From

Dr. Janeeshma E.
The Head of the Department
Department of Botany
MES Keveeyam College, Valanchery

To

The Principal
MES Keveeyam College, Valanchery

Sir,

Sub: Request for the Approval of Certificate Course

The Department of Botany is planning to conduct a Certificate Course on **"Macromolecular visualization using Bioinformatics tools" (KVM/CC/BOT/22-23/02)** of 30 hours duration for the third year UG students. So kindly grant permission for the same.

Thanking you

Yours faithfully,

Dr. Janeeshma E.

MES KEVEEYAM COLLEGE
Valanchery
Date:.....
Dept. of Botany

Place: Valanchery

Date: 12/10/2022

SHAJID P P
ASSISTANT PROFESSOR
IN CHARGE OF PRINCIPAL
M.E.S KEVEEYAM COLLEGE
VALANCHERY, PIN 67...

From

Dr. Janeeshma E.
Head of the Department
Department of Botany
MES Keveeyam College, Valanchery

To

The Principal
MES Keveeyam College, Valanchery

Sir,

Sub: Request for the Approval of Board of Studies for the short Term Course

The following academicians may be included in the Board of Studies for the Short Term Course on **"Macromolecular Visualization using Bioinformatics tools" (KVM/CC/BOT/22-23/02)** to be conducted by the Department of Botany with these members.

1. Dr. Jyothi.P.V, Associate Professor, Department of Botany, MES Ponnani College
2. Dr. Krishna Prabha K. S. , Assistant Professor, Department of Zoology, MES Keveeyam College, Valanchery.
3. Dr. Janeeshma E , Assistant Professor, Department of Botany, MES Keveeyam College, Valanchery.
4. Sruthi mohan C K, Assistant Professor, Department of Botany, MES Keveeyam College, Valanchery.

Thanking you

Yours faithfully

MES KEVEEYAM COLLEGE * Valanchery Date:..... * Dept. of Botany

Dr. Janeeshma E.

Place: Valanchery
Date: 12/10/2022

SHAJID P P
ASSISTANT PROFESSOR
IN CHARGE OF PRINCIPAL
M.E.S KEVEEYAM COLLEGE
VALANCHERY, PIN 676

MES KEVEEYAM COLLEGE
VALANCHERY

P.O.Valanchery, Malappuram Dist, Kerala, Pin:676 552.
Phone : 0494-2642670, 0494 2644380
www.meskeveeyamcollege.ac.in,
principal@meskeveeyamcollege.ac.in

Reaccredited with 'A+' Grade by NAAC (Score 3.44)

Aided by Govt. of Kerala and Affiliated to the University of Calicut
ISO 9001:2015 certified institution

Order No. Acs/2018-19/01 **Date:** 14/10/2022

Proceedings of the Principal, MES Keveeyam College Valanchery

(Present: Prof. Shajid PP)

Ref: (1) Request from the Head of the Department of Botany dt: 12/10/2022
(2) Minutes of Board of Studies meeting for approval of the syllabus dt: 12/10/2022

ORDER

As per reference cited (1), request was received from the HOD, Department of Botany to start a short term course on "**Macromolecular visualization using Bioinformatics tools**" **(KVM/CC/BOT/22-23/02).** In the same letter, the head of the department has recommended a panel of academicians to be included in the Board of Studies.

The department of Botany is hereby given sanction to conduct a short term course on Approaches for environmental awareness and education to the UG students of the college.

The board of studies for the above course is constituted with the following members

1. Dr. Jyothi.P.V, Associate Professor, Department of Botany, MES Ponnani College
2. Dr. Krishna Prabha K. S. , Assistant Professor, Department of Zoology, MES Keveeyam College, Valanchery.
3. Dr. Janeeshma E , Assistant Professor, Department of Botany, MES Keveeyam College, Valanchery.
4. Sruthi mohan C K, Assistant Professor, Department of Botany, MES Keveeyam College, Valanchery

Order is issued accordingly.

