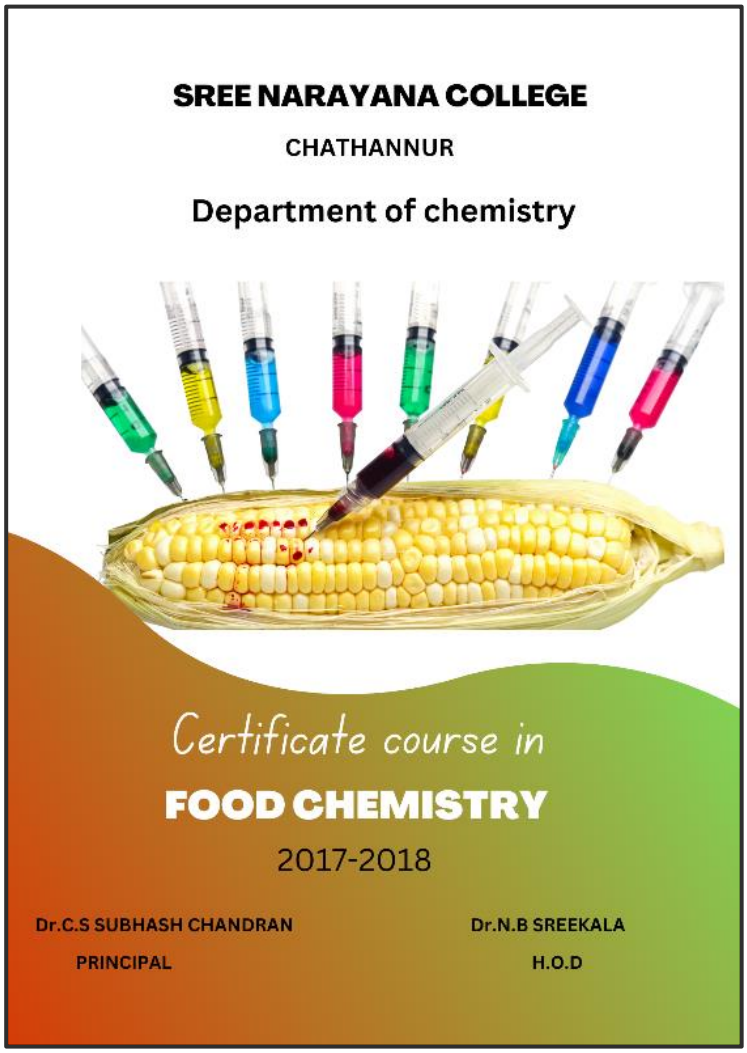
CERTIFICATE COURSE IN CHEMISTRY

- **CERTIFICATE COURSE IN FOOD CHEMISTRY 2017-2018**
- **CERTIFICATE COURSE IN FOOD CHEMISTRY 2018-2019**
- **CERTIFICATE COURSE IN FOOD CHEMISTRY 2019-2020**
- **UGC-NSQF SKILL COURSE DIPLOMA IN MOLECULAR DOCKING 2020-21**
- **UGC-NSQF SKILL COURSE DIPLOMA COURSE IN MOLECULAR DOCKING 2021-22**

CERTIFICATE COURSE IN FOOD CHEMISTRY (2017-2018)

Department of Chemistry, well conducted its first certificate course in Food chemistry during the academic year 2017-2018. The duration of the course was six months and course started with 26 students and the classes were handled by the faculties of the department. The course was designed in a manner to provide students a better understanding of nature of food, its chemical composition, food packing and packaging materials, food preservation and also the basic skills which are essential for getting hired in food analytical labs. The course was intended for students who have interest in pursuing a career in this field. The students completed the course with good grades, and they were given course completion certificates.



Brochure of certificate course - Food Chemistry, 2017-2018.

DIPLOMA COURSE IN FOOD CHEMISTRY

AIM OF THE COURSE:

The aim of this course is to provide students a better understanding of food chemistry and make students competent enough to work in food related industries. This course involves the study of nature and chemical composition of food, chemistry of carbohydrates, lipids and vitamins. This also provides the students the analytical skills to assess the quality of food samples.

OBJECTIVES:

- To get familiarise with chemical nature and composition of food
- To gain knowledge on food adulterants and its identification.
- To know the chemistry of food packing materials
- To understand the methods of food preservation and its chemistry
- To equip the students with basic skills which are essential to get hired in food-based industries and food analytical labs.

SYLLABUS:

Module 1: Introduction to food Chemistry
Food Chemistry: Food additives, colouring and flavouring agents, preservatives, anti-oxidants, commonly used permitted and non-permitted food colours artificial sweeteners-taste enhancers, Health effects of fast foods, instant foods, dehydrated foods and junk foods, trans fat.

Module 2: Pigments, flavours and colours in food
Food Pigments & Flavouring Agents: Importance, types and sources of pigments - their changes during processing and storages, colours added to foods, vegetable, fruit and spice flavours, flavours of milk and meat products, effect of processing on flavour Components.

Module 3: Food Additives & Preservation
Basic concepts of additives in food, general principles for the application. Examples & role play in food processing – Preservatives, Antioxidants, Emulsifiers, Stabilizers (Thickeners), Sequestering and buffering agents, Bleaching and maturing agents, Nutrient supplements, Non-nutritive and special dietary sweeteners, Anti-caking agents, Foaming and anti-foaming agents, Leavening agents, Firming agents, Humectants and texturisers, Clarifying agents. Food preservation and methods of preservation

Module 4: Food packaging and Packaging materials
Introduction to Food packaging and Packaging materials, Food packages – bags, pouches, wrappers, tetra packs-applications. Characteristics and functions of packaging materials for different foods, Modern packaging materials and forms-Glass containers, metal cans, composite containers, aerosol containers, rigid plastic packages, semi rigid packaging, flexible packaging.

Module 5: Carbohydrates, Lipids and Vitamins
Carbohydrates - functions, source, utilization, dietary fibre and health. Lipids, Fat soluble vitamins –A, D, E and K- functions, source, requirements, deficiency disorders. Water soluble vitamins –The B-complex vitamins –Thiamine, Riboflavin, Niacin, Folic acid, Biotin, Pantothenic acid, B12 and

Laboratory Practicals:

1. Estimation of moisture content in food sample.
2. Chemical Analysis of Vitamin C
3. Determination of pH in foods
4. Estimation of Iron in Iron Supplements.
5. Detection of adulterants in various food samples

Reference

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Syllabus

REGISTER OF ATTENDANCE & FEES

FOR THE MONTH OF AUGUST - MARCH 20 17 - 2018

Name of the Institute

Place

Section

Sl. No.	Admission No.	NAMES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	No. of days Present	FEES Rs. P.	Date of Payment
1		SRUTHI MOL T.S	a	x	x	a	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
2		AKSHAYANATH V	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
3		AMRUTHA A	x	a	x	x	x	x	x	x	x	x	x	x	a	x	x	x	x	x	x	a	x	x	x	x	x	x	x	x	x	a	x			
4		AYANA PRASAD	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
5		HARIKRISHNAN B	x	x	x	x	a	a	x	x	x	x	a	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	a	x	x	x	x			
6		KARTHIKA A	x	x	x	x	x	x	x	x	x	x	x	x	x	a	x	x	x	x	x	x	x	a	x	x	x	x	x	x	x	x	x			
7		ARSHA K S	x	x	x	x	x	x	x	x	x	x	x	x	x	a	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	a	x			
8		ANANDU PRASAD	x	x	x	x	x	x	x	x	x	x	x	x	x	a	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	a	x			
9		AFSAL K	x	x	x	x	x	x	a	x	x	x	x	x	x	a	x	x	x	x	x	x	x	x	x	a	x	a	x	x	x	x	x			
10		JITHARAJ J	x	x	x	x	x	x	x	a	x	x	x	x	x	x	x	a	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
11		AMINA S	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	a	x	x	x	x	x	x	x	a	x			
12		BALAGANESH M S	x	x	x	x	x	x	x	a	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	a	x	x	x	x	x	x			
13		GOKUL M	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	a	x	x	x	x	x	x	x	x	x	x	x	x	x	x	a			
14		JITHU P J	a	x	x	x	x	x	x	x	x	x	x	x	x	a	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	a			
15		SARAN M	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
16		ABHIJITH K S	x	x	x	x	x	x	a	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
17		AATHIRA S R	x	a	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
18		ATMI HAMID	a	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
19		GOPIKA S	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
20		REGMA REGHU	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
21		NIHALA N	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
22		MAHIMA VIJAYAN	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
23		AKHIL M	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
24		NAVANEETH A J	x	a	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
25		ANANDU B	a	x	x	x	x	x	a	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	a	x			
26		RAKESH A	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	a	x			

Number present M
Daily E

Initials M
E

No. of Working days. Average Attendance during the month. No.on Roll during month

Roll No. on Roll at end of month

Attendance register for certificate course in Food chemistry, 2017-18.

