reactions, Phases, nodes and symmetry properties of molecular orbital in ethylene, 1, 3-butadiene, 1, 3, 5-hexatriene. Allylcation, allyl radical, pentadienylcation and pentadienyl radical. Thermal and photochemical reactions. **Electrocyclic reactions:-** Woodward-Hoffmann selection rules for electrocyclic reactions. Explanation for the mechanism of electrocyclic reactions by: (i) Symmetry properties of HOMO of open chain partner; (ii) Conservation of orbital symmetry and orbital symmetry correlation diagram and (iii) Huckel-Mobius aromatic and antiaromatic transition state method.

Cycloaddition reactions:- Diels-Alder reaction. Woodward-Hoffmann selection rules for cycloaddition reactions. Explanation for the mechanism of cycloaddition reactions by Conservation of orbital symmetry and orbital symmetry correlation diagrams, Fukui Frontier Molecular Orbital (FMO) theory and Huckel-Mobius aromatic and antiaromatic transition state method. Endo-exo selectivity in Diels-Alder reaction and its explanation by FMO theory. Examples of cycloaddition reactions.

Sigmatropic reactions :- Selection rules for [i,j] shifts. Cope, degenerate Cope and Claisen rearrangements. Explanation of sigmatropic reactions by (i) symmetry properties of HOMO (ii) Huckel-Mobius aromatic and antiaromatic transition state method. Introduction to chelotropic reactions and the explanation of mechanism by FMO theory.

- 5) **Photochemistry :-**

Photochemistry of (π, π^*) transitions, Excited state of alkenes, cis-trans isomerisation, photochemistry state, electrocycloisatation and Sigmatropic rearrangements, di π -methane rearrangement.

Intermolecular reactions: photocycloadditions, photodimerisation. Photoaddition reactions. Excited states of aromatic compounds, photodimerisation of benzene, photosubstitution reactions of aromatic compounds and Photo-Fries rearrangement.

Photochemistry of (n, π) transitions: Excited state of carbonyl compounds, Norrish-I and Norrish-II reactions.

Addition to C-C multiple bonds: Paterno-Buchi reaction, photochemistry of alkyl peroxides, hypohalites and nitriles. Barton reaction. Photochemistry of azo compounds, diazo compounds, azides and diazonium salts. Singlet oxygen-photo oxygenation reactions. Ene reaction, formation of dioxetanes and endoperoxides. Chemiluminescent reactions. Oxidative coupling.

6) **Electronic absorption spectra of transition metal complexes :-**

Orbital angular momentum and spin angular momentum of an electron, coupling of single electron angular momenta (s-s, l-l, l-s coupling), the energy terms, the relative energy term (ground term). Selection rules: spin selection rule, Laporte selection rule, Interpretation of electron absorption spectra of coordinate compounds. Orgel diagrams & its applications, Racah parameters, Tanabe-Sugano diagrams. Charge transfer spectra.

7) **UV-Spectroscopy :-** Introduction, basic principle of UV Spectroscopy, types of electronic transitions, solvent effect on $n-\pi^*$ and $\pi-\pi^*$ transitions. Chromophore, auxochrome, bathochromic, hypsochromic shift, hyperchromic & hypsochromic effect. Spectrophotometer and spectrum recording. Woodward and Fieser rules for calculation of λ_{\max} . Applications of UV Spectroscopy.

8) **IR –spectroscopy :-** Introduction, basic principle of IR spectroscopy, Fundamental modes of vibrations, factors affecting on vibrational frequency. Instrumentation of IR spectrometer, sampling techniques, applications of IR spectroscopy for identification of functional groups,

9) **NMR- Spectroscopy :-**

a) H^1 –NMR : Basic principle of n.m.r., Instrumentation, chemical shift and its measurements, factors affecting on chemical shift, correlation data for proton NMR spectra, solvent used in n.m.r, spin-spin coupling, spin-spin splitting, coupling constant, factors affecting on coupling constant, non first order spectra, simplification of complex proton n,m,r spectra,

b) C^{13} -NMR : Natural abundance of C^{13} n.m.r., correlation data for C^{13} n.m.r. Applications of C^{13} n.m.r., 2D–NMR, Shift correlation spectra-COSY, The HETCOR technique, NOESY experiments DEPT spectrum.

F^{19} , P^{31} N^{15} n.m.r spectra, magnetic resonance imaging (MRI).

10) **Mass spectroscopy :-** Basic principle of mass spectroscopy, Instrumentation, isotope abundance, molecular ions, metastable ion, base peak, structural analysis and fragmentation pattern.

11) **Electron Spin Resonance spectroscopy:-** Introduction, Principle of esr spectroscopy, position of spectrum, Hyperfine splitting (electron-nucleus coupling), The fine structure of esr spectra (electron-electron coupling), factors affecting on the magnitude of g-values, Interactions affecting the energies of unpaired electrons in transition metal ion complexes, Zero field

splitting and Kramer's degeneracy, Anisotropy in the hyperfine coupling constant, Nuclear quadrupole interactions, line width in solid state E.P.R., limitations of esr spectroscopy , Applications of esr spectroscopy.

Mossbauer spectroscopy :- Introduction, principle of Mossbauer spectroscopy, Mossbauer nuclides, spectral parameters required for evaluation of Mossbauer spectra: Isomer or resonance line shift, quadrupole interactions, magnetic interactions (Nuclear Zeeman splitting), Instrumentation, Application of mossbauer spectroscopy : chemical shift and bond character Isomer shift and Ionicity, Electro negativity and ionic shift, Isomer shift and Curie point, structure determination of tin and iron compounds, Biological applications of Mossbauer spectra.

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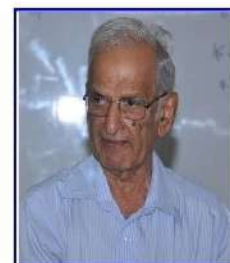
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Report –

Registration: - On 21st June, 2017 at 9.30 am Registration of the participants started. Bag, Pen, Register and timetable were issued to all the registered participants in all 21.

All India Science Academies Two Week's Refresher course in General Chemistry was held at Dayanand Science college, Latur from 21st June to 5th July, 2017.