MES KEVEEYAM COLLEGE Valanchery Date:..... Dept. of Botany

Prof. Shajid PP

Principal

SHAJID P P
ASSISTANT PROFESSOR
IN CHARGE OF PRINCIPAL
M.E.S KEVEEYAM COLLEGE
VALANCHERY, PIN 676 552

Copy to

1. HOD, Department of Botany
2. File

MINUTES OF BOARD OF STUDIES MEETING

Venue: Department of Botany

Date: 14/10/2022

Agenda: Approval of syllabus of the short term course

Decisions:-

1. Discussions were done on the draft syllabus
2. Suggestions were made to include practical hrs.
3. A one day Field trip has to be included.
4. Approval can be given to syllabus

Members Present:

1. Dr. Jyothi.P.V, Associate Professor, Department of Botany, MES Ponnani College
2. Dr. Krishna Prabha K. S. , Assistant Professor, Department of Zoology, MES Keveeyam College, Valanchery.
3. Dr. Janeeshma E , Assistant Professor, Department of Botany, MES Keveeyam College, Valanchery.
4. Sruthi mohan C K, Assistant Professor, Department of Botany, MES Keveeyam College, Valanchery

SHAJID P P
ASSISTANT PROFESSOR
IN CHARGE OF PRINCIPAL
M.E.S KEVEEYAM COLLEGE
VALANCHERY, PIN 676 552

MES KEVEEYAM COLLEGE
Valanchery
Date:
Dept. of Botany

Macromolecular Visualization using Bioinformatics tools

Course Description: This course focuses on principles and techniques for visualizing macromolecules, such as proteins and nucleic acids, using computational methods and structural biology tools. Students will learn about software applications, visualization techniques, and interpretation of complex molecular structures.

Course Objectives:

1. **Understand Macromolecular Structures:** Gain knowledge of the principles underlying the structure and function of macromolecules.
2. **Learn Computational Tools:** Acquire skills in using computational tools and software for molecular visualization.
3. **Develop Visualization Skills:** Learn techniques for visualizing and manipulating molecular structures in three dimensions.
4. **Interpret Structural Data:** Gain proficiency in interpreting data from structural biology experiments and databases.
5. **Apply Knowledge:** Apply theoretical concepts to real-world examples and case studies in structural biology.

Course Outcomes: By the end of the course, students will be able to:

- Describe the principles of macromolecular structure and function.
- Utilize software tools for visualizing and analyzing macromolecular structures.
- Demonstrate proficiency in manipulating molecular structures in three dimensions.
- Interpret structural data from experimental methods like X-ray crystallography and NMR spectroscopy.
- Apply their knowledge to understand and discuss complex biological processes at the molecular level.

Scheme of evaluation

- Written Examination (Conventional): 40 marks
- Practical : 10 marks
- Total : 50 marks

A Grade: 80% and above, B Grade: 60 – 79%, C Grade: 40 – 59%, below 40% D Grade

M.E.S KEVEEYAM COLLEGE Valanchery Date:..... Dept. of Botany

Dr. Jaseena E

SHAJUTTY I
ASSISTANT PROFESSOR
IN CHARGE OF PRINCIPAL
M.E.S KEVEEYAM COLLEGE
VALANCHERY, PIN-67

Syllabus: Macromolecular Visualization using Bioinformatics tools (30-hour Certificate Course)

Week 1: Introduction to Macromolecular Visualization

- **Introduction to Macromolecules**
  - Overview of proteins, nucleic acids, and complexes
  - Importance of visualization in structural biology
- **Principles of Molecular Visualization**
  - Fundamentals of molecular graphics
  - Visualization techniques and representation of biomolecules
- **Tools and Software Overview**
  - Introduction to popular visualization software (e.g., PyMOL, Chimera, UCSF ChimeraX)
  - Understanding file formats (PDB, CIF, XYZ) and their relevance in visualization