SREE NARAYANA COLLEGE CHATHANNUR
DEPARTMENT OF CHEMISTRY
CERTIFICATE COURSE IN FOOD CHEMISTRY 2017-18
FINAL ASSESSMENT EXAMINATION

Time: 2 hours Maximum Marks: 50

Part A: Answer all the questions
(Each question carries 1 mark)

1. The adulterant mixed with chilli powder is ……
2. The expansion of ISI is…….
3. An example of polysaccharide is ……..
4. ……. is referred as good cholesterol
5. A natural food colour is…..
6. Name a chemical preservative.
7. In …… FDA approved the use of irradiation to control pathogens in fresh and frozen red meats, such as beef, lamb, and pork.
8. The most common sweetener used in candies and chocolates is ____.
9. ……..is a food stabiliser
10. An additive that can keep a compound, mixture or solution from changing its form or chemical nature is called a …….. **(10 x 1= 10 Marks)**

Part B: Answer any five questions.
(Each question carries 2 marks)

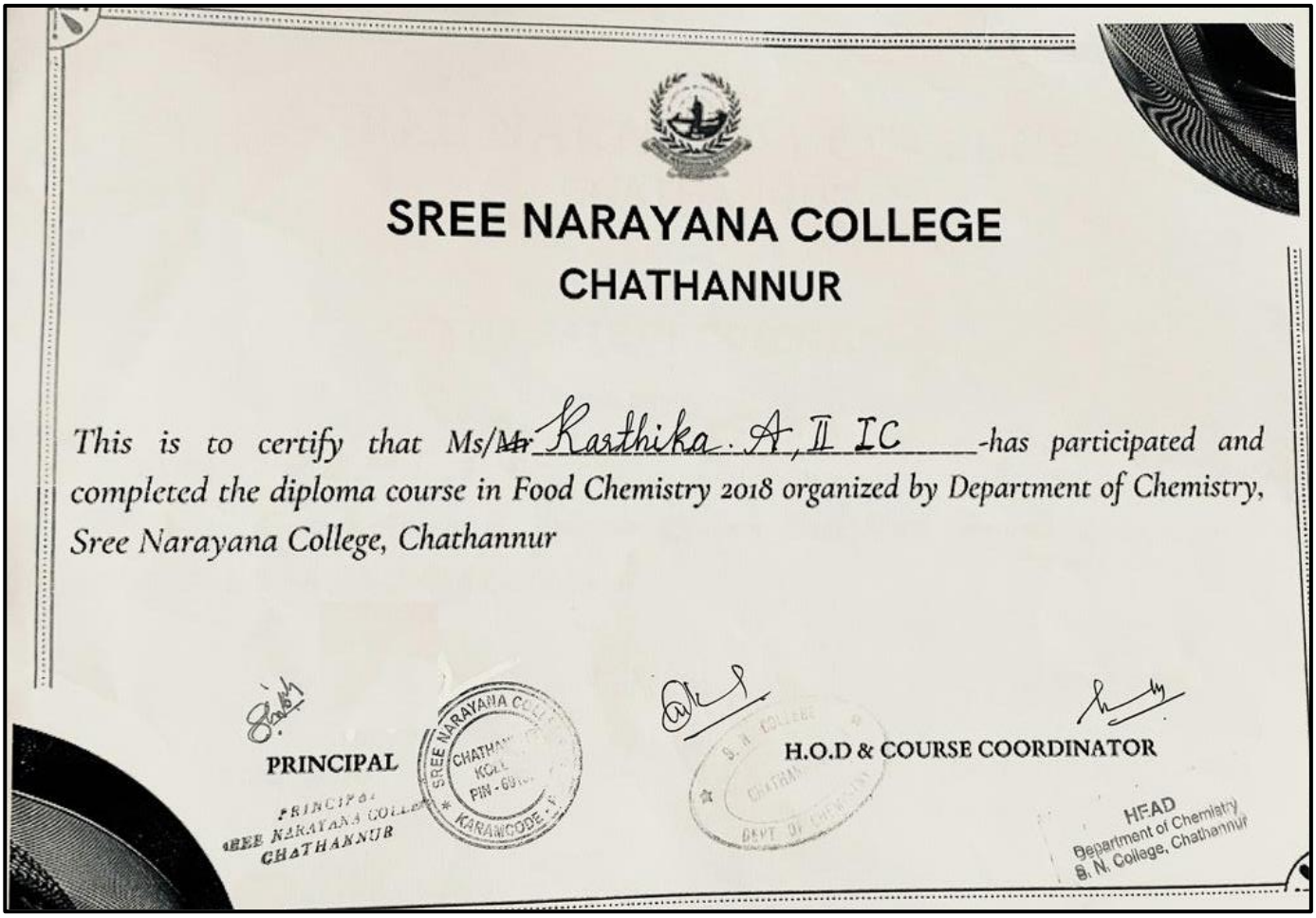
11. What are antioxidants?
12. Explain enzymatic browning?
13. Describe caramalisation.
14. Write notes on calorific value of food?
15. How can we prevent rancidity?
16. Explain freeze drying
17. Define food adulteration? **(5 x 2= 10 Marks)**

Part C: Answer any two questions
(Each question carries 15 marks)

18. Discuss about the common Foods which are subjected to Adulteration and explain the types poisonous substances added for food adulteration.
19. How can we estimate the moisture content in food? Explain preservation techniques by removal of moisture?
20. Explain the food testing and standardized testing methods and protocols

(2 x 15 = 30 Marks)

Question paper.



SREE NARAYANA COLLEGE
CHATHANNUR

This is to certify that Ms/~~Mr~~ Karthika. A, II IC -has participated and completed the diploma course in Food Chemistry 2018 organized by Department of Chemistry, Sree Narayana College, Chathannur

PRINCIPAL

PRINCIPAL
SREE NARAYANA COLLEGE
CHATHANNUR

H.O.D & COURSE COORDINATOR

HEAD
Department of Chemistry
S. N. College, Chathannur

Sample of student certificate.

SREE NARAYANA COLLEGE, CHATHANNUR

DEPARTMENT OF CHEMISTRY

CERTIFICATE COURSE IN FOOD CHEMISTRY

REPORT

2017-2018

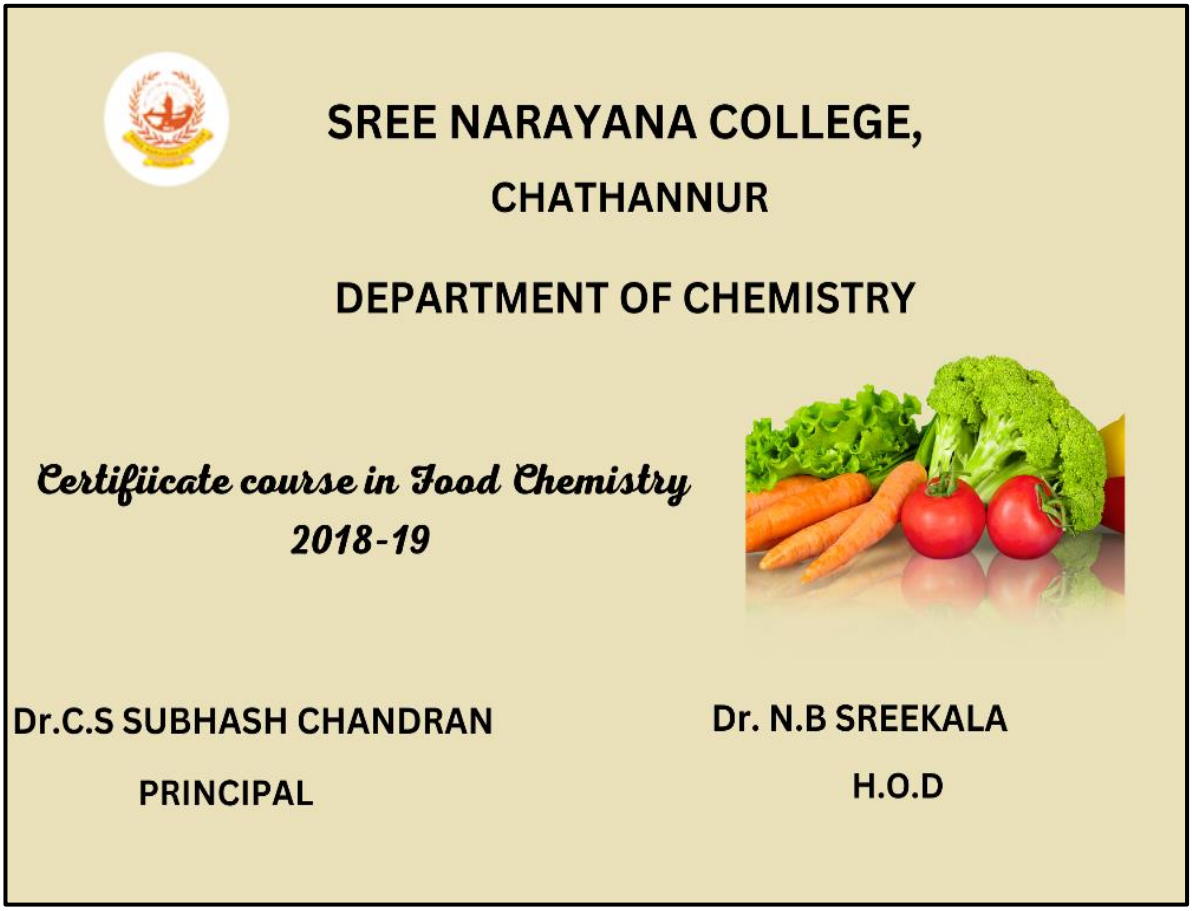
A certificate course in food chemistry organized by the Department of Chemistry, Sree Narayana College, Chathannur started during the academic year 2017-2018. The course duration was six months.The first batch started with 26 students.The classes were handled by the faculties of the department.The course provide a better understanding in the nature, chemical composition of food, food packing and packaging materials,food preservation and also the basic skills which are essential to get hired in food analytical labs. The course is designed for students who are interested in pursuing a career in this field.The students completed the course with grades and course completion certificates were provided.