The refresher course was inaugurated by the course Director Prof. Dr. Dilip Dhavale, Department of Chemistry, Savitribai Phule University, Pune and Principal of Rajarshi Shau College, Latur Dr. S. D. Salunke, Principal of Dayanand Science College Dr. J. S. Darad, Head Dept. of Chemistry Dayanand Science College, Latur Prof. Y. P. Sarnikar, on 21st June at 11.00 am.

Dr. Dilip Dhavale has expressed the importance of Refresher Courses and the subject matter used in this Refresher Course how it is useful for undergraduate Teachers in their regular Teaching Dr. S. D. Salunke have given the presentation about the Refresher Course. Principal Dr. J. S. Dargad has explained about the college activities and the importance of Refresher Course in Higher Education. The college has an excellent track record in academic development. College has organized 14 INSPIRE Camps for meritorious 11th class students funded by Dept of Sci. and Technology New Delhi.

Photograph of Lightning of Lamps



Academic Programme

1. Afternoon at 2.30 Dr. Dilip Dhavale one of the resource person has delivered lectures up to 5.30. He has delivered in all 7 lectures. He has given notes which were Xeroxed and Circulated to the Teacher, Participants the notes were on NMR Practice Problems and General Problems in Spectroscopy.

Photograph of Dr. Dilip Dhavale while teaching



2. Dr. N. N. Karade delivered 12 lectures on Heterocyclic Chemistry, Biosynthesis of Terpenoids reaction mechanism, Retro synthesis etc. and given notes.



3. Dr. M. S. Wadia has delivered 7 lectures on Stereochemistry of cyclohexane. Notes were given which were Xeroxed and circulated to all participants.



4. Dr. Suresh Waghmode has delivered 9 lectures on Pericyclic Reactions. Notes were given and circulated the Xerox copies to participants.



5. Dr. V. D. Bobade has delivered 12 lectures on mass spectroscopy. Notes are given which are Xeroxed and circulated to participants.



6. Dr. Sangita Makone delivered 6 lectures.



7. Again Dr. Dilip Dhavale has delivered 10 Lectures. Also there was a Laboratory visit where Dr. V. D. Bobade has demonstrated few Microanalysis experiments to participants.



On the same day there was library visit where the books are distributed to participants and they have assessed the books in the library.

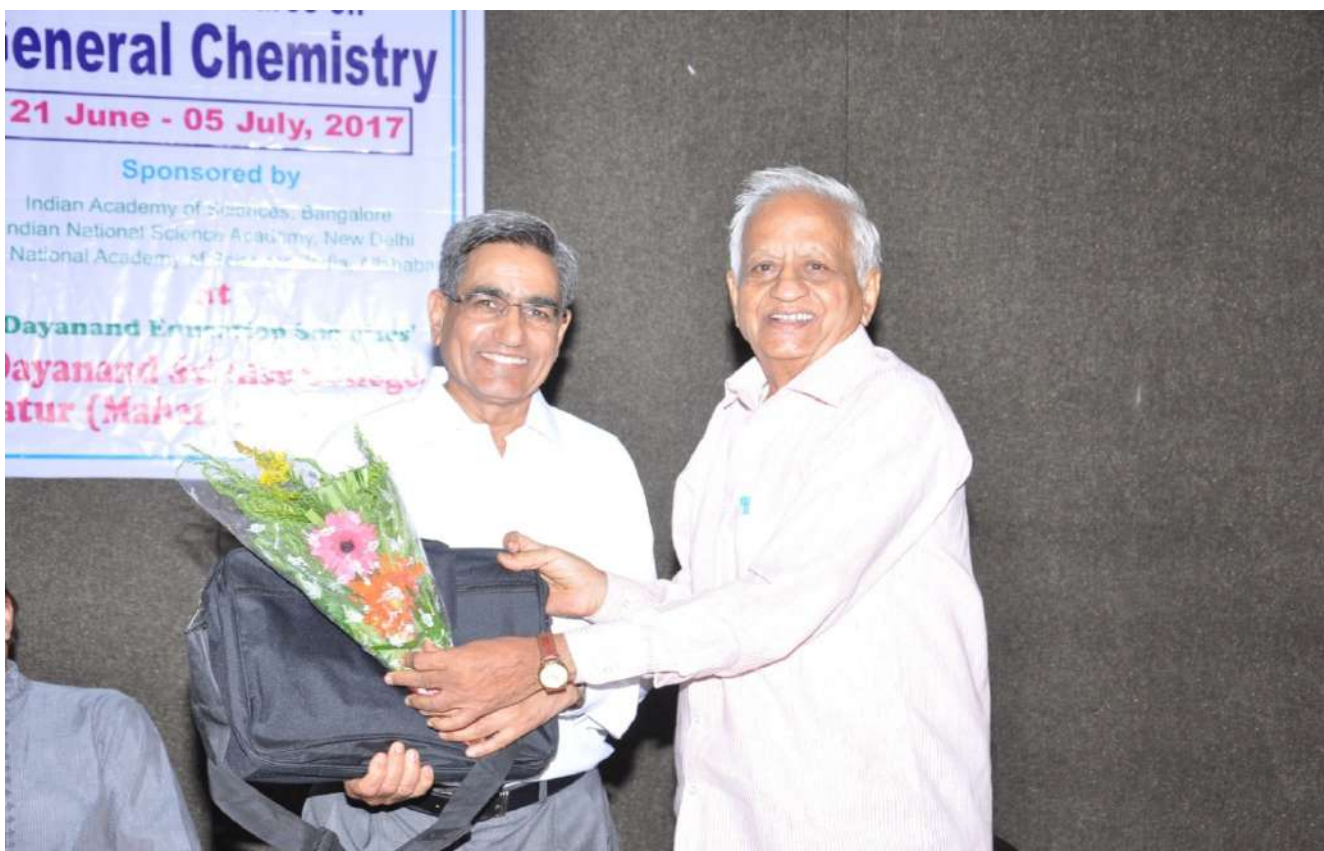


We have arranged a seminar of 5 participant teachers. The chairperson Dr. J. S. Tulba Ex.Principal conducted the seminar.



Valedictory Function :- Certificates and common photograph were distributed to participant teachers. 4 participant, Teachers have expressed their views. About this Refresher Course.















