



Ramakrishna Mission Vidyamandira

P.O. Belur Math, Dist. Howrah - 711202, West Bengal, India

A Residential Autonomous College affiliated to Calcutta University
College with Potential for Excellence • Re-accredited by NAAC with 'A'

Phone : (033) 2654 9181 / 9632; E-mail : vidyamandira@gmail.com

Website : www.vidyamandira.ac.in

VM/Star/DBT/PF/2

21.01.2019

Dr. Garima Gupta

Scientist 'E'

Program Office, Star College Scheme

Department of Biotechnology,

Ministry of Science & Technology, GOI

Block -3, 5th Floor, Room No.- 509

CGO Complex,

Lodi Road, New Delhi – 110003

Sub: Submission of DBT Star College Proforma.

Respected Sir/ Madam,

We are hereby submitting the filled up proforma for DBT star college scheme.

Kindly accept our appeal.

Thanking you,

With regards

(Swami Shastrajnananda)

Cont. no. : 9432090889

Principal

Ramakrishna Mission Vidyamandira
Belur Math, Howrah, Pin - 711 202



Welcome:
 User Type:
AGENCYADM
 Agency:
RAMAKRISHNA
MISSION
VIDYAMANDIRA
 Financial Year: **2018-**
2019



[Rkmy1941]
 Logout
 Change
 Password

Public Financial Management System-PFMS

(formerly CPSMS)

O/o Controller General of Accounts, Ministry of Finance

Manage Scheme / Bank Account

- AdhocReports
- BharatKosh Reports
- Home
- E-Payment
- Health Module
- Reports
- My Details
- Masters
- My Schemes
- Agencies
- EAT MIS Process
- My Funds
- Transfers
- Advances
- Scheme Allocation
- Expenditures
- Bank
- Register/ Track Issue
- Misc. Deduction Filing
- Utilisation Certificate
- Accounting System Integration
- Bank Printing Templates

Scheme	Bank Details	Agency Name In Bank	Status	AccountNo	Bank Status	Receiving Funds from
Biotechnology Research and Development - [0150]	UNITED BANK OF INDIA BELUR MATH BELUR MATH	RKM VIDYAMANDIRA GOVT FUND	Pending PD Approval	0365010138796	✓	Central Government
CT RASHTRIYA UCHHATAR SIKSHA ABHIYAN - [CT2]				Cash	₹	Central Government
CH Rashtriya Uchhatar Shiksha Abhiyan (RUSA) - [CH25]				Cash	₹	Central Government
WB Rashtriya Uchhatar Shiksha Abhiyan (RUSA) - [WB4]				Cash	₹	Central Government
RASHTRIYA UCCHATAR SHIKSHA ABHIYAN (RUSA) - [ML139]				Cash	₹	Central Government
RESEARCH AND DEVELOPMENT SUPPORT SERC - [1009]				Cash	₹	Central Government

1 2 **3** 4

[Register New Scheme](#)



Annexure-I

Agency Details	Bank Details
Agency Name : Ramakrishna Mission Vidyamandira (Autonomous College)	Bank Name : United Bank Of India
Act/Registration No.: Society Registration Act 1860; 1917/3 of 1909-1910	Branch Address : P.O.- Belur Math, Dist.Howrah,, West Bengal.
Registering Authority: University of Calcutta	Branch Name : Belur Math Branch
TIN No.: NIL	Account no: 0365010138796
Address Line 1:	IFSC Code: UTBIOBEM958
State: West Bengal	MICR Code: 700027017
Pin Code: 711 202	Agency Name as per Bank Account : Ramakrishna Mission Vidyamandira
Phone: 9432090889	
Email: vidyamandira@gmail.com	
Agency Type: Govt. Aided College [Registered Societies (NGO's)]	
Date of Registration: 4th May 1909	
State of Registration: West Bengal	
TAN No. : CALR00855B	
City: Howrah	
District: Howrah	
Contact Person: Swami Shastrajnananda	
Alternate Phone/Mobil No.: 9163449776	
PFMS unique code : Rkmv1941	



Annexure-II

1. Yes, College is eligible to receive grant under section (12B & 2F) of UGC act.
2. Darpan ID : Not received till now. (User Id : 9432090889)
3. Annual fee being charged from the students

Sl. No.	Subject	1 st Year	2 nd Year	3 rd Year
1	Physics	16,100	14,400	13,000
2	Chemistry	19,700	18,000	16,600
3	Microbiology	24,500	22,800	21,400
4	Computer Science	24,500	21,600	20,200
5	Industrial Chemistry	24,500	21,600	20,200
6	Zoology	24,500	21,600	----

4. The Practical Experiments listed below are being done by our students either individually or in groups after the demonstration given by teachers.

a. Chemistry

2nd Semester (25M)

Practical

(Practical Examination will be held after end of 2rd Semester): duration 4hrs.

(Analysis of an unknown single compound containing cation and anion)

Cation Radicals: Pb^{+2} , As^{3+} , Hg^{2+} , Bi^{3+} , Cu^{+2} , Cd^{+2} , Sb^{+3} , Fe^{+3} , Al^{+3} , Cr^{+3} , Zn^{+2} , Ni^{+2} , Co^{+2} , $\text{Mn}^{+2/+4}$, Ca^{+2} , Ba^{+2} , Sr^{+2} , Na^{+} , K^{+} , NH_4^{+} ,

Anion Radicals: F^{-} , Cl^{-} , Br^{-} , I^{-} , BrO_3^{-} , IO_3^{-} , SCN^{-} , NO_2^{-} , NO_3^{-} , S^{-2} , SO_4^{-2} , $\text{S}_2\text{O}_3^{-2}$, PO_4^{-3} , BO_3^{-3} , H_3BO_3 , CrO_4^{-2} / $\text{Cr}_2\text{O}_7^{-2}$, $\text{Fe}(\text{CN})_6^{-4}$, $\text{Fe}(\text{CN})_6^{-3}$, AsO_4^{3-} , AsO_3^{3-}

3rd Semester (25M)

Practical

(Practical Examination will be held after end of 3rd Semester): duration 6hrs.