Week 2: Protein Visualization

- **Protein Structure Basics**
  - Protein primary, secondary, tertiary, and quaternary structures
  - Ramachandran plot and dihedral angles
- **Visualization Techniques for Proteins**
  - Ribbon diagrams, space-filling models, and molecular surfaces
  - Using electrostatic potential maps for visualization
- **Case Study: Visualizing Protein-Ligand Interactions**
  - Docking studies and visualization of protein-ligand complexes

Week 3: Nucleic Acid Visualization

- **DNA and RNA Structure**
  - Structural motifs and variations
- **Visualization Techniques for Nucleic Acids**
  - Helical representations, backbone traces, and base-pair interactions
  - Visualizing nucleic acid-protein complexes
- **Case Study: RNA Structure Prediction and Visualization**

Week 4: Macromolecular Complexes and Advanced Techniques

- **Complexes and Assemblies**
  - Visualizing macromolecular complexes and assemblies
  - Techniques for analyzing dynamic structures (molecular dynamics simulations)
- **Visualization of Membrane Proteins and Lipid Interactions**
  - Challenges and techniques specific to membrane proteins
- **Advanced Visualization Techniques**
  - Introduction to virtual reality (VR) and augmented reality (AR) in molecular visualization
  - Interactive visualization tools and platforms

Week 5: Practical Applications and Hands-on Sessions

- **Hands-on Sessions with Visualization Software**
  - Guided tutorials using PyMOL, Chimera, or ChimeraX
  - Visualization of real-world biological structures and datasets
- **Interactive Case Studies**
  - Visualizing structural changes upon mutation or post-translational modifications
  - Integrating structural and functional information

Week 6: Project Work and Assessment

- **Project Assignment**
  - Students work on a project to visualize and analyze a given macromolecular structure or dataset
- **Presentation and Evaluation**
  - Presentation of project findings and visualization techniques used
  - Peer review and feedback session

Assessment:

- Quizzes or assignments after each module to assess understanding
- Final project presentation and report evaluation

Additional Resources:

- Recommended readings and research papers
- Online resources and tutorials for further learning

MES KEVEEYAM COLLEGE
Valanchery
Date:.....
Dept. of Botany

Dr. Jaseestmma E.

SHAJID P P
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IN CHARGE OF PRINCIPAL
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VALANCHERY, PIN 676 55

MES KEVEEYAM COLLEGE

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NAAC RE-ACCREDITED WITH "A+"GRADE (3.44)