Non Academic Report

The Bags were also given to the resource persons. Excursion Tour was organized to Chakur.

















Dinner Party





The science Academies Refresher Course helped Teachers to add value for their teaching as there was an interaction almost in every period by the resource persons with teacher participants the publicity is given on academy website Also 500 brochures were printed and posted to about 500 colleges and respond of 55 applications were received. 29 outstation participants has confirmed after selection but only 11 participants finally have reported all 21 participants attended the course 75% of

the syllabus was covered and new topic Green Chemistry was also introduced. C. D. containing the resource materials is also enclosed. I must thank to the Indian Academy of Sciences, Bangalore particularly, Coordinator Dr. T. D. Mahabaleshwara and Geetha Madam for providing funds in Time and solving other difficulties also.



Acknowledgement :-

We Sincerely Thank the Science Academies Particularly Dr. Mahabaleshwara the Coordinator of an Academy the Assistant Coordinator Geetha Madam for giving guidance and financial support and extending every possible help in time on phone and by e-mail as and when required.

Photo Gallery -



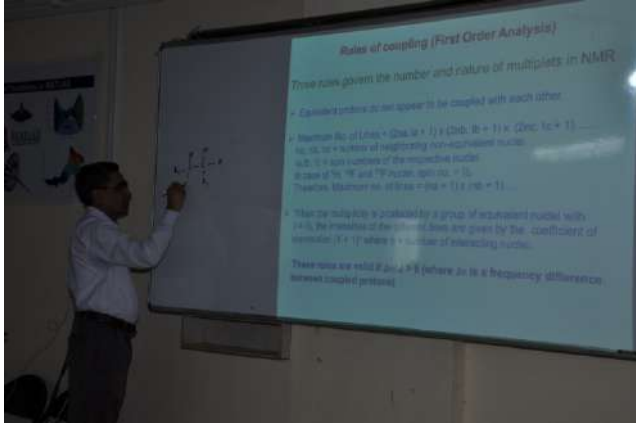








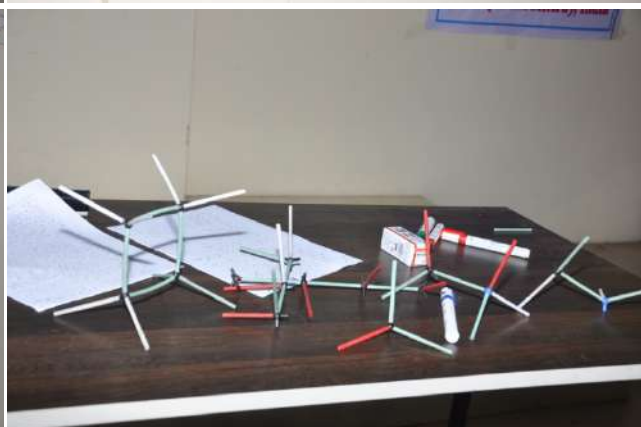
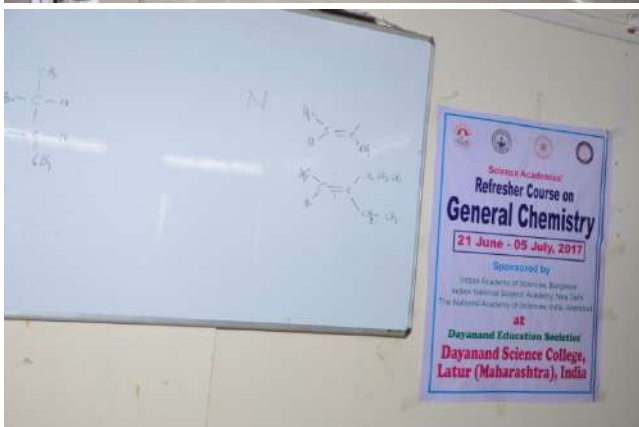
















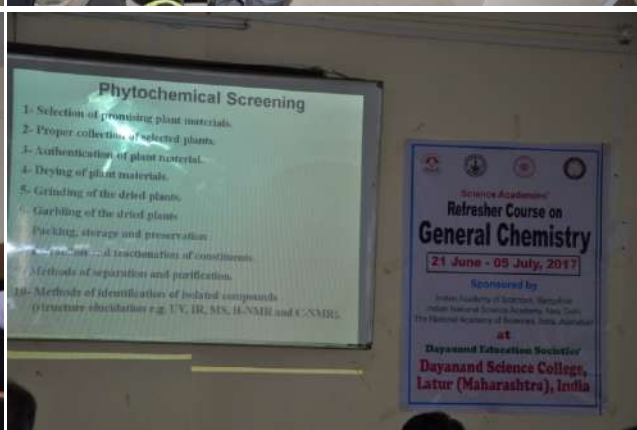








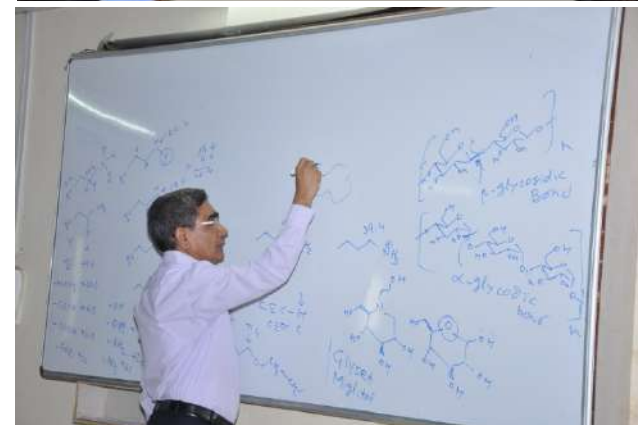








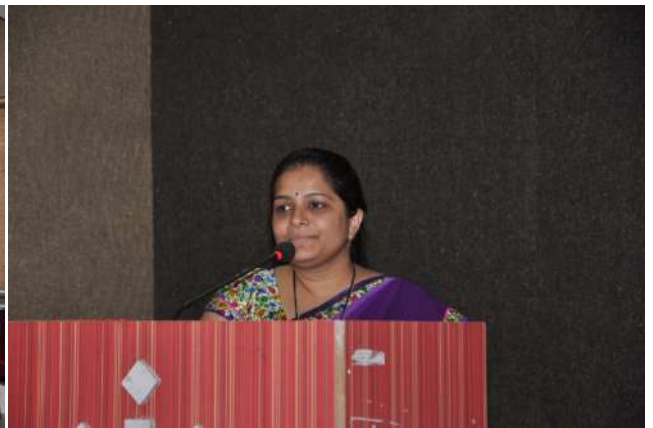


















3] Refresher Course In Mathematics

Coordinator – Dr. R. H. Ladda and Dr. S. S. Bellale

Director – Prof. Ramasawamy Mythily
Professor,
TIFR Centre ofr Applicable Mathematics,
P.B. No. 6503, Sharada Nagar,
Bangalore - 560 065
Email - mythily@math.tifrbng.res.in