(Analysis of an unknown mixture containing four radicals, with composition)

Cation Radicals: Pb^{+2} , As^{3+} , Hg^{2+} , Bi^{3+} , Cu^{+2} , Cd^{+2} , Sb^{+3} , Fe^{+3} , Al^{+3} , Cr^{+3} , Zn^{+2} , Ni^{+2} , Co^{+2} , $\text{Mn}^{+2/+4}$, Ca^{+2} , Ba^{+2} , Sr^{+2} , Na^{+} , K^{+} , NH_4^{+} ,

Anion Radicals: F^{-} , Cl^{-} , Br^{-} , I^{-} , BrO_3^{-} , IO_3^{-} , SCN^{-} , NO_2^{-} , NO_3^{-} , S^{-2} , SO_4^{-2} , $\text{S}_2\text{O}_3^{-2}$, PO_4^{-3} , BO_3^{-3} , H_3BO_3 , CrO_4^{-2} / $\text{Cr}_2\text{O}_7^{-2}$, $\text{Fe}(\text{CN})_6^{-4}$, $\text{Fe}(\text{CN})_6^{-3}$, AsO_4^{3-} , AsO_3^{3-} ,

Insoluble Materials: Al_2O_3 , Fe_2O_3 , Cr_2O_3 , SrSO_4 , BaSO_4 , PbSO_4 ,

6th semester (Paper IX-C, 30M), Duration: 6 hrs.

Practical

Syllabus of Inorganic Practical

A. Preparation of Primary standard solutions ($\text{K}_2\text{Cr}_2\text{O}_7$, Oxalic Acid)

Preparation of Secondary Standard solutions (KMnO_4 , $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$, Mohr Salt soln.)

1. Standardization of Mohr Salt and estimation of Iron (Fe^{2+})



2. Standardization of Sodium thiosulphate and estimation of copper (Cu^{2+})
 3. Standardization of KMnO_4 and estimation of calcium (Ca^{2+})
 - B. Mixture separation:
 1. Estimation of Fe^{3+} and Cu^{2+} in a mixture iodometrically
 2. Estimation of Fe^{3+} and $\text{Cr}_2\text{O}_7^{2-}$ in a mixture dichrometrically
 - C. Complexometric estimation using EDTA as secondary standard and zinc acetate as primary standard
 1. Calcium and Magnesium in a mixture.
- Spectrophotometric estimation of: Fe^{2+} , Cr^{6+} , Mn^{7+} (any two)

6th semester (Paper X-D, 20M), Duration: 4hrs

Practical

1. Total manganese in a pyrolusite
2. Iron in cement
3. Alloy Analysis– Copper in Brass
4. Ore Analysis— Calcium and Magnesium in Dolomite
5. Hardness of water complexometrically [Analysis of water-As As^{3+} , F^- spectrophotometrically (Not for evaluation)].
6. Estimation of Aniline
7. Estimation of Vit. C
8. Estimation of Glycin
9. Gravimetric Analysis— Estimation of Cl^- , Ni^{2+} , SO_4^{2-} .
- 10 Estimation of phosphate in cold drinks
11. Column chromatography.

Semester 4

(Paper IVD, 25M)

Experiments based on Physical Chemistry – I [25M – one experiment is to be performed]

1. Determination of solubility of sparingly soluble salts in water and various Electrolyte medium by titrimetric method. KHTa as sparingly soluble salt in water, KCl, NaNO_3 may be used.
2. Determination of pH of an unknown solution by colour matching method.
3. Determination of the rate constant for the first order acid catalyzed hydrolysis of an ester (V_0 and V_∞ be supplied).
4. Determination of rate constant of decomposition of H_2O_2 by acidified KI solution using clock reactions.
5. Conductometric titration of HCl-AcOH mixture; dibasic acid.
6. Determination of equilibrium constant for $\text{KI} + \text{I}_2 = \text{KI}_3$, using partition coefficient method.
7. Determination of Solubility of a sparingly soluble salt, conductometrically.

A separate laboratory workbook should be maintained for this practical course.

Semester 5

Experiments based on Physical Chemistry – II[40M – one experiment is to be performed]

Experiments based on Physical Chemistry – II

1. To study the kinetics of inversion of sucrose using polarimeter.
2. Determination of Surface tension of an unknown liquid by relative method.
3. Determination of Viscosity of an unknown liquid by relative method.



4. Determination of pK values of weak monobasic, dibasic and polybasic acid by pHmetric method (e.g. HCl+acetic acid, oxalic acid, phosphoric acid, etc.).
 5. Determination of ionization constant of a weak acid by conductometric method.
 6. To study the kinetics of saponification of ester by conductometric method.
 7. Determination of E_0 of Fe^{+3}/Fe^{+2} couple in the hydrogen scale by potentiometric titration of ferrous ammonium sulfate solution using $KMnO_4$, or, $K_2Cr_2O_7$ as standard.
 8. Determination of concentration of (i) $AgNO_3$ solution and (ii) solubility product of $AgCl$ by potentiometric titration of standard KCl solution against $AgNO_3$ solution.
 9. New experiment (to be proposed)
- A separate laboratory workbook should be maintained for this practical course.

Semester 6

1. Study of the kinetics of the reaction $I_2 + S_2O_8$ - by colorimetric method.
 2. Determination of pK_{in} of an indicator by spectrophotometric method.
 3. To study the Lambert-Beer's law
 4. To study the phase diagram of a binary system (Phenol + water) and the effect of impurities (e.g. NaCl).
 5. Determination of CMC from micellization (conductometric)
- A separate laboratory workbook should be maintained for this practical course

b. Computer Science

Paper – *CMSA102 (Practical)* MARKS: 25

Group A: Digital Laboratory: (Full Marks: 10)

Combinational Circuits:

Study the functionalities & applications of - IC 7483, (IC 74153 and/or IC 74151) (IC74155 and/or IC 74138), IC 7485.

Use of seven segment display unit with driver chip.

Study of IC 7489 and applications. Horizontal and Vertical expansion.

Sequential Circuits:

Study the functionalities & applications of IC 7476, IC 74194, IC 74193.

Group B: C Programming Laboratory: (Full Marks: 15)

Problems should cover basic features of the Language.

Paper – *CMSA202 (Practical)*

Group A: Numerical Laboratory: (Full Marks 10, Credit: 1)

Implementation of various Numerical problems using SKYLAB/OCTAVE/C Programming.

Group B: Data Structure-I Laboratory: (Full Marks 15, Credit: 2)

Implementation of applications and problems related to: Arrays, Linked Lists, Stack, Queue, Searching and Sorting;

Paper – *CMSA302 (Practical)* MARKS: 25

Group A: Object Oriented Programming Lab: :(Full Marks: 10, Credit: 1)

Problems should cover basic features of the Language.