Principal

Course Coordinator

CERTIFICATE COURSE IN FOOD CHEMISTRY (2018-19)

During the academic year 2018-2019, 31 students were registered for the six months certificate course in Food chemistry, organized by the Department of Chemistry, Sree Narayana College, Chathannur. The classes and laboratory practicals were handled by the faculties of the department. The topics include food chemistry, pigments and flavours in food, additives, food adulteration, food packing and packaging materials, and methods of food preservation. Lab sessions were also included in the course, through which students acquired the hands-on experience of food analysis. The course was organized for the students who have got interest in pursuing a career in food chemistry field. The students completed the course with good grades and course completion certificates were distributed to students.



DIPLOMA COURSE IN FOOD CHEMISTRY

AIM OF THE COURSE:

The aim of this course is to provide students a better understanding of food chemistry and make students competent enough to work in food related industries. This course involves the study of nature and chemical composition of food, chemistry of carbohydrates, lipids and vitamins. This also provides the students the analytical skills to assess the quality of food samples.

OBJECTIVES:

- To get familiarise with chemical nature and composition of food
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SYLLABUS:

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Food Chemistry: Food additives, colouring and flavouring agents, preservatives, anti-oxidants, commonly used permitted and non-permitted food colours artificial sweeteners-taste enhancers, Health effects of fast foods, instant foods, dehydrated foods and junk foods, trans fat.

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Carbohydrates - functions, source, utilization, dietary fibre and health. Lipids, Fat soluble vitamins –A, D, E and K- functions, source, requirements, deficiency disorders. Water soluble vitamins –The B-complex vitamins –Thiamine, Riboflavin, Niacin, Folic acid, Biotin, Pantothenic acid, B12 and Vitamin C - functions, source, requirements and deficiency disorders.

Laboratory Practicals:

1. Estimation of moisture content in food sample.
2. Chemical Analysis of Vitamin C
3. Determination of pH in foods
4. Estimation of Iron in Iron Supplements.
5. Detection of adulterants in various food samples

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Syllabus

Attendance statement for Certificate Course in Food chemistry, 2018-19.

SREE NARAYANA COLLEGE, CHATHANNUR

DEPARTMENT OF CHEMISTRY

CERTIFICATE COURSE IN FOOD CHEMISTRY MARCH 2019

Time: 2 Hrs **Max. Marks : 50**

FOOD CHEMISTRY

Section A (Answer all questions) (5X1=5)

1. Name the substance used to impart chocolate flavor in food
2. A water soluble vitamin.
3. A permitted natural food colouring agent
4. Deficiency of vitamin C causes _____
5. Glucose is a _____ sugar

Section B (Answer any five questions) (2X5=10)

6. What are artificial sweeteners ? Give an example
7. Give the importance of carbohydrates.
8. What is MSG? Explain its application in Food industry.
9. Write the sources and deficiency diseases of vitamin D
10. Write notes on nutrient supplements.
11. Discuss the functions of Vitamin A
12. Describe the term emulsifier in food chemistry.

Section C(Answer any four questions) (5X4=20)

13. Write notes on Vitamin B.
14. Write notes on foaming and anti foaming agents
15. What are food bulking agents?Give an example.
16. Explain the role of antioxidants in food processing.Give examples
17. Define the term food adulteration ? Give its impact on human body.
18. Give different methods of packaging of foods

Section D(Answer any one question) (15X1=15)

19. What is meant by food preservation.Discuss different methods.
20. Write an essay on food additives

Question paper

FOOD CHEMISTRY

Amal Raj

1. polyphenols.
2. Vitamin B.
3. Anthocyanin.
4. Scurvy
5. ~~Pentose~~ Reducing

38/50

6. Chemical substances that impart sweetness of foods are called artificial sweeteners
Eg. Sucralose

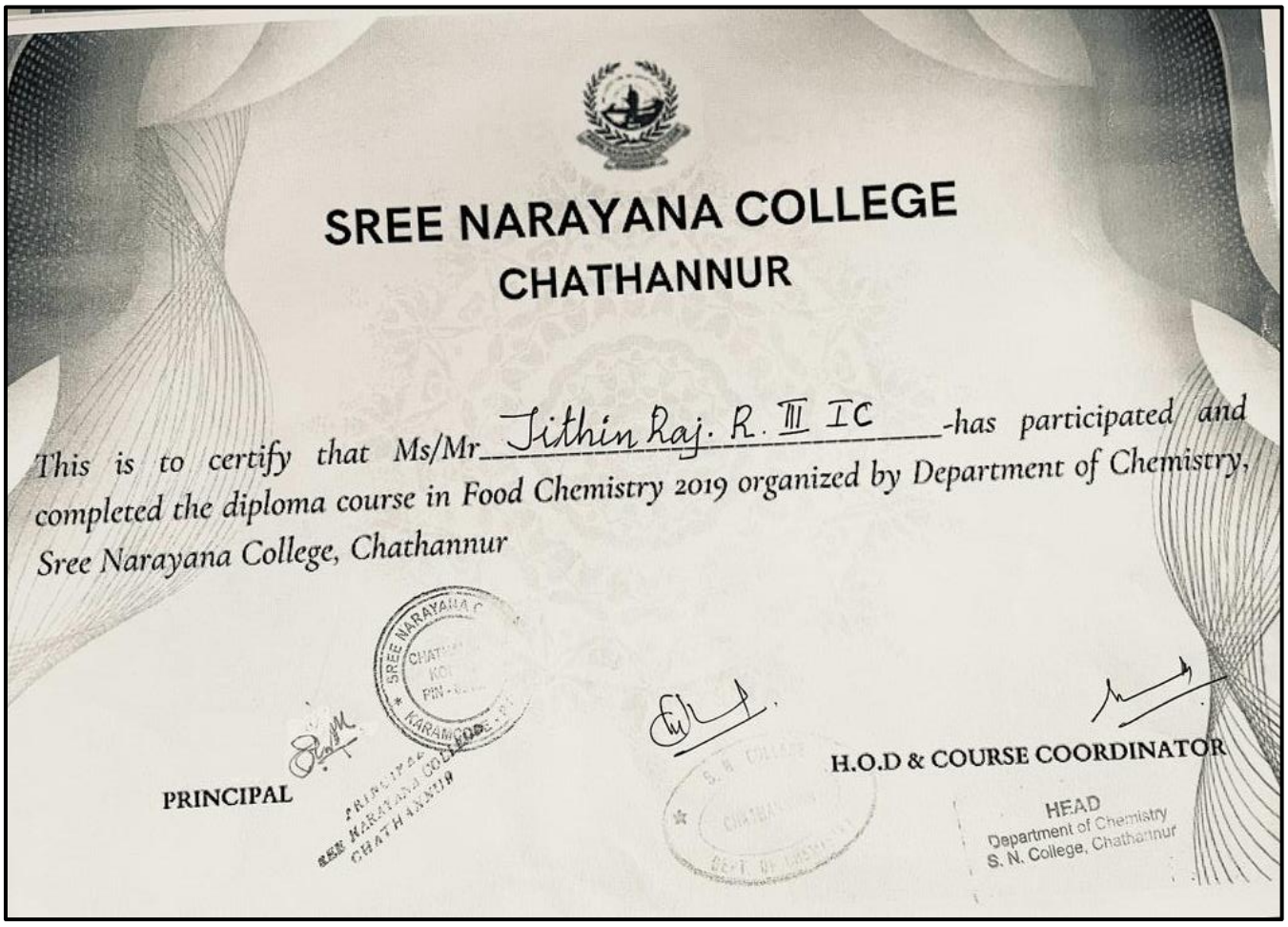
7. Carbohydrates provide the body with glucose, which is converted to energy used to support bodily functions and physical activity

8.