Conv ener – Dr. J. S. Dargad, Principal of Dayanand Science College, Latur

Curriculum –

1. Real Analysis -

Dedekind Theory of Irrational numbers :-

Rational numbers, section of Rational numbers, Irrational numbers, real Numbers, Dedekind Theorem, The Continuum Exercise- Tutorial

Cantor's Theory of Irrational numbers :-

Cantor's Theory, Convergent sequence of real numbers,
Equivalence of the definition of Dedekind & Cantor

Limit of Sequences of Real Numbers :-

Bounded sequences, Null sequences, Monotone sequences, Convergent sequences, Fundamental theorems on limit, limit sup, limit in of sequences, Ratio Test & other Tests, Cauchy theorems, Cauchy Convergence Criteria.

2. Differential Calculus in Several Variables -

Directional derivatives as direct generalization from one variable; drawbacks; definition of differentiable functions of several variable; examples; matrix of a linear transformation; Jacobian matrix; recovering directional derivative from derivative; chain rule.

3. Applied Mathematics -

Mobius transformations. Multivalued functions; integral representations. Laplace transforms. Fourier transforms. Fundamental Green function for the Laplacian operator. The diffusion equation. Green function for the Helmholtz operator; non relativistic scattering. The wave equation. The rotation group.

4. Linear Algebra -

Characteristic values and characteristic vectors of linear transformations, Diagonalizability, Minimal polynomial of a linear transformation, Cayley-Hamilton theorem, Invariant subspaces, Direct-sum decompositions, Invariant direct sums, The primary decomposition theorem, Cyclic subspaces and annihilators,

Cyclic decomposition, Rational, Jordan forms.

5. Mathematical Softwares -

MATLAB, SCILAB , LATEX , MATHEMATICA ,

6. Classical Mechanics -

Introduction to Euler angles, pitch, precession and nutation, The heavy symmetric top, the energy equation Special case of 'fast' and 'sleeping' top Lagrangian dynamics: Forces of constrain, virtual displacement, Principle of virtual work and D'Alembert's principle, Generalized co-ordinates, Lagrange's equation of 1st kind, Lagrange's undetermined multiplier Generalized velocity and force, Lagrange's equation of 2nd kind, Lagrangian, Classification of constrains, Lagrange's equations for non-holonomic systems, Dissipation and gauge function, most general form of Lagrange's equation, review of rigid body including heavy symmetric top.

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Ex- Vice Chancellor

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Report –

Registration: - On 11st June, 2018 at 9.00 a.m. Registration of the participants started by Bags, Pen, Register and Time-table, Broucher etc. were issued to all the registered participants in all 26. After the Breakfast self introduction was given by all the participants in the Seminar Hall of Dayanand Science College, Latur (Maharaashtra)

All India Science Academies Two Week's Refresher course in Mathematics was held in same Hall. The Refresher Course was inaugurated by the Course Director Dr. Mythily Ramasawamy Department of Mathematics, Tata Institute of Applicable Mathematics, Bengaluru and Convener of the Course and Principal of Dayanand Sciene College, Latur Dr. J. S. Dargad, Vice – Principal and Head of the Department of Mathematics Dr. Bellale were present.

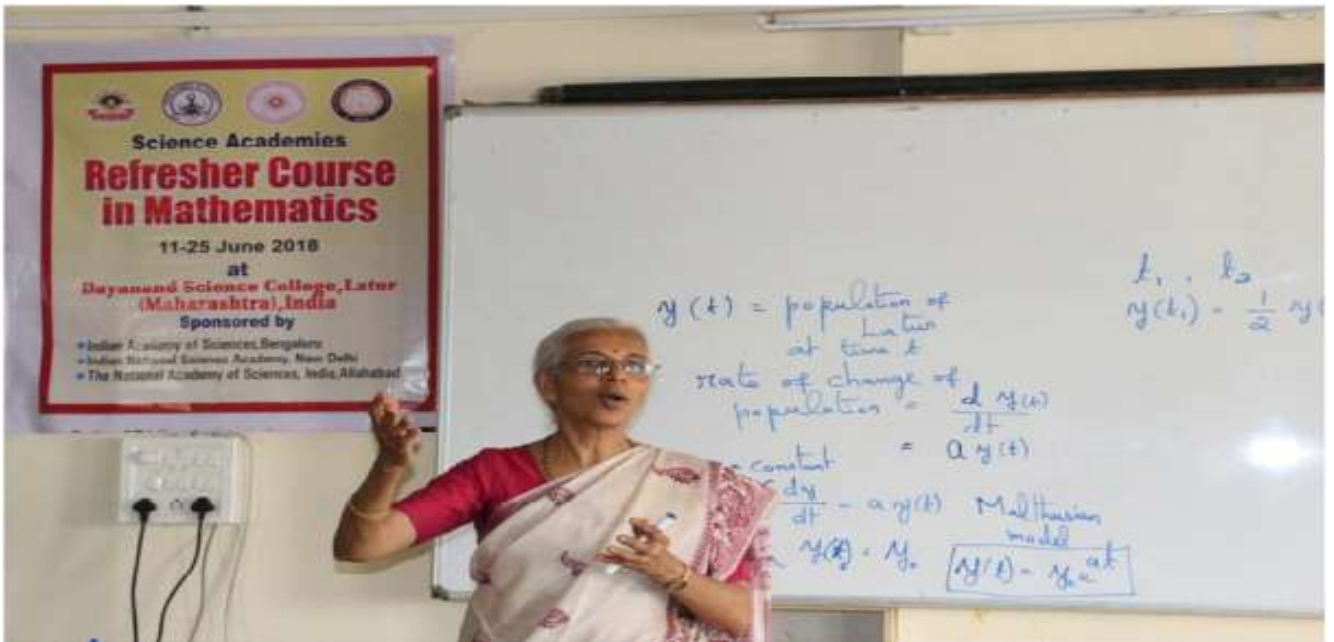
Dr. Mythily Ramasawamy has expressed the importance of Refresher Course and the subject matter used in this Refresher Course how it is useful for undergraduate Teachers. Principal Dr. J. S. Dargad has expressed his views stating that Two weeks Refresher Courses form an important segment of Science Academies Program. Also stated that the primary focus is to enhance the quality of Science Education at undergraduate and graduate levels and the college organize all such academic Programs and mentioned that this is the Third Refresher Course. Dr. S. S. Bellale has given vote of thanks.