Group B: Data Structure-II Laboratory: :(Full Marks: 15, Credit: 2)

Implementation of applications and problems related to: Tree and Hashing.

Paper – *CMSA402 (Practical)* MARKS: 25



Group A: Graph Algorithm Lab :(Full Marks 10)

Implementation of Graph algorithms: BFS, DFS, Prim's Algorithm, Kruskal's Algorithm, Floyd's

Algorithm, Floyd-Warshall Algorithm, Dijkstra's Algorithm.

Group B: Linux Shell and System Programming Lab: (Full Marks 15)

Shell Programming :Concept and simple programming problems.

Linux system calls, IPC problems, use of semaphore for synchronization problems.

Paper – CMSA502 (Practical)MARKS: 100

Group A: Database management Laboratory: (Marks 40)

Introduction of SQL, PL/SQL;

Group B: Assembly Language Programming & I/O Interfacing: (Marks 40)

Experiment with 8085A based micro computing kits + 8086 simulators

☐ Data movement between register – register, register-memory, memory-memory. ☐

☐ Arithmetic operations ☐ on single byte, word and multi-byte integer, signed and

Ordered arrangement of a set of operands.☐

Sorting, Replacement, Searching. ☐

Block and transfer. ☐

Parity Generator.☐☐☐

Delay Routines.☐☐☐

Interfacing :

Display of Alphanumeric Characters on 7 segment displays.☐☐☐☐☐

Matrix Keyboard Interfacing and Identification of the keys.☐☐☐☐☐

Group C: GUI Development Laboratory: (Marks 20)

Using C#.net / Java

Paper – CMSA602 (Practical)MARKS: 100

Group A: Network Programming: (Marks 25)

Fundamental ideas on client-server programming using socket.

Group B: Web programming: (Marks 25)

Basic Web Programming using HTML, Javascript, CSS.

Group C: Project Work: (Marks 50)

C. Industrial Chemistry

Laboratory Practical & Sessional [Full Marks -25]

Inorganic & Analytical Chemistry

A) Detection of some important ions/radicals

Ag^+ , Pb^{+2} , Cu^{2+} , Cd^{2+} , As^{3+} , Al^{3+} , Fe^{3+} , Cr^{3+} , Ni^{2+} , Mn^{2+} , Co^{2+} , Mg^{2+} , Cl^- , NO_3^- , SO_4^{2-} , $\text{S}_2\text{O}_3^{2-}$, PO_4^{3-} , F^- , BO_3^{3-}

B) Quantitative Chemical Analysis of Ores and Alloys

Ores - Limestone, Dolomite, Pyrolusite.

Alloys - Cu in Brass, Cr and Mn in steel.

Organic Chemistry

Experiment: Qualitative analysis of single solid organic compounds

A. Detection of special elements (N, Cl, S) by Lassaigne's test

B. Solubility and Classification (solvents: H_2O , 5% HCl, 5% NaHCO_3 , 5% NaOH)

C. Detection of the following functional groups by systematic chemical tests:



Aromatic amino ($-\text{NH}_2$), aromatic nitro ($-\text{NO}_2$), Amide ($-\text{CONH}_2$, including imide), Phenolic – OH, Carboxylic acid ($-\text{COOH}$), Carbonyl ($>\text{C}=\text{O}$); only one test for each functional group is to be reported.

Each student, during laboratory session, is required to carry out qualitative chemical tests for all the special elements and the functional groups in known and unknown (at least 5) organic compounds.

Materials Science

Synthesis of pure and rare earth nano materials through sol-gel technique.

Characterization of synthesized materials by XRD, FTIR and FESEM/HRTEM

Photoluminescence study of rare earth doped materials for solid state lighting applications.

Unit I- Fuels & Furnace Lab

[Marks 40]

Determination of Flash Point, Fire Point, Kinetic Viscosity of oil, Proximate analysis of coal, Calorific value of Solid Fuel.

Unit II- Unit Process Laboratory

[Marks 30]

One example of: Nitration, Oxidation, Partial reduction, Esterification, Polymerization.

Unit III: Industrial/Plant training & reporting

[Marks 30]

Detailed report on Industrial training.

Unit I- Chemical Engineering Laboratory

[Marks 30]

1) Study the Flow measurement: Venturimeter, Orifice meter, Pitot tube, Rotameter, Water-meter.

2) Double pipe Heat Exchanger:

3) Temperature measurement set-up: Study of Temperature sensors (Mercury in glass, Bimetal, RTD, Thermistor, Thermocouple), Characteristics of RTD, Thermistor and Thermocouple, Study & calibration of temperature indicator and temperature transmitter, Study of Seebeck effect, Time constant of glass thermometer and bimetal thermometer. Time constant of RTD, Thermistor, Thermocouple.

4) Study the various kind of pressure gauge:

Unit II: Project work

[Marks 50]

Unit III: Presentation of Seminar

[Marks 20]

Topic for presentation will be different from the topic highlighted in the industrial/Plant visit report. Evaluation will be based upon the following points:

- (i) Contents;
- (ii) Mastery of the subject;
- (iii) Delivery & Gesture;
- (iv) Contact with Audience;
- (v) Handling of the questions.

The presentation will be evaluated by one internal and the external examiner of the paper concerned.

d. Physics

Core Course I (Lab), Marks 50

Internal Assessment 25 (Regular Assessment 20, LNB 5); Examination 25

1. Determination of the volume of a solid cylinder by slide callipers and find out the density of the material by measuring the mass of the cylinder.
2. Determination of external diameter of a capillary tube by screw gauge and internal diameter by travelling microscope.