9. Rickets is a rare disease that cause the bones to become soft and bend.
Sources of Vitamin D : ~~fish~~.
Mushrooms.
exposed to sunlight.
fortified Yogurt.
Pork chops.

2

Sample of student answer sheet.



SREE NARAYANA COLLEGE
CHATHANNUR

This is to certify that Ms/Mr Jithin Raj. R. III IC -has participated and completed the diploma course in Food Chemistry 2019 organized by Department of Chemistry, Sree Narayana College, Chathannur

PRINCIPAL

H.O.D & COURSE COORDINATOR

HEAD
Department of Chemistry
S. N. College, Chathannur

Sample of student certificate.

SREE NARAYANA COLLEGE, CHATHANNUR

DEPARTMENT OF CHEMISTRY

CERTIFICATE COURSE IN FOOD CHEMISTRY

REPORT

2018-2019

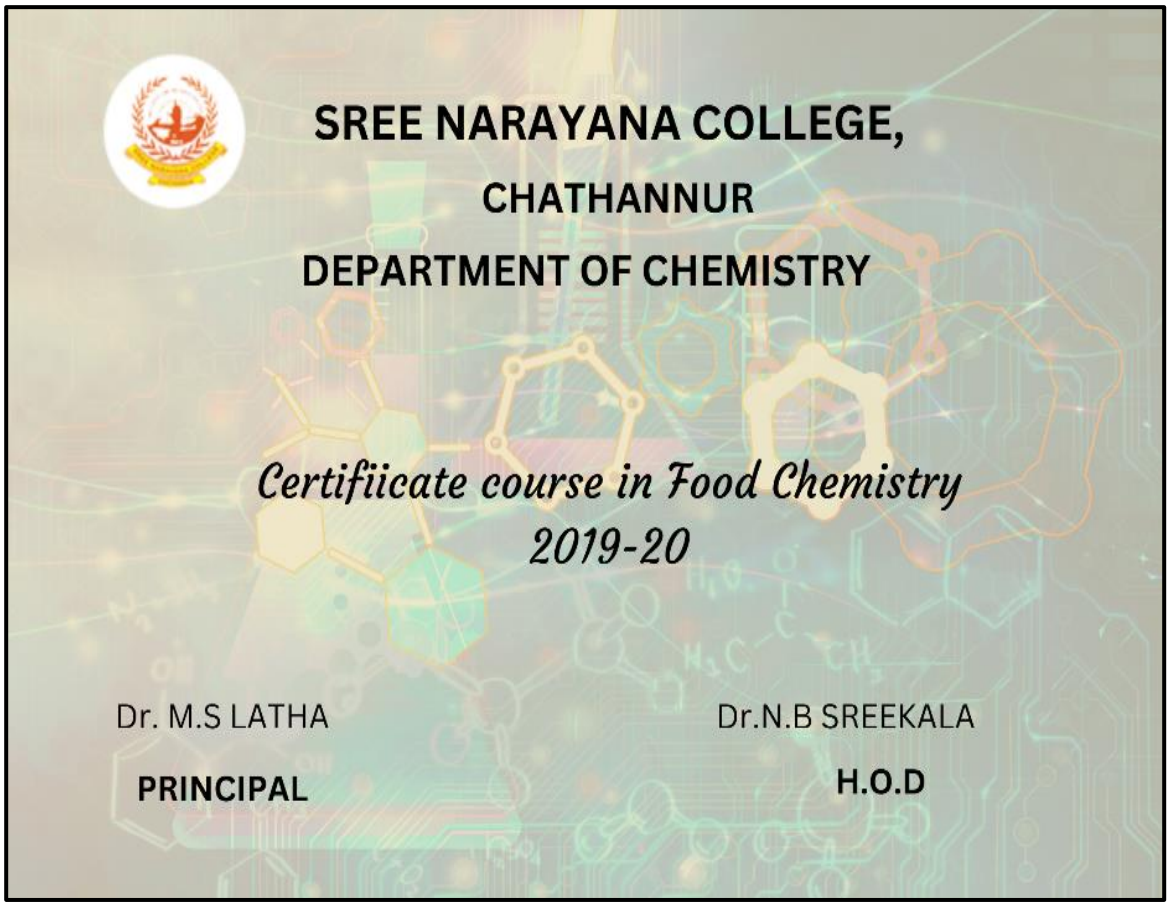
During the academic year 2018-2019, thirty one students registered for the six months certificate course in Food chemistry, organized by the Department of Chemistry, Sree Narayana College, Chathannur .The classes and laboratory practicals were handled by the faculties of the department.The basics of food chemistry, pigments and flavors in food,food additives and food adulteration, food packing and packaging materials,food preservation were covered.The course also included laboratory practicals where students gain hands on experience with food analysis. The course is designed for students who are interested in pursuing a career in this field.The students completed the course with grades and course completion certificates were provided.

Principal

Course Coordinator

CERTIFICATE COURSE IN FOOD CHEMISTRY (2019-2020)

Department of Chemistry enrolled its third batch students for the certificate course in Food chemistry during the academic year 2019-2020. A total of 26 students registered for the course and classes were arranged in Chemistry department. The theory sessions and lab sessions were handled by the faculties of the department. The basics of food chemistry, pigments and flavours of food, food additives, adulteration, food packing and packaging materials, and methods of food preservation were the topics included for the course. Lab sessions were conducted at laboratory of department of chemistry and students were given hands-on practice for analysing the food quality. The course felicitated the students to gain basic knowledge in food chemistry and equipped them with the skills needed to pursue a career in this field. The students completed the course with good grades and course completion certificates were awarded to students.



DIPLOMA COURSE IN FOOD CHEMISTRY

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SREE NARAYANA COLLEGE, CHATHANNUR

DEPARTMENT OF CHEMISTRY

CERTIFICATE COURSE IN FOOD CHEMISTRY MARCH 2020

FOOD CHEMISTRY

Time: 2 Hrs **Max. Marks : 50**

Section A (Answer all questions) (1X5=5)

1. The adulterant mixed with chilli powder is .....
2. .....is a food stabilizer
3. A fat soluble vitamin.
4. Name the substance used to impart pineapple flavor in food
5. A natural food colour is.....

Section B (Answer any five questions) (2X5=10)

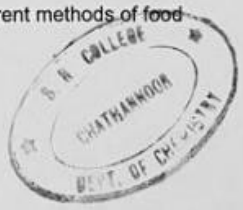
6. How can we prevent rancidity?
7. Write the sources and deficiency diseases of vitamin C
8. Write notes on foaming and anti foaming agents.
9. Discuss the functions of Vitamin K
10. Describe the term stabilizers in food chemistry
11. Explain the role of antioxidants in food processing.Give examples
12. Give different methods of packaging of foods
13. Write a note on food adultrants.

Section C(Answer any four questions) (5X4=20)

14. What are food bulking agents?Give an example.
15. Explain the laws related to food packaging.
16. Explain the role of antioxidants in food processing.Give examples
17. Explain the food testing and standardized testing methods
18. Write the sources and deficiency diseases of vitamin D
19. Mention any three problems of food adulteration.

Section D(Answer any one question) (15X1=15)

20. What is meant by food preservation.Briefly discuss different methods of food preservation..
21. Write an essay on Food processing.



REGISTER OF ATTENDANCE & FEES

FOR THE MONTH OF AUGUST 2019 - FEB 2020.