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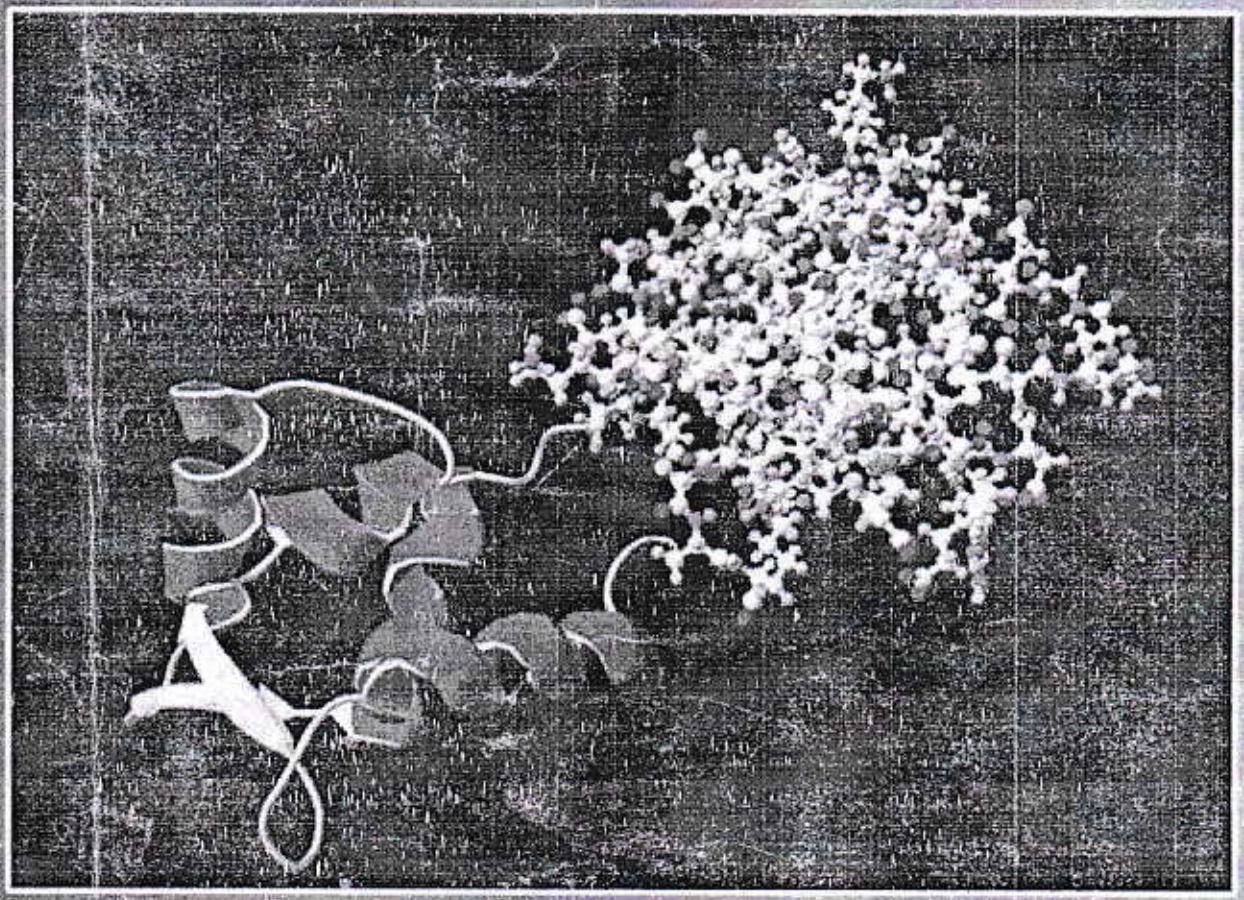
DEPARTMENT OF BOTANY

Presents



CERTIFICATE COURSE ON

VISUALIZATION OF MACROMOLECULES USING BIOINFORMATICS TOOLS

Registration Deadline : 01/11/2022

Duration : 30 hrs

Eligibility: UG Students

For more details: Contact Botany Department

Mark list

Name of College/Institution/Center : MES KEVEEYAM College, Valanchery
Name of Course : Macromolecular visualization using Bioinformatics tools

Sl. No.	Reg. No.	Name of candidate	Marks
1	KVAUIBC001	AYISHA AJNA K.P	25
2	KVAUIBC002	FASLA	23
3	KVAUIBC003	ISMATH P	20
4	KVAUIBC004	RANIYA K	25
5	KVAUIBC005	RANIYA K.K	25
6	KVAUIBC006	RINSHA T	25
7	KVAUIBC007	SAMIYYABI E	24
8	KVAUIBC008	SHANA	23
9	KVAUIBC009	ARSHAK MUHAMMED ANJUM	23
10	KVAUIBC010	MUHAMMED FIYAS N.M	23
11	KVAUIBC011	HAMNA SAINA A.P	25
12	KVAUIBC012	KAVYA A	25
13	KVAUIBC013	ANSITHA	25
14	KVAUIBC014	ARYA K.P	22
15	KVAUIBC015	AVANI V	24
16	KVAUIBC016	AYSHA JINSHA. P	24
17	KVAUIBC017	FATHIMA WAFA A	25
18	KVAUIBC018	VYSHNAVI M.P	23