4. Determination of radii of curvature of both the surface of a concave/convex lens by spherometer and estimation of the focal length of the lens (*r.i.* is known).
5. Determination of the value of resistance of carbon resistor by colour code and checking their actual values with the help of digital meter. Estimation of the equivalent resistance of some combinations of carbon resistance on bread board.
6. Determination of the modulus of rigidity of the material of the given wire by dynamical method.
7. Determination of the moment of inertia of a rectangular body about an axis passing through its centre of gravity and perpendicular to its length. Using a cylinder as known body, compare the value of moment of inertia thus obtained with theoretical value calculated with the measured mass and dimensions of the rectangular body.
8. Determination of the coefficient of linear expansion of the material of the given metallic rod using an optical lever.
9. Study the variation of pressure with temperature [from room temp to 60° C] of a given mass of air at constant volume. Draw the pressure temperature graph and hence calculate the pressure coefficient of air using two points from the graph within the observed region. Readings will be taken at intervals of 5 or 6°C.
10. Determination of the refractive index of a liquid and that of the material of the convex lens supplied by using the lens and a plane mirror.
11. Determination of the focal length of the given concave lens by combination method. Focal length of the given convex lens and that of its combination with the given concave lens are to be measured by displacement method for three distances between the object and the screen and each consecutive distance between the object and the screen should differ by 4 or 6 cm.
12. Determination of the unknown frequency of a tuning fork with the help of a sonometer by $n-l$ curve and/or $n-1/l$ curve. [The resonating length of the sonometer wire for tuning forks of at least five different frequencies are to be recorded].
13. Draw the current-voltage characteristics of an ordinary p-n junction diode in forward biased condition with experimentally obtained data. From the graph estimate the dynamic resistance of the diode for three different currents. Indicate the cut-in voltage of the diode.
14. Determination of the resistance per unit length of the bridge wire by Carey Foster's method. Then determine the resistance of an unknown resistor.
15. Verification of Stefan's law.

Course Core II (Lab), Total Marks 50

Internal Assessment 25 (Regular Performance 20, LNB 5); Examination 25

1. Determination of Young's modulus of the material of a given uniform bar by the method of flexure.
2. Determination of the coefficient of viscosity (η) of water by Poiseuille's Method.
3. Measurement of g by Kater's Pendulum (New)
4. a) Study of the nature of the dependence of the dipolar field of a short bar magnet placed at a distance d using a deflection magnetometer b) Determination of the horizontal component of earth's magnetic field using vibration magnetometer.
5. Determination of the wave length of the incident light source by Newton's ring method.
6. Determine the Fourier spectrum of the output from the amplifier using CRO
7. Determination of internal resistance of micro ammeter and conversion of micro ammeter into voltmeter, milli-ammeter .
8. Single slit experiment by LASER



9. Verification of Malu's Law

e. Microbiology

SEM I

1. Operation of light microscope, use of oil immersion objective (3)
2. Preparation of culture media: Complex media (Nutrient broth, Nutrient agar (slant, lactose broth), chemically defined media (CzapekDox media), YEPD/Selective medi potato-dextrose-agar (PDA) medium (12)
3. Cultivation of microorganisms: Streaking on agar slant/agar plate of Bacteria (*Bacillus subtilis*, *Staphylococcus aureus*, *Escherichia coli*), Yeast (*Saccharomyces cerevisiae*), and Moulds (*Penicillium notatum*, *Aspergillus niger*) (12)
4. Study of microorganisms by staining techniques: Preparation of heat fixed smear of bacteria. Simple staining (*B. subtilis*, *S. aureus*) and Gram staining (Gram-positive: *B. subtilis*, *S. aureus*, *Micrococcus luteus*; Gram-negative: *E. coli*, *Klebsiella aerogenes*) (18)
5. Study of algae by temporary mounts- *Chlamydomonas* and *Spirogyra* (6)
6. Study of fungi following lactophenol-cotton blue staining- *Mucor*, *Saccharomyces*, *Aspergillus* and *Penicillium* (6)
7. Isolation of pure culture: by Streak and pour-plate method (12)
8. Micrometry: Microscopic measurement of bacterial cell (*B. subtilis*), Yeast (*S. cerevisiae*), and fungal spores (*P. notatum*, *A. niger*) (6)
9. Spot Identification (3)
 - Bacteria- *Streptococcus*, *Sarcina*, *Bacillus*, *Spirillum*, *Vibrio*
 - Cyanobacteria- *Nostoc*, *Anabaena*, *Oscillatoria*
 - Algae- *Chlamydomonas*, *Volvox*, *Spirogyra*
 - Fungi- *Mucor* (sporangia, zygospore), *Saccharomyces* (budding), *Aspergillus* (conidia) *Penicillium* (conidia), *Neurospora* (ascus), *Puccinia* (uredospore and teleutospore), *Helminthosporium* (conidia).
 - Protozoa- *Entamoeba*, *Plasmodium*, *Giardia*, *Paramecium*

SEM II

1. Qualitative tests for carbohydrates (glucose, fructose, sucrose) proteins and lipids (6)
2. Separation of amino acids (lysine, glycine, tryptophan, proline) by thin layer chromatography (6)
3. Separation of lipids by thin layer chromatography (6)
4. Estimation of amino acid (glycine) by formol titration (6)
5. Determination of partition coefficient of acetic acid between n-butanol and water (6)
6. Staining of capsule (*Klebsiella aerogenes*) and endospore (*Bacillus subtilis*) (9)
7. Enumeration of microbes (yeast) by haemocytometer (6)
8. a) χ^2 analysis: Testing goodness of fit, contingency and homogeneity chi-square tests; t-test for analysis of experimental samples (12)
b) Study of Poisson distribution of microbes in a sample (e.g. bacteria in a sample of water collected from a reservoir) using haemocytometer (9)

SEM III

1. Isolation of pure culture from natural resources:
 - a) Microbes from air by agar exposure method



- b) Algae from soil or water by suitable method
- 2. Microbiological examination of water (drinking water /supply water/pond water):
Multiple tube fermentation test method for detection of coliform bacteria
 - a) Presumptive test
 - b) Confirmatory test
 - c) Completed test
- 3. IMViC reactions
- 4. Microbiological assay of antibiotics: Antibiotic sensitivity test by paper disc and cup-plate method
- 5. Determination of Minimal Inhibitory Concentration (MIC) by serial dilution method for assaying commonly used antibiotics (using appropriate test bacteria)
- 6. Biochemical activities of microorganisms
 - a) Carbohydrate fermentation
 - b) Triple sugar-iron agar test
 - c) Hydrogen sulfide test
 - d) Gelatinase production test
 - e) Urease test
 - f) Nitrate reduction test
 - g) Catalase test
 - h) Oxidase test
- 7. Measurement of growth by turbidometry.
- 8. Isolation of mutants of bacteria by UV exposure.