Ashwani

Name of the Institute

Section

Place

Sl. No.	Admission No.	NAMES	No. of days Present	FEES Rs.	P.	Date of Payment
1		HEMA S				
2		SAJI KRISHNA				
3		SUBIN S B				
4		VEENA THAMBI				
5		AKSHARA N S				
6		AMRUTHA S				
7		DEEPIKA D S				
8		KRISHNA PRIYA S G				
9		LAVANA LAL				
10		RAGI G R				
11		SANDRA R				
12		SRUTHY B				
13		SRUTHY NATH S				
14		VIDYA S				
15		BHAVANA T				
16		DEVI C H				
17		ATHIRA KRISHNAN L				
18		PRIJI S				
19		SARIGA RAJ				
20		ASWATHY R				
21		JYOTHISH S P				
22		SUMAYYA S				
23		MEOMINA A				
24		NEETHU M				
25		SRUTHY J R				
26		VRINDA V				

Number present M / Daily E

Initials M / E

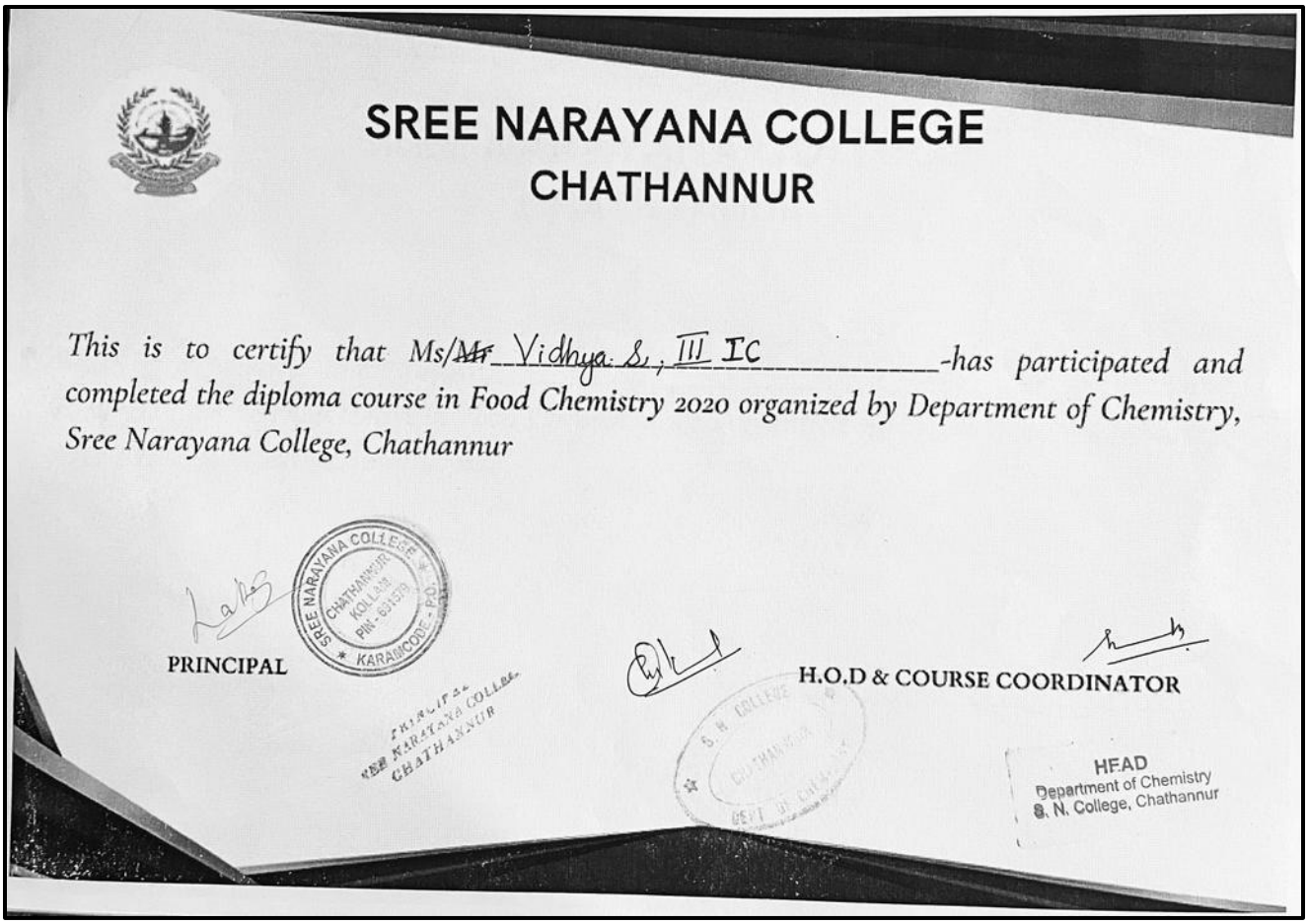
No. on roll at the begining of month. Admitted during the month Left No. on Roll at end of month

Attendance register: Certificate course in Food chemistry 2019-20.

37/50

1. Coloured Sawdust
2. Carboxymethyl Cellulose
3. Vitamin A, D, E K.
4. Natural butyl butyrate
5. any dye or pigment extracted from Vegetables.
6. Randicity can be prevented by keeping the food in air tightened containers containing N_2 as air
7. The Sources of Vitamin C are
   - citrus fruits such as oranges.
   - Peppers
   - strawberries.
   - black currants
   - broccoli
   - Potatoes.

   The deficiency of Vitamin C is called Scurvy.
9. Main functions of Vitamin K are
   - Assist in blood clotting
   - Promotes bone calcification.
   - Prevents blood vessel Calcification.
   - Consumption of Vitamin K with dietary fat to enhance adsorption
   - Helps in wound healing
12. Aseptic processing : made of paper and aluminium mixture with a layer



SREE NARAYANA COLLEGE
CHATHANNUR

This is to certify that Ms/~~Mr~~ Vidhya. S, III IC -has participated and completed the diploma course in Food Chemistry 2020 organized by Department of Chemistry, Sree Narayana College, Chathannur

PRINCIPAL

SREE NARAYANA COLLEGE CHATHANNUR KOLLAM PIN-691570 KARAMCODE-PO

PRINCIPAL SREE NARAYANA COLLEGE CHATHANNUR

H.O.D & COURSE COORDINATOR

S. N. COLLEGE CHATHANNUR GOVT. OF CHARGE

HEAD
Department of Chemistry
S. N. College, Chathannur

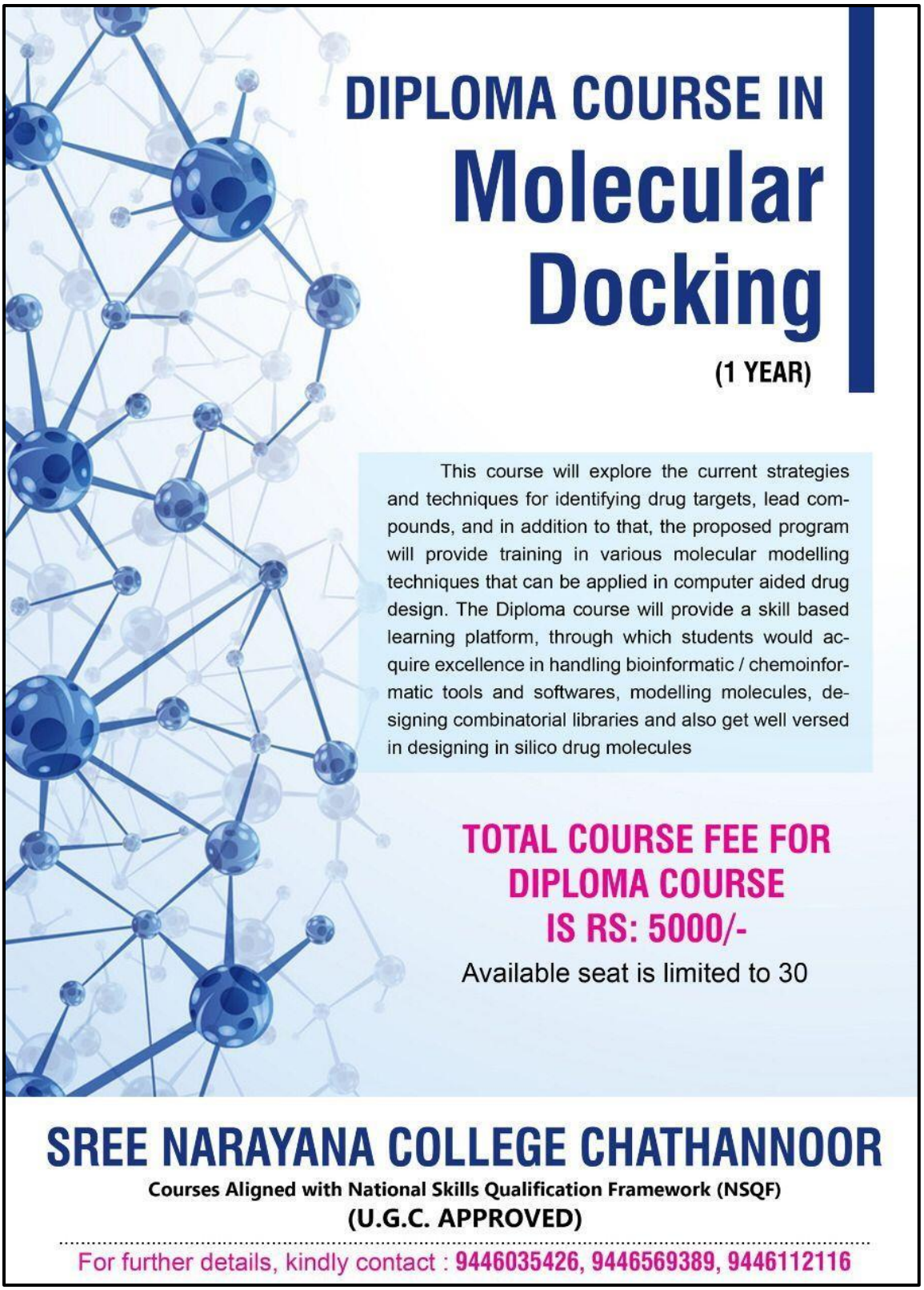
REPORT

Department of Chemistry, Sree Narayana College, Chathannur enrolled its third batch students for the certificate course in Food chemistry during the academic year 2019-2020. A total of 26 students registered for the course and classes were arranged in Chemistry department. The theory sessions and lab sessions were handled by the faculties of the department. The basics of food chemistry, pigments and flavours of food, food additives, adulteration, food packing and packaging materials, and methods of food preservation were the topics included for the course. Lab sessions were conducted at laboratory of department of chemistry and students were given hands-on practice for analysing the food quality. The course felicitated the students to gain basic knowledge in food chemistry and equipped them with the skills needed to pursue a career in this field. The students completed the course with good grades and course completion certificates were awarded to students.