Dr. Janeeshna E

M.E.S KEVEEYAM COLLEGE Valanchery Dept. of Botany

SHAJID P P
ASSISTANT PROFESSOR
IN CHARGE OF PRINCIPAL
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Certificate

KVM/CC/22-23/

This is to certify that

VYSHNAVI M.P., THIRD YEAR BOTANY

has successfully completed the certificate course on "MACROMOLECULAR VISUALIZATION USING BIOINFORMATICS TOOLS" conducted by the Department of BOTANY, MES Keveeyam College, Valanchery during the period 2022-23.

CO-ORDINATOR

HEAD OF DEPARTMENT

Dr. K.P. VINOD KUMAR
PRINCIPAL

M.E.S. Ke Vee Yam College * Valanchery * Date:

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Certificate

KVM/CC/22-23/

This is to certify that

AYISHA AJNA K.P., THIRD YEAR BOTANY

has successfully completed the certificate course on "MACROMOLECULAR VISUALIZATION USING BIOINFORMATICS TOOLS" conducted by the Department of BOTANY, MES Keveeyam College, Valanchery during the period 2022-23.

CO-ORDINATOR

HEAD OF DEPARTMENT

Dr. K.P. VINOD KUMAR
PRINCIPAL

M.E.S. Ke Vee Yam College * Date: * Valanchery

Time table for the short term certificate course

Date	Day	Name of the faculty	time
2/11/22	Wednesday	Dr. Janeeshma E	8.30-9.30, 3.30-4.30
3/11/22	Thursday	Sruthi	8.30-9.30, 3.30-4.30
4/11/22	Friday	Ragitha	8.30-9.30, 3.30-4.30
7/11/22	Monday	Dr. Abdul Faisal	8.30-9.30, 3.30-4.30
8/11/22	Tuesday	Dr. Janeeshma E	8.30-9.30, 3.30-4.30
9/11/22	Wednesday	Sruthi	8.30-9.30, 3.30-4.30
10/11/22	Thursday	Ragitha	8.30-9.30, 3.30-4.30
11/11/22	Friday	Dr. Abdul Faisal	8.30-9.30, 3.30-4.30
14/11/22	Monday	Dr. Janeeshma E	8.30-9.30, 3.30-4.30
15/11/22	Tuesday	Sruthi	8.30-9.30, 3.30-4.30
16/11/22	Wednesday	Ragitha	8.30-9.30, 3.30-4.30
17/11/22	Thursday	Dr. Abdul Faisal	8.30-9.30, 3.30-4.30
18/11/22	Friday	Dr. Janeeshma E	8.30-9.30, 3.30-4.30
21/11/22	Monday	Sruthi	8.30-9.30, 3.30-4.30
22/11/22	Tuesday	Ragitha	8.30-9.30, 3.30-4.30

Dr. Janeeshma

Dr. Abdul Faisal

Sruthi

Ragitha.

MES KEVEEYAM COLLEGE
Valanchery
Date:.....
Dept. of Botany

SHAJID P P
ASSISTANT PROFESSOR
IN CHARGE OF PRINCIPAL
M.E.S KEVEEYAM COLLEGE
VALANCHERY, PIN 676 552

MES KEVEEYAM COLLEGE VALANCHERY

Department of Botany

Unique ID and Name of the Certificate Course : **KVM/CC/BOT/22-23/02; Macromolecular Visualization using Bioinformatics tools**

Sl No	Name of the student	Class/ Semester	Date														
			2/11	3/11	4/11	7/11	8/11	9/11	10/11	11/11	14/11	15/11	16/11	17/11	18/11	21/11	22/11
1.	AYISHA AJNA K.P	5th															
2.	FASLA	5th															
3.	ISMATH P	5th															
4.	RANIYA K	5th															
5.	RANIYA K.K	5th															
6.	RINSHA T	5th															
7.	SAMIYYABI E	5th															
8.	SHANA	5th															
9.	ARSHAK MUHAMMED ANJUM	5th															
10.	MUHAMMED FIYAS N.M	5th															
11.	HAMNA SAINA	5th															