SEM IV

- 1. Microbiological examination of milk: By methylene-blue dye reduction test;
- 2. Isolation of pure culture from natural resources:
 - a) Bacteria from soil by serial dilution and pour-plate/spread plate method
 - b) Yeast from rotten banana or apple by streak plate method
 - c) Molds from infected citrus fruit by streak plate method
- 3. Isolation, ammonium sulphate precipitation and quantitative estimation of protein by Folin-Lowry method
- 4. Isolation of Protease, Amylase, Phosphatase producing microorganisms from soil
- 5. Microbial quality study of fresh salad vegetables using dilution plating technique
- 6. Observation of the stages of cell division and mitotic chromosomes
- 7. Stain and identify the VAM from root samples.

SEM V:

A. Molecular Biology

- 1. Isolation of bacterial genomic DNA and analyze it through agarose gel-electrophoresis.
- 2. Isolation of plasmid DNA (*E. coli*-DH5 α) by using a standard protocol; gel-electrophoresis (Agarose gel); quantification of DNA and purity
- 3. Isolation of RNA from yeast or bacteria and analyze it through agarose gel electrophoresis.
- 3. Transformation of *E. coli* using standard protocol and calculation of transformation efficiency [18]
- 4. Restriction digestion of plasmid DNA [12]
- 5. Determination of Progress curve, K_m & V_{max} of the enzyme α - amylase. [12]



6. Determination of Progress curve, pH optima, Km & Vmax, effect of activators and inhibitors of the enzyme alkaline phosphatase. [9]
7. Standard curve of reducing sugar (Maltose) and p-nitrophenol. [6]
8. Bioinformatics Practicals
- I. Retrieval of Protein Sequence and Nucleotide Sequences
 - II. Retrieval of Protein Structure from PROTEIN DATA BANK and visualization using RasMol
 - III. Similarity Search using BLAST and FASTA
 - IV. Pair wise Sequence Alignment Using EBI
 - V. Multiple Sequence Alignment Using CLUSTAL W
 - VI. Phylogenetic analysis of retrieved sequences
 - VII. Restriction mapping

SEM VI

1. Antigen-Antibody interaction:
 - i) Agglutination (blood typing) [8]
 - ii) Ouchterlony's double diffusion method [10]
 - iii) Mancini's radial Immunodiffusion technique [10]
 - iv) Immunoelectrophoresis
 - v) VDRL and WIDAL test
- [12]
2. Project/Review
 3. Grand Viva

f. Zoology

Semester 1:

Paper I: Laboratory Course: Core Course 02

(Full Marks – 50)

Demonstration including mounting & preparation; identification of non-chordate specimens; Cytology Practical for Module 2:

Cytology: (Two) Demonstration and description of compound microscope; Measurement of size (length/breadth) by micrometry of any Cell/organ/protozoa; Study of meiotic stages from Grasshopper. Separation of nucleic acid bases by Thin Layer chromatography (15 marks)

1. Practical for Module 1:

- a) **Study of internal organ systems** of two non-chordate specimens (*Periplaneta* & *Pila*) (*Periplaneta*: Nervous system, Digestive system, Reproductive systems; *Pila*: Digestive system, Nervous system). (10 marks)
- b) **Mounting and preparation** (one): Mouth parts of cockroach; Radula & Osphradium of *Pila*. (5 marks)
- c) **Identification of Non Chordate Specimens with systematic position upto Genus** (three) *Plasmodium vivax*, *Paramoecium*, *Scypha*, *Obelia*, Sea-anaemone, *Amoeba* sp. etc.



- Nereis, Heteronereis, Sabella, Serpula, Chaetopterus, Pheretima, Hirudinaria, Ascaris, Hirudinaria,*
- d) *Scorpion, Limulus, Palamnaeus, Palaemon, Daphnia, Balanus, Sacculina, Bombyxmori, Lamellidens, Achatina, Loligo, Chiton, Dentalium, Starfish, Cucumaria, Antedon*
(7.5 marks)
2. **Lab Note Book** (7.5 marks)
3. **Viva voce** (5 marks)

Semester 2:

Paper II: Laboratory Course: Core Course 4

(Full Marks – 50)

Internal organ systems of Chordates; Identification of Chordate Specimens; Genetics; Developmental Biology & Osteology

1. **Practical for Module 3:**

- a) **Study of internal organ systems** of a chordate specimens (Lata: afferent and efferent, brain, cranial nerves (IXth and Xth - origin and distribution).
(10 marks)
- b) **Mounting and preparation** (one) (5 marks)
- i) Placoid scale of *Scoliodon* sp, and Ctenoid scale of fin fish.
 - ii) Olfactory apparatus of *Oreochromis*.

c) **Identification of Chordate Specimens with systematic position upto Genus** (two)

Branchiostoma, Petromyzon, Labeo, Anabas, Exocoetus, Scolidon, Rhacophorous, Ichthyophis, Necturus, Varanus, Draco, Axolotl larva, Tylototriton, Hemidactylus, Naja, Chiroptera.
(5 marks)

- d) **Identification of bones with reasons:** (a) Skull of *Calotes*, a poisonous snake, *Chelonia, Columba, Cavia* (b) Vertebrae of *Columba & Cavia* (c) Appendicular bones of *Columba & Cavia* (d) Girdle bones of *Columba & Cavia* (5 marks)

2. **Practical for Module 4:** (two) (5 marks)

- a. Chick - Study of developmental stages - primitive streak, 21h, 24h, 28h, 33h, 36h, 48h, 72h, 96h by raising chick embryo in the laboratory.

3. **Practical for Module 5:** (two) (10 marks)

- a. Mendelian laws and gene interaction using *Drosophila* crosses.
- b. Study of Linkage, recombination, gene mapping using marker based data from *Drosophila*.
- c. Study of Human and *Phlox/Allium* Karyotype (normal and abnormal).
- d. Pedigree analysis of some human inherited traits.
- e. Preparation of Polytene Chromosome form *Drosophila* larva

4. **Lab Note Book & Viva-voce** (10 marks)

Semester 3:

Paper III: Laboratory Course: Core Course 6

(Full Marks – 50)

Genomics & Proteomics; Ecology

1. **Practical for Modules 6 & 7:**

- (a) Determination of population density in a terrestrial community or hypothetical community by quadrat method and calculation of the Simpson's and Shannon-

Weiner diversity index for the same community.

(15 marks)

(b) Principles of GPS

(c) Study of the life table and fecundity table, plotting of the three types of survivorship curves from the hypothetical data.