DIPLOMA COURSE IN MOLECULAR DOCKING 2020-21

(An UGC approved Skill based Diploma course under National Skills Qualification Framework (NSQF))

Department of Chemistry, Sree Narayana College, Chathannur has well-coordinated and successfully consummated its UGC approved one year Skill based Diploma Course (under National Skills Qualification Framework (NSQF), sanctioned to the college in the year 2020. This skill-based program was intended to provide basic expertise to students in computational drug discovery process, starting from CADD fundaments to drug approval process. Course was designed in a such way to cover all the recent developments in the field of CADD and included training sessions in various molecular modelling techniques and in computer aided drug design. The hands-on practice sessions included in this course equipped the students to handle various drug docking tools. This diploma course was inaugurated by Dr. Achuthsankar S. Nair, Professor and Head, Department of Computational Biology and Bioinformatics, University of Kerala on 10/03/2020 with an introductory talk “Molecular Docking”. A total of twenty-three students enrolled for this programme and the classes were handled by the faculties in chemistry department of this college and our industrial collaborators Accubits Technologies Inc. Due to covid pandemic situation, we had to postpone some of the training sessions which necessitated lab facilities and hence got lagged and extended till college reopen. After the successful completion of the course, students were given the course completion certificate.


DIPLOMA COURSE IN
Molecular Docking
(1 YEAR)
This course will explore the current strategies and techniques for identifying drug targets, lead compounds, and in addition to that, the proposed program will provide training in various molecular modelling techniques that can be applied in computer aided drug design. The Diploma course will provide a skill based learning platform, through which students would acquire excellence in handling bioinformatic / chemoinformatic tools and softwares, modelling molecules, designing combinatorial libraries and also get well versed in designing in silico drug molecules
TOTAL COURSE FEE FOR DIPLOMA COURSE IS RS: 5000/-
Available seat is limited to 30
SREE NARAYANA COLLEGE CHATHANNOOR
Courses Aligned with National Skills Qualification Framework (NSQF)
(U.G.C. APPROVED)
For further details, kindly contact : 9446035426, 9446569389, 9446112116

SKILL BASED DIPLOMA COURSE IN MOLECULAR DOCKING

This Diploma program in Molecular Docking aims to provide basic expertise in drug discovery process, starting from CADD fundaments to drug approval process. This course will explore the current strategies and techniques for identifying drug targets, lead compounds, and in addition to that, the proposed program will provide training in various molecular modelling techniques that can be applied in computeraided drug design. The hands-on practise sessions included in this course will equip the student to handledrug docking tools and software and the students will learn to design combinatorial libraries. The coursewill also cover the procedural practises in getting approval for newly designed drug and patent acquiringformalities

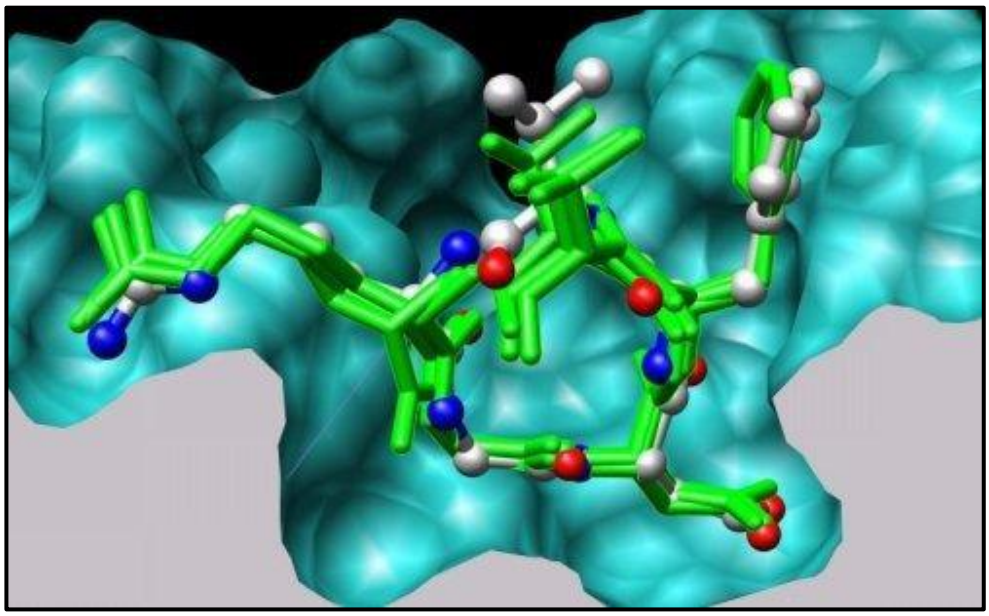
Scope:

The Diploma course will provide a skill based learning platform, through which students would acquire excellence in handling bioinformatic/chemoinformatic tools and softwares, modelling molecules, designing combinatorial libraries and also get well versed in designing *in silico* drug molecules.

Course Objectives: On course completion the student will;

1. learn basic concepts of drug docking
2. get introduced to various biological and chemical databases
3. get familiarise with bioinformatics and chemoinformatics tools
4. gain expertise in molecular modelling
5. learn various techniques in *insilico* virtual screening & its protocols
6. get exposure in CADD through case studies and hands-on practises

Background



Biology has undergone a transformation from its traditional ethos to that of an information science. Currently, a lot of work in life sciences is centered around biological databases, mainly genomic and proteomic. Many of the tools and techniques of biology have been reborn with an informational flavor. A typical example is that of phylogenetics. The classification of species based on phenotype (external characteristics) is now recognized as being highly subjective. Its place hasbeen taken by a classification that is based on genotype (genetic makeup).

As the whole world is facing the Covid 19 pandemic, it is imperative that the higher education institutions explore avenues to impart knowledge and skills that are of relevance to it. Moleculardocking is an important skill in the field of modern drug design and development which is being applied the world over, in the hope of discovering a potent molecule that can arrest target molecules of Covid 19. Students of higher education in the field of Chemistry and allied branchessuch as biochemistry and biotechnology will benefit by training in this area, both in terms of research and innovation, as well as enhanced employability in pharma sector. This proposal has been evolved in this backdrop. A six month certificate course in Molecular Docking has been designed by the college.

Industrial Relevance of Drug Docking

Identifying a disease and bringing out an effective drug into the market could take anywhere from 10-15 years, cost up to US$800 million, and involve testing of up to 30,000

candidate molecules. The economic significance of the activity thus needs no special emphasis. This costly,time-consuming activity has been traditionally based on a blind search for molecules, rightly termed as serendipitous discovery. Computer aided drug design or rational drug design has cut the cost and time of drug discovery with great effect. Today computationally it is possible to select candidate drug molecules from huge available databases and check whether it can bind tothe active site of the troublesome molecule using computational docking procedures.

Drug Docking: Tools and Techniques

Computer aided drug design is the use of computational techniques to cut down the search for drug molecules. A large class of diseases arises out of an unwelcome molecule, possibly a proteinproduced from the gene of a pathogen, an intruder organism, like a virus. A simplified picture ofdiseases could be given based on "good" and "bad" proteins. The human body can be assumed to be producing proteins P1, P2, P3 ... that are useful and required for the human body. When apathogen, a virus or a bacteria, enters the human body, it could produce its own protein, say X, which is possibly harmful. How exactly is it harmful? X could interact and form a complex, in which two molecules are bound together into a new one, with one of the good proteins, say P1,thereby inhibiting it from its routine activities and causing the onset of a disease. The strategy to combat the disease is to introduce a new molecule, say Y, into the body such that X is more attracted to Y than to P1, thereby freeing P1 to get back to routine work. It must be noted that all diseases do not fit into this model. Sometimes, our own protein-making machinery can go wrong and produce P1' instead of P1, causing disease.