Photograph of Lightning of Lamps



Academic Programme

1. After the lunch in the afternoon Dr. Mythily Ramaswamy as one of the Resource Person also has delivered Two lectures on multivariable and calculus up to 5.30 PM

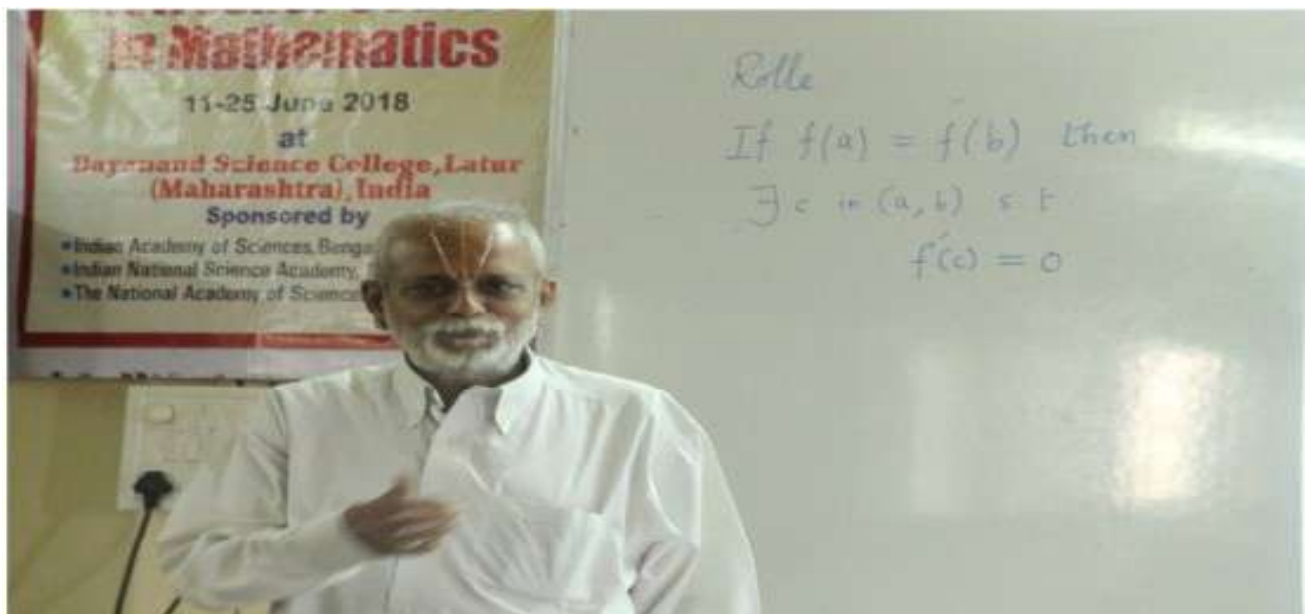


Totally she has engaged 10 Periods during 11.06.2018 to 14.06.2018.

2. From 12.06.2018 Dr. Sharad Sane from I.I.T. Powai, Mumbai has engaged 12 Periods on the Topic of Linear Algebra as per the given syllabus he has completed all the Topics in Linear algebra giving some problems and solving it in the class-room.



3. Next comes Dr. V. Kannan from University of Hyderabad. He has engaged his periods from 15.06.2018 to 17.06.2018. He has engaged 7 Periods during his stay and he has completed all the topics in Real Analysis allotted to him.



4. Deepmala Rai has engaged 7 Periods in Two days i.e. 17.06.2018 and 18.06.2018. She has demonstrated LATEX, Mathematica and Computer Modeling etc.



5. Dr. Vishnu Narayan Misra from Department of Mathematics, Indira Gandhi National Tribal University has delivered 20 Lectures from 18.06.2018 to 25.06.2018 on different Topics as Diffentiability, Increasing and Decreasing functions etc. as per given syllabus.



6. Dr. Ram-Bilas Mishra Ex-vice-Chancellor of Avadh University Faizabad. He has delivered 12 lectures during his stay from 19.06.2018 to 25.06.2018 and he has given lectures on Applied Mathematics and has shared his experiences in different countries. Xerox copies of his book on Applied Mathematics were given to all participant teachers.



In all 122 applications were received out of which 12 were Local Participants. From this list 25 out-station Participant and 10 Local participants were invited . Few of them has refused and again from the waiting list the quota of total 35 was completed. After few days again many of them have refused and hence almost all the list was exhausted except students from out-station were not invited, because it was high time to invite them. Thus only 26 participants have joined finally this course.

The only reason may be that this is Two weeks Refresher Course which may not be allowed for their CAS Promotion and Family difficulties my be the other reason because of which 35 participants could join the course.

Non Academic Report

The Bags were also given to the resource persons also a wide publicity was given for this Refresher course by printing Brouchers (400) and sent by post to different 350 colleges and as usual also the announcement was published in Science Academis monthly magzins mirror and Resonance and putting it on Whats-app also samples of Boucher's, Invitation cards, Photographs are enclosed herewith. Also C. D. Containing PPT of all the material taught in the class is enclosed.

Excursion Tour was arranged on 24.06.2018 to Nandanvan Chakur.