(d) Use of pH meter for estimation of pH in water and soil samples

(e) Identification of soil arthropods & Zooplanktons

2. **Practical for Module 8:**

(a) Protein isolation & gel electrophoresis (SDS & Native PAGE); Western Blot Technique

(b) Isolation of DNA & quantification by Agarose Gel Electrophoresis

(c) Multiplication of the isolated DNA by using PCR

(15 marks)

2. **Lab Note Book & Viva-voce**

(10 marks)

3. **Field Note Book & Viva-voce**

(10 marks)

Semester 4:

Paper IV: Laboratory Course: Core Course 8

(Full Marks – 50)

Immunology; Biochemical Assays & Analysis; Biostatistics

Immunology:

(Full marks 12)

- Dissection and display of lymphoid organs.
- ABO blood group determination.
- Preparation of single cell suspension of spleen.
- Viability and cell counting of peritoneal macrophages.
- Immuno-electrophoresis.
- To perform Enzyme-linked immunosorbent assay (ELISA) (no quantification required)

2. **Enzymology:**

(Full marks 8)

- Study of the action of salivary amylase at optimum condition.
- Effect of pH on the action of salivary amylase.
- Effect of temperature on the action of salivary amylase.
- Effect of inhibitor on the action of salivary amylase.
- Study the activity of Trypsin using fresh tissue extracts.

Qualitative techniques:

(Full marks 10)

Qualitative tests for Carbohydrate (Starch, Sucrose, Maltose Fructose, Glucose), Protein (Albumin, Gelatin, Peptone), fat, uric acid (in Alkaline solution) and urea (Tests to be performed – Red Litmus Test, Hypobromite test, Biuret test, Millon's test, Iodine test, Benedict's test, Barfoed test, Seliwanof's test); Quantitative Techniques - Colorimetric estimation of total protein in the given solution.

Biostatistics:

(Full marks 10)

- Experimental project work and Data Analysis – Mean, Mode, Median, Probability, Hypothesis testing (Chi-square, t-test. Correlation test)
- Measures of central tendency. Measures of dispersion; skewness, kurtosis. Elementary Probability and basic laws.
- Normal distribution. Sample mean and Sampling variance. Hypothesis testing using standard normal variate, ANOVA

5. **Lab note Book & Viva voce(Full marks 10)**



Semester 5:

Paper V: Laboratory Course Core Course 10 (Full Marks – 75)

Animal physiology & Functional Histology; Integration Biology & Homeostasis; Tools & Techniques of Biotechnology

1. Practical for Modules 14 & 15: (Full marks 30)

- (a) Enumeration of red blood cells using haemocytometer.
- (b) Recording of blood pressure using a sphygmomanometer.
- (c) Identification of stages of oestrous cycle in white rat
- (d) Examination of sections of mammalian oesophagus, stomach, duodenum, ileum, rectum, liver, spleen, trachea, lung, kidney.

2. Practical for Module 16:(Full marks 30)

- (a) Transformation of *E.coli*(pUC 18/19) and calculation of transformation efficiency; Plasmid DNA isolation (pUC 18/19) and DNA quantitation using agarose gel electrophoresis (by using lambda DNA as standard).
- (b) Restriction digestion of lambda (λ) DNA using *EcoRI* and *Hind III*.
- (c) DNA ligation (lambda DNA *EcoRI/Hind III* digested).
- (d) Restriction digestion (pUC 18/19) with *EcoRI* and ligation of linear pUC 18/19 DNA with *EcoRI*-digested lambda (λ) DNA.
- (e) Transformation with ligated DNA in *E.coli* and selection of transformants on X-gal and IPTG.
- (f) Separation of proteins by SDS-PAGE.
- (g) To perform dry lab experiments using data to demonstrate the significance of various enzymes like alkaline phosphatase, frequent cutters etc.

3. Lab note Book & Viva voce

Semester 6:

Paper VI: Laboratory Course Core Course 11 (Full Marks – 75)

Adaptation, dissertation, local excursion and grand viva voce:

Adaptation:

(15 marks)

Study of animals from museum specimens to analyze adaptive features for cursorial, aquatic, desert, volant and deep sea adaptations, Preparation of taxonomic keys.

Dissertation: Review assignment and its defence

(25

marks)

Local excursion: Applied zoology centres

(10

marks) **Lab Note Book & grand viva voce**

(25

marks)

5. List of Practicals as mentioned above are done by students as mentioned earlier.

6. List of Institutes willing to offer training :

- a) IACS-Kolkata



- b) CGCRI-Kolkata
- c) IICB-Kolkata
- d) IISER-Kolkata
- e) Jadavpur University-Kolkata
- f) TCG Life Sciences Ltd, Haldia

7. List of Teachers with area of Specialization, Training.

Sl. No.	Subject	Name	Duration of Training
1	Physics	Rajesh Karmakar	21 days summer training
2	Chemistry	Asadulla Mallick	21 days summer training
3	Microbiology	Diptendu Sarkar	21 days summer training
4	Computer Science	Atanu Mondal	21 days summer training
5	Industrial Chemistry	Uttam Kumar Ghorai	21 days summer training
6	Zoology	Abhinaba Sihna	21 days summer training

8. New Practicals Proposed to be introduced :

a. Chemistry and Industrial Chemistry :

- Small scale reaction in micro oven
- Estimation of metal ion mixture
- Nanomaterial Preparation and purification by Digital Electronic balance, Vacuum Oven with pump and probe sonicator
- Study the electronic transition and band gap of synthesized Organic and Inorganic product with the help of double beam UV-Visible spectrophotometer

b. Computer Science :

- Inclusion of software development in Android platform.
- Combinatorial Optimizations and Web scrapping
- Compiler design with laboratory based approach
- Introducing Python

c. Microbiology and Zoology :

- Propagation of Animal Cell culture to understand the morphology and functions of various animal cells
- Maintenance of animal cell lines and checking its viability maintenance of specific animal cell lines and testing the effect of different molecules(drugs) on cultured cells
- Preservation of microbiological cultures to preserve various important microbial cultures for future use

d. Physics :

- Inclusion of Double Slit experiment
- Set up for Balmer Series and Rydbarg Constant Measurement

- Set up for Frank-Hertz Experiment
 - Geiger Muller Counter
 - Set up for the measurement of resistivity of bulk material
 - Measurement of Di-electric Constant at different frequencies
- Measurement of magnetic field apparatus