ASSISTANT PROFESSOR
IN CHARGE OF PRINCIPAL
M.E.S KEVEEYAM COLLEGE
VALANCHERY, PIN

	A.P																
12.	KAVYA A	5th															
13.	ANSITHA	5th															
14.	ARYA K.P	5th															
15.	AVANI V	5th															
16.	AYSHA JINSHA. P	5th															
17.	FATHIMA WAFA A	5th															
18.	VYSHNAVI M.P	5th															

Dr. Janeeshma Dr. Abdul Faisal Sruthi Ragitha.

Signature of teachers who had engaged the sessions

Signature of HoD Dr. Janeeshma E

Department seal

MES KEVEEYAM COLLEGE Valanchery Date:..... Dept. of Botany

Signature of Principal

SHAJID P P
ASSISTANT PROFESSOR
IN CHARGE OF PRINCIPAL
M.E.S KEVEEYAM COLLEGE
VALANCHERY, PIN 676 552

Name: .....

Roll. No.....

MES KEVEEYAM COLLEGE VALANCHERY

M.SC INTEGRATED BOTANY

Certificate Course Examination

Time: 2 hrs **Maximum Marks: 50**

PART – A (Answer all questions)

1. Define bioinformatics and explain its role in the study of macromolecules.
2. Describe the importance of visualizing macromolecules in understanding their structure and function.
3. Differentiate between primary, secondary, tertiary, and quaternary structures of macromolecules.
4. Explain the concept of molecular visualization software. Provide examples of commonly used tools.
5. Discuss the significance of molecular docking in drug discovery and development.

(2 Marks)

PART – B (Answer any four)

1. Describe the process of molecular modeling. How is it useful in predicting macromolecular structures?
2. Discuss the principles and methods of molecular dynamics simulations in bioinformatics.
3. Explain the steps involved in homology modeling of proteins. Highlight its applications and limitations.
4. Compare and contrast NMR spectroscopy and X-ray crystallography as methods for determining macromolecular structures.
5. Discuss the role of visualization in understanding protein-ligand interactions. Provide examples.

(5 Marks)

PART – C (Answer any two)

1. Outline the steps involved in molecular visualization of DNA/RNA structures. Discuss the challenges and advancements in this field.
2. Choose a specific case study of a macromolecule (e.g., enzyme, receptor) and describe a comprehensive workflow from data retrieval to visualization using bioinformatics tools.
3. Analyze the impact of computational methods in structural biology and drug design. Provide examples of breakthroughs facilitated by molecular visualization techniques.
4. Discuss the ethical considerations related to bioinformatics research involving macromolecular visualization.
5. • Evaluate the future trends in bioinformatics tools for macromolecular visualization. How can these tools contribute to advancements in biological research and medicine?

(10 Marks)

SHAJU P P
ASSISTANT PROFESSOR
IN CHARGE OF PRINCIPAL
M.E.S KEVEEYAM COLLEGE
VALANCHERY, PIN 676 5

List of students completed the certificate course

Sl No	Name of the student
1.	AYISHA AJNA K.P
2.	FASLA
3.	ISMATH P
4.	RANIYA K
5.	RANIYA K.K
6.	RINSHA T
7.	SAMIYYABI E
8.	SHANA
9.	ARSHAK MUHAMMED ANJUM
10.	MUHAMMED FIYAS N.M
11.	HAMNA SAINA A.P
12.	KAVYA A
13.	ANSITHA
14.	ARYA K.P
15.	AVANI V
16.	AYSHA JINSHA. P
17.	FATHIMA WAFA A
18.	VYSHNAVI M.P

Dr. Jaseesbma K

MES KEVEEYAM COLLEGE
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