Valedictory function the Chief Guest Ram-Bilas Mishra, Secretary of Dayanand Education Society Rameshji Biyani and Principal Dr. J. S. Dargad were present with the auspicious hands of these persons.

Common Photo and Certificate were distributed to all the participants. Three Participants have expressed their views about this Refresher Course. This Science Academies Refresher Course helped the Teachers add value to their Teaching in the class room. There was interaction during Teaching with all the 6 Resource Persons. Which has much better effect on the Teachers.









ROW FIRST (L TO R) : 1) Dr. VIJAY BIHEKA PATIL, 2) Dr. HARENDRANATHAR RANCAANDRA DASRE, 3) Dr. S. S. BELSARE, 4) Dr. MYTHRY RAMASWAMY, 5) Dr. I. S. Durgal, 6) Dr. SHARAD SANGI
 7) SHRI. H. B. LADGA, 8) ASHOK VASANTRAO SONAWANE, 9) RAJESH SAHEBRAO WAHARE
 10) SHARDA SUDHAKAR, 11) POTESAR BHARAT SITARAM, 12) SHELAGI GIRISH DHONDIRAM, 13) SURYAWARSHI RAUL DHONDIRA, 14) DR. ASHOK VITTHAL
 15) BHUPWALAO PRABHU BHARADAR, 16) MALEGAONKAR SWAPNIL DEPPAR, 17) DAMKONDWAR ARUN BABURAO
 18) PATIL NAGENDRANATHAR, 19) BALDARVA RAJNEKA HAMPRASAD, 20) HERKER ASHVINI UMESHKANT, 21) KALE ASHWINI RAJAJIRAO, 22) KUNBIHARE KALYAN RAM
 23) ANURAG VIKRANT SAKSHAR, 24) SHAMSHIRKAR ANAND JAGANNATHAN, 25) DEKAT JYOTIKANT KISHORRAO, 26) P. N. SAKSHAR SUDHAR DEKAT, 27) P. S. SHREERANGARAO
 28) KESHAV SUDHAKAR S., 29) RAJENDR KUDRAN



Acknowledgement :-

I must express my vote of thanks to the Coordinator of the Academy Ravi kumar and Science Education Pannel also special thanks to Dr. Geetha Madam. Thanks to Indian Academy of Sciences, Bengaluru for providing the funds.

Photo Gallery –

















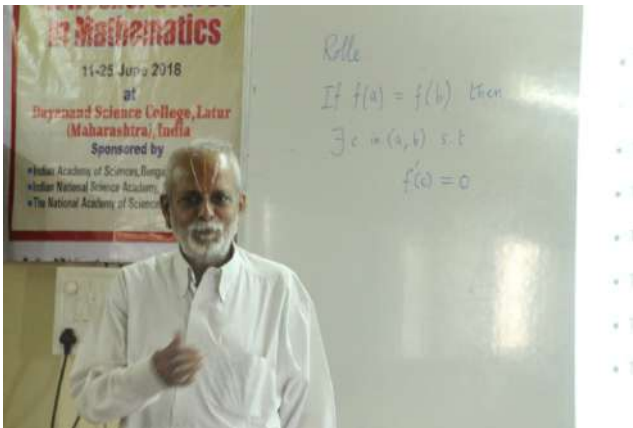
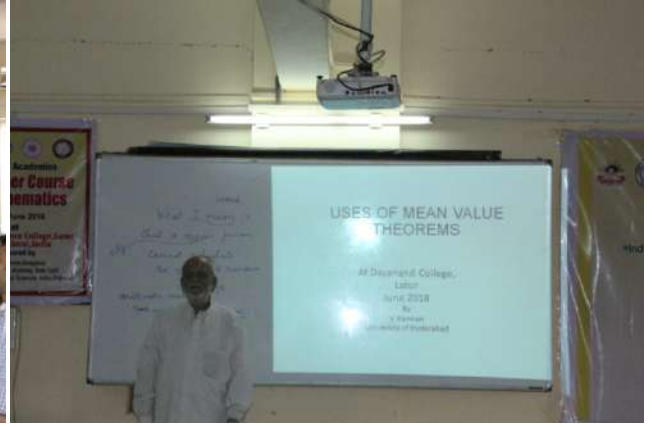