9. DBT Grant will be used for purchase of new equipment and consumables and for other activities as specified below.

Budget Proposed by Chemistry and Industrial Chemistry

Equipment : 10 Lakhs

No	Name of the equipment	Quantity	Rs
1	Double beam UV-Visible spectrophotometer	1	500,000.00
2	Vacuum Oven with pump	1	70,000.00
3	Digital Electronic balance MG (0.001gm)	2	40,000.00
4	Probe Sonicator	1	130,000.00
5	Centrifuge Machine	2	50,000.00
6	Mechanical Shaker	2	50,000.00
7	Microwave Oven	2	30,000.00
8	Visible spectrophotometer	1	130,000.00

Recurring :

Recurring (consolidated, not exceeding 3 lakhs)	Year 1	Year 2	Year 3
Training	0.25 lakhs	0.25 lakhs	0.25 lakhs
Consumables	2.5 lakhs	2.5 lakhs	2.5 lakhs
Faculty improvement programme	0.25 lakhs	0.25 lakhs	0.25 lakhs
Total	3 lakhs	3 lakhs	3 lakhs



• **Budget Proposed by Computer Science :**

Equipment : 10 Lakhs

Items	Quantity	
<u>Dell Commercial Desktop 5050 MT, Core i5 7500 7th Gen</u>	13	644280.00
<u>Windows 10 Pro OLP NL Genuine</u>	13	126555.00
<u>Canon Multifunction Printer (Model 241D)</u>	1	15,222.00
<u>600 VA UPS (Model BX 600C – IN)/ 2 years warranty</u>	13	31,907.00
<u>HP Pro G1 MT Desktop, Core i7 8700 7th Gen</u>	3	1,75,230.00

Recurring :

Recurring (consolidated, not exceeding 3 lakhs)	Year 1	Year 2	Year 3
1. Training	1 lakh	1 lakh	1 lakh
1. Consumables	1 lakh	1 lakh	1 lakh
1. Faculty improvement programme	1 lakh	1 lakh	1 lakh
Total	3 lakhs	3 lakhs	3 lakhs

• **Budget Proposed by Microbiology and Zoology :**

Equipment : 10 Lakhs

Sl. No.	Instrument name	Quantity	Total price (INR)
1.	Vertical laminar air flow hood	1	2,00,000
2.	CO ₂ incubator with CO ₂ supply	1	6,00,000
3.	-20°C refrigerator	1	1,00,000
4.	Pipetteman	20	1,00,000

Recurring :

Recurring (consolidated, not exceeding 3 lakhs)	Year 1	Year 2	Year 3
1. Training	0.25 lakhs	0.25 lakhs	0.25 lakhs
1. Consumables	2.5 lakhs	2.5 lakhs	2.5 lakhs
1. Faculty & NT Staff improvement programme	0.25 lakhs	0.25 lakhs	0.25 lakhs
Total	3 lakhs	3 lakhs	3 lakhs



• **Budget Proposed by Physics :**

☐ Equipment : 10 Lakhs

Name of the Equipments	Quantity	Total Price in Rs.
Function Generator (Scientific Make)	4 pcs	60,000.00
Digital Oscilloscope (Scientific Make)	4 pcs	1,20,000.00
Set up for the measurement of charge by Millikan's Oil Drop Method (SES Roorkee make)	1 pcs	50,000.00
True RMS AC Millivoltmeter (SES Roorkee Make)	3 pcs	45,000.00
Set up for the Double slit experiment by He-Ne LASER (Osawa make)	1 pc	80,000.00
Digital Multimeter (Scientific Make)	10 pcs	20,000.00
Set up for the Balmer series and Rydberg constant measurement (Osawa make)	1 pc	35,000.00
Set up for Frank Hertz Experiment (SES Roorkee Make)	1 pc	42,000.00
Digital GM counter (Osawa make)	1 pc	65,000.00
ExpEyes - 17	2 pc	10,000.00
Set up for the measurement of resistivity (low to high value) of bulk material by four probe method at different temperatures (Research model) (SES Roorkee Make)	1 pc	62,000.00
Measurement of Dielectric constant, model – DEC-600 (SES Roorkee Make)	1 pc	60,000.00
Magnetic field measurement apparatus model- MFM-01 (SES Roorkee Make)	1 pc	25,400.00
Apparatus for the study of modulation and demodulation (SES Roorkee Make)	1 pc	4,000.00
Set up for the Ionization potential measurement (SES Roorkee Make)	1 pc	42,000.00
Magnetic Levitation System (Osawa make)	1 pc	30,000.00
Apparatus for PE-Hysteresis loop of Ferro electric crystal (SES Roorkee)	1 pc	1,50,000.00
Computer for computational laboratory	4 pcs	1,00,000.00

Recurring (consolidated, not exceeding 3 lakhs)

Recurring (consolidated, not exceeding 3 lakhs)	Year 1	Year 2	Year 3
1. Training	1 lakh	1 lakh	1 lakh
1. Consumables	1 lakh	1 lakh	1 lakh
1. Faculty improvement programme	1 lakh	1 lakh	1 lakh
Total	3 lakhs	3 lakhs	3 lakhs



**10. List of specific books/journals proposed to be purchased
Not Required.**

11. Any Other Activities :

a. Minor Research Projects to be Introduced :

- i. Development of Efficient Nano-Phosphor for Solid State Lighting Application
- ii. Synthesis and Characterization of Metal Nano Particles (Copper, Gold, Silver) to study their Anti-bacterial properties
- iii. Design and Fabrication of Cost-effective Portable device for detection of contaminants (Cr-VI, Fe, F⁻ drinking water