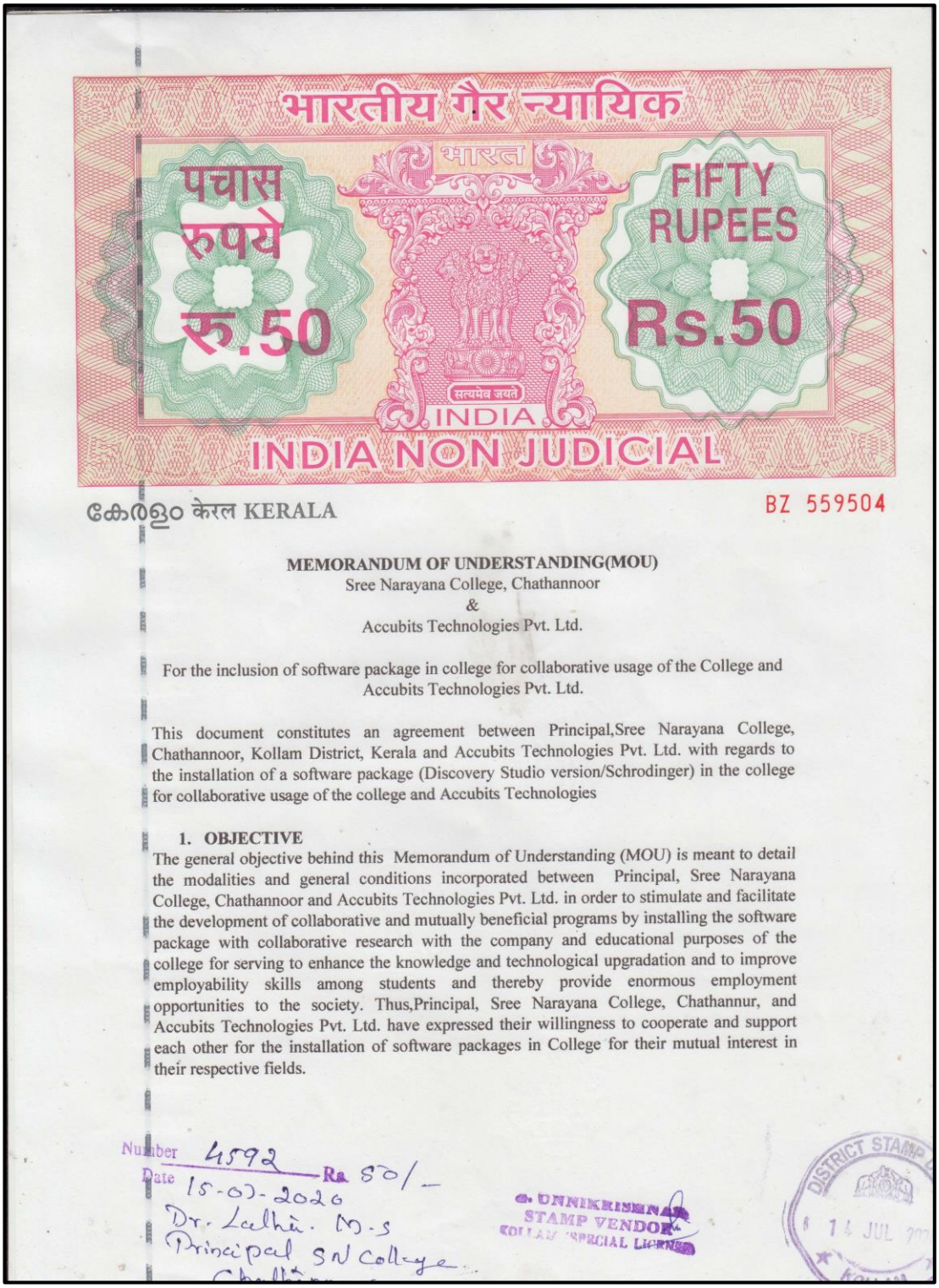
Docking software such as Hex, Argus Lab, and Autodock (Open Source) are capable of docking the small molecules to selected active sites of target molecules and give a relative score for the binding. The small number of (a few dozen) of molecules thus predicted computationally is thenpassed on to the wet lab for synthesis and clinical trials. Licence softwares are also available.

Curricula and Credit System for the course:

Total credits	60
Credits for Skill development Component (70%)	42
General Education (30%)	18

Total number of students enrolled in the programme: 23

Memorandum of Undertaking for the diploma course.



भारतीय गैर न्यायिक

पचास रुपये रु.50

भारत

FIFTY RUPEES Rs.50

सत्यमेव जयते

INDIA

INDIA NON JUDICIAL

കേരളം केरल KERALA

BZ 559504

MEMORANDUM OF UNDERSTANDING(MOU)

Sree Narayana College, Chathannoor

&

Accubits Technologies Pvt. Ltd.

For the inclusion of software package in college for collaborative usage of the College and Accubits Technologies Pvt. Ltd.

This document constitutes an agreement between Principal,Sree Narayana College, Chathannoor, Kollam District, Kerala and Accubits Technologies Pvt. Ltd. with regards to the installation of a software package (Discovery Studio version/Schrodinger) in the college for collaborative usage of the college and Accubits Technologies

1. OBJECTIVE

The general objective behind this Memorandum of Understanding (MOU) is meant to detail the modalities and general conditions incorporated between Principal, Sree Narayana College, Chathannoor and Accubits Technologies Pvt. Ltd. in order to stimulate and facilitate the development of collaborative and mutually beneficial programs by installing the software package with collaborative research with the company and educational purposes of the college for serving to enhance the knowledge and technological upgradation and to improve employability skills among students and thereby provide enormous employment opportunities to the society. Thus,Principal, Sree Narayana College, Chathannur, and Accubits Technologies Pvt. Ltd. have expressed their willingness to cooperate and support each other for the installation of software packages in College for their mutual interest in their respective fields.

Number 4592 Rs 50/-

Date 15-07-2020

Dr. Lalhi. M.S

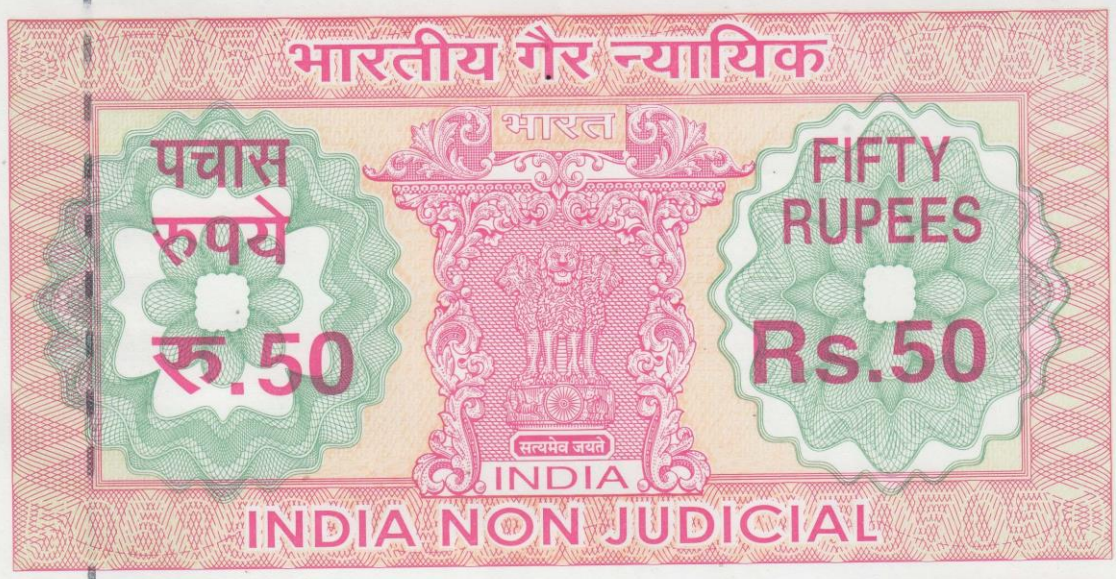
Principal SN College

G. UNNIKRISHNAN

STAMP VENDOR

DISTRICT STAMP

14 JUL



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The Specific activities framed and incorporated in MOU are dealt in accordance with consultation between the two parties.

Accubits Technologies Pvt. Ltd. agrees to purchase and later install the software package in the computer lab of Sree Narayana College, Chathannurand agrees to provide education-oriented programs, practical and training classes as well as technical assistance to the students which may improve the knowledge power, employability, and competitive skills among them.

2. **GENERAL TERMS OF MoU**

2.1 Duration of MOU: This MOU shall be operational upon signing and will have a duration of a minimum of two years and can be extended based on the outcome and benefits of the program by the mutual consent between the two parties of MoU.