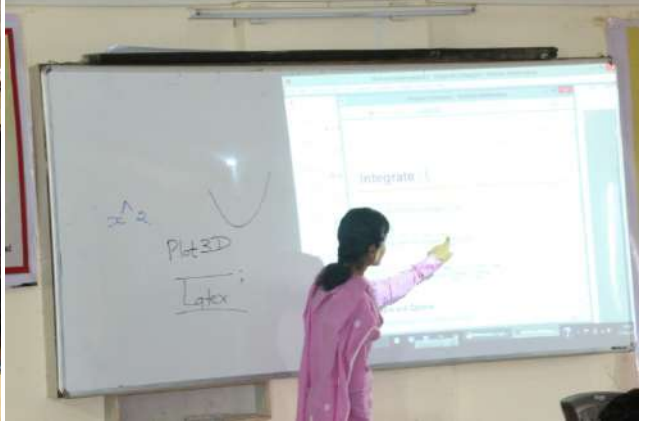




































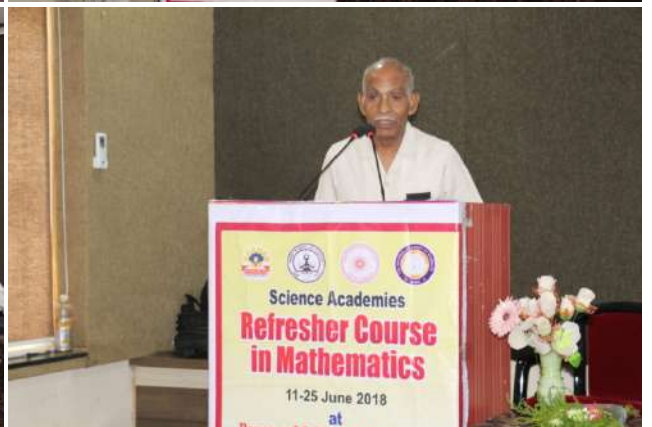


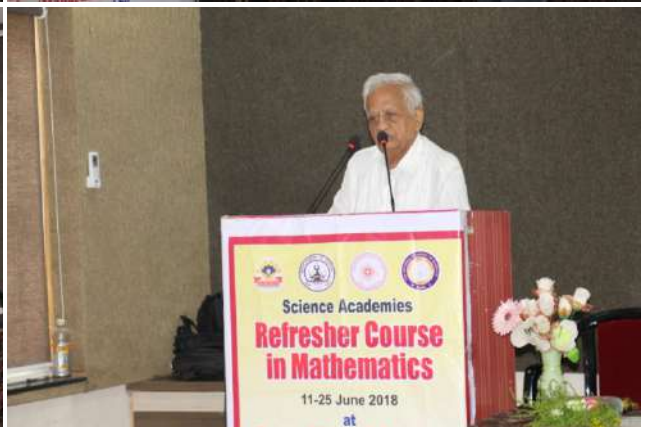












4. Refresher Course Refresher Course in Biological Sciences – Botany

- Coordinator** – Dr. R. H. Ladda and Dr. C. S. Swami
- Director** – Director,
Prof. Dr. S. R. Yadav, from Shivaji University Kolhapur
- Convener** – Dr. J. S. Dargad, Principal Dayanand Science College, Latur
- Curriculum** –

Mycology & Plant Pathology :- Role of fungi as food and feed, Role of fungi in industry, Mycorrhiza as bio fertilizers, Fungi as Bio control agents, Scope and importance of plant pathology, Aerobiology and its significance, Mechanism of infection in plants, Effect of environment on pathogenesis in plants, Disease forecasting, Defense mechanisms in plants, Seed pathology – seed – borne pathogens, their detection and control, Host – parasite interaction in plants, Transmission and plant diseases, Integrated management of diseases of crop plants, Role of fungicides in plant disease control, Fungal biomass production - Mushroom and *Trichoderma* sp.

Cell Biology & Genetics :-

Prokaryotic & Eukaryotic Cell Structure, Mutations – Types and applications, Cell-cycle and cell – division, Process of protein synthesis, Biomolecules in plants, Mendel and his work, Interaction of Genes, Linkage and Crossing over, Multiple alleles.

Biotechnology & Plant Tissue Culture :-

Tools and Techniques of Plant Tissue culture, Applications of tissue culture in plant breeding, Agriculture, Medicine, Horticulture, Forestry & Industry, Transgenic plants, Technique of R DNA technology, Agrobacterium – mediated gene transfer in plants, Protoplast culture and somatic hybridization.

Plant Physiology :-

Plant – water relations, Practical applications of plant growth hormones, Photoperiodism and vernalization, Plant responses to stress, Mechanism of non-biological and biological nitrogen fixation, Enzymology – enzymes, coenzymes, cofactors, etc. in plants, Photosynthesis – Process and significance, Respiration – Process and significance, Transport of solutes in plants, Secondary metabolites and their role, Mineral nutrition in plants, Mineral salt absorption in plants, Seed dormancy – causes and methods of breaking the seed dormancy.

Ecology :-

Biotic and Abiotic environmental factors, Biogeochemical cycles, Ecosystems, Ecological succession, Environmental pollution and global environmental change, Biodiversity status and

management approaches, Natural resources and management, Global warming and ozone layer depletion, Solid waste management practices, composting and biogas production, Biogeography in India.

Plant Breeding :-

Plant breeding and improvement of crop plants, Role of induced mutations in plant breeding, Hybridization techniques in crop plants, Male sterility and its significance in plant breeding.

Plant Taxonomy :-

Concept of species and hierarchical taxa, biological nomenclature, Classical and Quantitative methods of Taxonomy of plants, Outline of plant classification.

Biostatistics : –

Collection and presentation of data, Mean, mode and median, Standard deviation and coefficient of variation, Test of significance , Chi – square test, Application of computers in biological education.

Ethno botany :- Ethno botany and its importance, Use of Medicinal plants.

Bioinstrumentation :- Microscopy, Chromatography, Electrophoresis, Spectrophotometry, Centrifugation.

Molecular Biology :- Southern and Western blotting, DNA finger printing, Cell fractionation, Nucleic acid purification, DNA sequencing, Polymerase chain reaction.

Sustainable agricultural practices :- Use of bio fertilizers and bio pesticides, concept of organics farming.

List of Mentor –

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24	SHIVANGIKAR PRANAV PRASHANT	Shivangikar Niwas, Pochamma Galli, Latur	Pran_pps@yahoo.in	9421480919
25	CHANDRASHEKHAR SIDRAM SWAMI	Dept. of Botany Dayanand Science College, Latur	Swamics2806@gmail.com	9421986880
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Report

Registration: - The Registration of the participant Teachers started on 10th June, 2019 at 9.00 am. In Registration Bag, Pen, Register, timetable and Broucher etc were issued to all the registered participants in all 26. After the Breakfast self introduction was given by all the participants in the Seminar Hall of Dayanand Science college, Latur (Maharashtra).

The Refresher Course in Botany for all India Science Academies Two Week's is entitled for CAS (Promotion) of Senior College Teachers told to them.

The refresher course was inaugurated by the course Director Prof. Dr. S. R. Yadav, from Shivaji University Kolhapur and the Convener of the Course Principal of Dayanand Science College, Latur, Dr. J. S. Dargad, Head of the Department of Botany Dr. C. S. swami were present for this function.

Dr. S. R. Yadav has expressed the importance of this Refresher Course which is necessary for updating the knowledge of the Teachers & new methods to be used in teaching Dr. J. S. Dargad has expressed his views about the different programmes organized by this college during last five years and told to Teachers the importance of this Refresher Course Dr. C. S. Swami has given vote of thanks.



The News of Inaugural function given to State Level Papers cutting of the news of one of the paper is enclosed.

Photograph of Lightning of Lamps



Academic Programme

1. Immediately after the inaugural function Dr. S. R. Yadav has started his first lecture . After first lecture the lunch was provided to all the participants and then Dr. Dr. S. R. Yadav has started his afternoon secession periods. He has engaged 9 Periods in all.



Dr. S. R. Yadav delivering lecture.