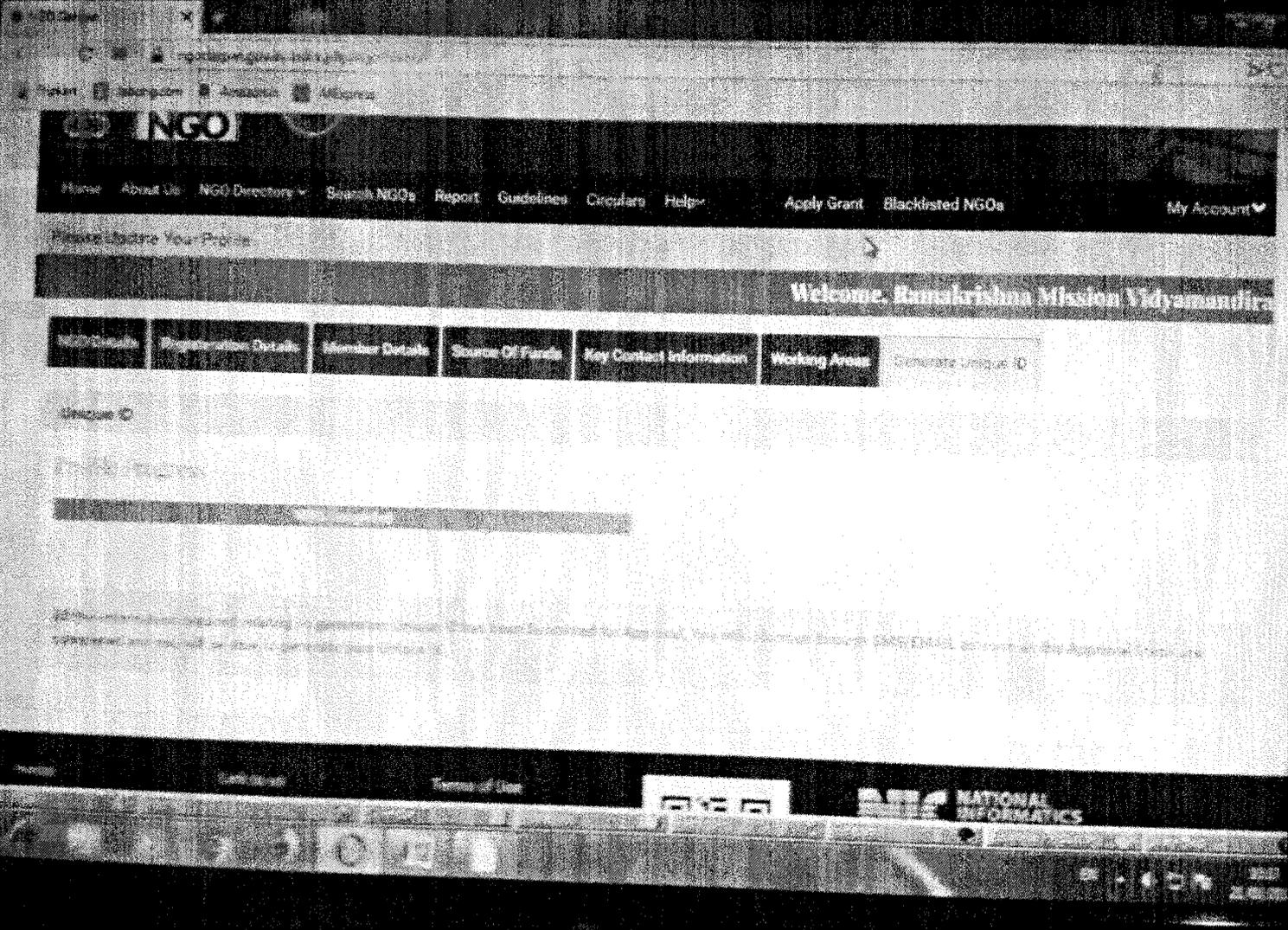
b. Faculty Improvement Programmes:

- i. Training on different tools of Bioinformatics to understand and compare nucleic acids and proteins of various samples to interpret their taxonomical position and relation
- ii. Training to use Matlab which provides a single, integrated environment to support bioinformatics, systems biology, bioimage processing, and biostatistics. It can predict biological behavior using data analysis and mathematical modeling. Computational biology products of Matlab can be used to import, analyze and model data, to customize algorithms and tools critical to developing innovative methods for working with unexplored research areas
- iii. Training to learn the advance techniques to use the high-end equipment like X-Ray Diffractometer (Bruker), Spectrofluorophotometer (Edinburg), Thermogravimetric analyzer, Automated Surface Area & Pore Size Analyser etc.

c. Inter-Disciplinary Activities

- i. At Least 3 Conferences for all science students and faculties of this college as well as of other institutions on the Researches on the use of nano-materials in different applications of life sciences, chemical sciences and physical sciences.
- ii. Hands-on training-cum-workshops for the students of all science departments of the college and also of other colleges of neighboring districts for introducing them with different instruments and their applications which they study in their theoretical papers. These instruments are either already present in our college or will be procured out of the funds, if sanctioned, of this scheme.
- iii. Conferences and/or Workshops may be arranged on Bio-inspired computing which is aimed at solving problems using computer models in the areas like Genetic algorithms, Neural networks, Artificial immune systems, Membrane computing, swarm intelligence can be used to solve problem in biological sciences and chemical sciences.





Required Darpan Unique Id

1 message

Vidyamandira Ramakrishna Mission <vidyamandira@gmail.com>
To: ngo@india.gov.in

21 January 2019 at 11:38

Sir,

We signed up for Darpan Unique Id in your portal. But till now we have not received Darpan Unique Id .
Please send the same immediately through E-mail/SMS.

Thanking you,

Swami Shastrajnananda
Principal
Ramakrishna Mission Vidyamandira
A Residential Autonomous College with CPE status
Belur Math
Howrah
West Bengal
contact : 9432090889
website : www.vidyamandira.ac.in





राम-विद्यालय विद्यामन्दिर



सत्यमेव जयते

विश्वविद्यालय अनुदान आयोग
University Grants Commission
(मानवसंसाधन विकास मंत्रालय, भारत सरकार)
Ministry of Human Resource Development,
Govt. of India)
बहादुरशाहजफरमार्ग, नई दिल्ली - 110 002
Bahadur Shah Zafar Marg, New Delhi - 110 002

UGC Website: www.ugc.ac.in
Ph. 011-23604414 (CPP-I/Colleges)

F.1-1/2016 (CPP-I/C)

September, 2016

The Principal
Ramkrishna Mission Vidyamandir
Belur Math
District Howrah - 711 202
West Bengal

2 SEP 2016

Subject : Recognition of College under Section 2(f) & 12 (B) of the UGC Act, 1956. Reg.

Sir/Madam,

With reference to your e-mail dated 2nd September, 2016 on the above subject, I am to inform you that the name of **Ramkrishna Mission Vidyamandir, Belur Math, District Howrah - 711 202, West Bengal** established in the year of 1941, affiliated to **University of Calcutta, Kolkata** has already been included in the list of Colleges maintained under Section 2(f) & 12 (B) of the UGC Act, 1956 under the head **Non - Government** College teaching upto **Bachelor's Degree**.

Yours faithfully,

Charan Dass
(Charan Dass)
Under Secretary