2. The next day on 11th June 2019 the lectures have been started as per the Time-Table. The Topics given by the Resource Persons earlier were taken up by all the resource persons. The content material of their Topics were given in C. D. which is enclosed.

Photograph of Dr. Bernard F. Rodrigues is given here while teaching his Topics in the seminar hall only.



He has engaged 8 Periods in all in Three days.

3. Then Resource person Dr. Dhabe has delivered his lectures Photograph of Dr. Arvind Dhable while delivering his lectures is shown here. He has engaged 8 Lectures in four days .



4. Dr Raghavendra R. Rao has started his lectures on 14.06.2019 on the given Topics. Participants have asked questions as his lectures were interesting and knowledgeable.



5. Dr. Sabita Rani has started her lectures on genetics and related Topics for three days.



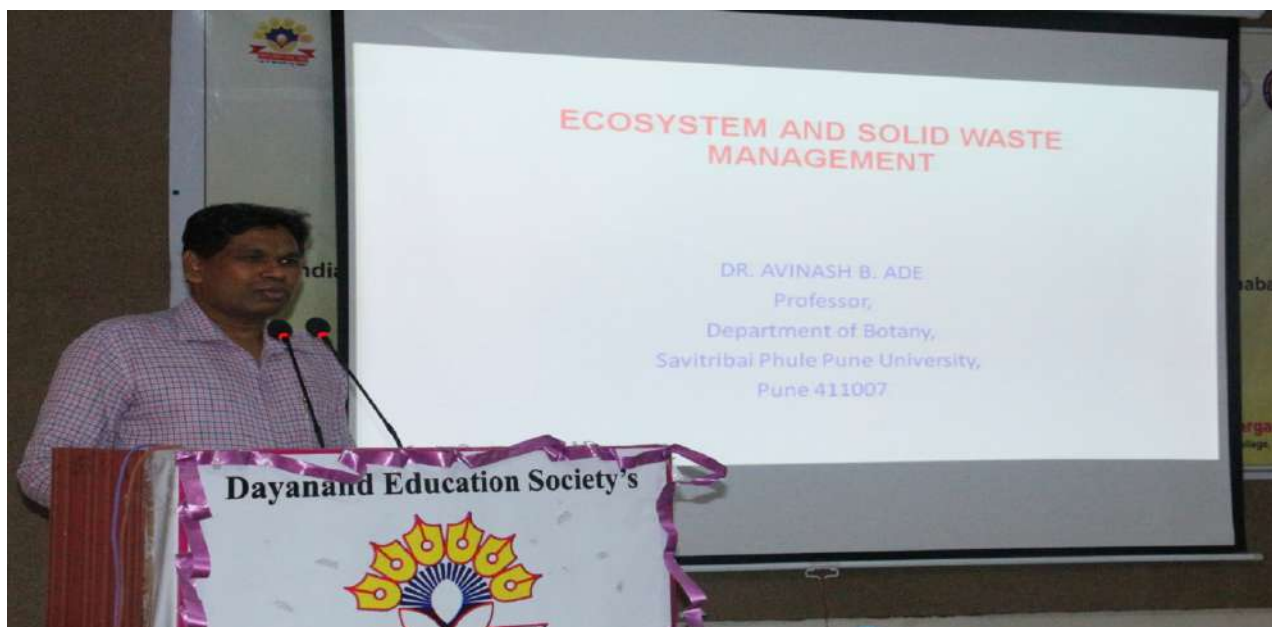
6. Dr. B. N. Reddy have delivered 7 lectures and had an interaction with the participants. He has given his book and asked to get the Xerox copies of his few pages and were circulated to the participants for their future study. Participants were enriched with his lectures having advanced ideas.



7. On 20.06.2019 Dr. T. Shrinivasu has started his lectures on different Topics. Totally he has delivered 11 lecture in five days.



8. The last Resource person was Dr. Avinash Ade he has delivered 8 lectures in all in four days Dr. Avinash Ade when he was teaching his one of the Topic.



We have received in all 75 applications out of which we have selected 30 from outstation participants and local 4 After few days 5 have refused to join and on 8th June 4 more have refused and on 10th June 19 Participants from outstation and 7 participants from local have registered for joining the course In previous three Refresher Courses we have the same experience which we have organized in our college. We could not complete the quota of 35. Participants (25+10) in one of these Refresher Courses 1) Physics 2) Chemistry 3) Mathematics and now this is the fourth in Botany. This is perhaps because there is in last 7 to 8 years in any colleges no recruitment and 3 out of State Participant have registered and remaining from all over Maharashtra

Non Academic Report

The wide publicity was given for this Refresher Course in Botany by printing Broachers 500 well in advance and were sent to different 500 colleges and as usual the announcement was published in Science Academes magazines mirror and Resonance in the month of Jan. 2019 and also on website. Samples of Broachers, invitation cards Photographs are enclosed herewith. Also C. D. containing PPT of all the Material taught in the Class room is enclosed..

Excursion Tour was arranged on 23.06.2019 some photographs of this Tour are also enclosed. Seminar by Participant teachers was also arranged on 20.06.2019. The Chairperson for this Seminar was Prof. P. M. Warad Ex. Head of Dept. of Botany was present in Library visit the Books were distributed to all Participants and also Books available in the Library were shown to them.





Photo of excursion Tour







In Valedictory Function President, Secretary of Dayanand Education society Laxmiremanji Lahoti and Rameshji Biyani respectively were present. The Certificates and common Photograph were distributed to all participants Four participants have expressed their views about this Refresher Course in botany. Because of particular subject participants have shown much interest as per their opinion.





The Science Academies Refresher Course helped the teachers to improve their knowledge of the subject. They have interacted with all the eight Resource persons. List of all the participant teachers is enclosed.

Acknowledgement :- I have expressed vote of thanks to the participant teachers as they have shown much interest in all the activities of the programme. I must express vote of thanks to the coordinator of the Academy Ravikumar C. S. by providing funds in crucial time when the funds were not available with Academy. Thanks to Science Education Panel for sanctioning my proposal and special thanks to K. Geetha Madam having given all the information which I have enquired time to time Thanks to Indian Academy of Sciences Bangalore for providing funds.

Photo gallery -

