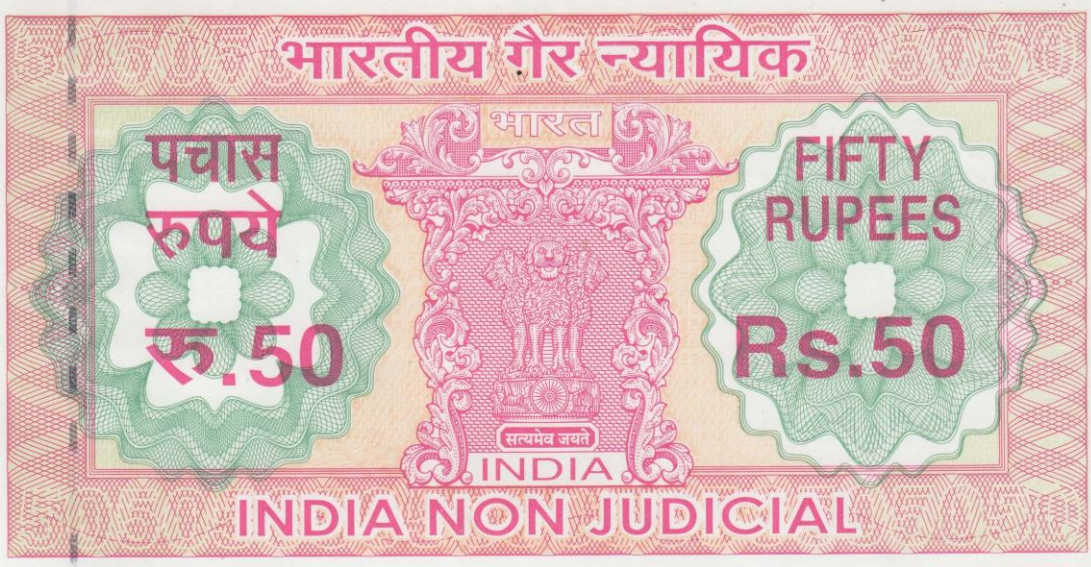
2.2 Timing of program access: The college/students shall have access to the software package during working hours of the college whereas the company can utilize and access the installed software package for their purposes without any restrictions whatsoever after the regular working hours. During working hours, if the need may arise, the company shall be given access without any clash with classwork and with prior notice to the head of the institution. During holidays the company can access the installed software with prior notice to the head of the institution. In order to facilitate software access, internet connectivity, power availability and remote access shall be provided at all times to the installed system by the college.

2.3 Coordination: In order to carry out and fulfill the objectives of MoU in a coordinated manner, both parties are required to appoint an appropriate person(s) to represent its organization and to coordinate the implementation of activities and have to conduct meetings between them if needed to discuss progress and plan activities.

Number 4593 Rs. 50/-
Date 15-07-2020
Dr. Lalha. M.S
Principal, SN College
Chathannoor.

G. UNNIKRISHNAN
STAMP VENDOR
KOLLAM (SPECIAL LICENCE)

DISTRICT STAMP DEPOT
14 JUL 2020
KOLLAM



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2.4 Confidentiality: The parties to the MoU agree that it shall not, at any time, after executing the activities of this MOU, disclose any information in relation to these activities or any other matters without the consent of both parties.

2.5 Research publication/patent: The parties agree that any publication arising from the use of the software shall include the names of, to a minimum of one representative from each party in the author list. Also, the company can go for the filing of a patent application (in its name) in case it finds a lead in its independent research activity. Moreover, the company has the right to commercialize any product it comes across its research without further intervention from the college.

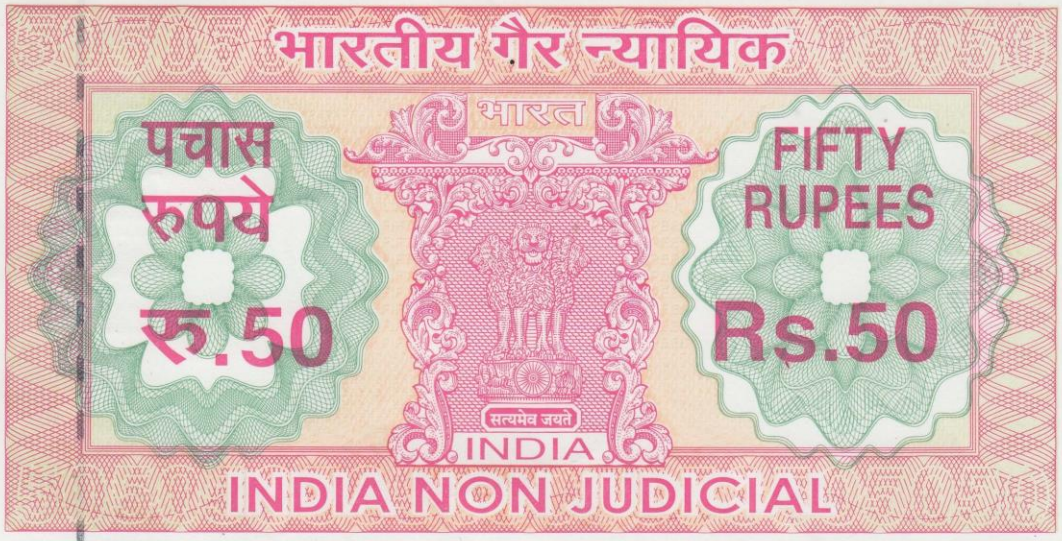
2.6 Extension of Agreement: The MOU may be extended provided both the parties agree upon and can provide the necessary resources.

This MoU will take effect from the date of its signing and shall be valid for a period of 3 years from that date unless sooner terminated, revoked or modified by mutual written agreement between tile Parties, and may be extended by mutual written agreement.

Number 4594
Date 15-07-2020 Rs. 50/-
Dr. Latha. M.S
Principal, SN College, Chathannoor,

G. UNNIKRISHNAN
STAMP VENDOR
KOLLAM SPECIAL LICENCE

DISTRICT STAMP DEPOT
14 JUL 2020
KOLLAM



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Either party may terminate the Agreement at any time during the term by the provision of three months' written notice to the other party.

14/7/2020
Chathannur

Dr.Nidhin Sreekumar,
Director, Accubits Invent Pvt. Ltd.
The Pirate Square,
Kulathoor,
Thiruvananthapuram
Kerala.
695004.

Principal,
Sree Narayana College,
Chathannur,
Kollam District,
Kerala.

Number 4595 Rs 50/-
Date 15-07-2020
Dr. Latha. M.S
Principal, SN college, Chathannoor.

G. UNNIKRISHNAN
STAMP VENDOR
KOLLAM (SPECIAL LICENCE)

DISTRICT STAMP DEPOT
14 JUL 2020
KOLLAM

COURSE STRUCTURE AND CONTENT

Skill Development Component:(Credits: 42)					
Course Curriculum : Molecular Docking					
	Course Content	**Credits**		**Hours**	
	Course content	**Theory**	**Lab**	**Theory**	**Lab**
Module I	**Introduction to Computer – Aided Drug Design:** Concept and basic terminologies of Computer-Aided Drug Design, Target, hit, lead, optimization, docking, pharmacophore- Informatics & Methods in drug design; Introduction to genomics, proteomics, Bioinformatics, chemoinformatics, combinatorial chemistry.-Role of chemoinformatics in drug discovery. Pharmacology, reverse pharmacology, toxicology, ADME databases, chemical, biochemical and pharmaceutical databases. Drug Discovery pipeline	**6**	**1**	**6**	**2**
		Credits: 7		**Hours: 8**	
Module II	**Molecular Modelling and docking:** Introduction, Molecular Dynamics of simple molecules, structure predicting tools, homology modelling, Ab-Initio modelling, protein 3D structure prediction,Modelling softwares, energy minimization techniques, Ramachandran plot, Fold recognition.	**6**	**2**	**6**	**4**
		Credits: 8		**Hours: 10**	
Module III	**Drug targets and molecules:** Drug Molecules, Mechanism of Drug Action; Drug like compounds,	**6**	**2**	**6**	**4**

	Prediction of drug toxicity, Small Molecule Data bases and representation of Drug molecules; QSAR, pharmacophore mapping				
		Credits: 8		**Hours: 10**	
Module IV	**Various approaches in drug design**: Rational drug design, Structure based drug design, Ligand based Drug Design, drug binding mechanisms, virtual screening, Docking and scoring, Docking methods-preparation of molecules, Combinatorial library design. sampling techniques, scoring, errors indocking, drug target selection, Leadcompound discovery andoptimization, The role of quantummechanics in structure-based drug design, Drug receptor interactions, Checking ADME properties in drug design, hands on experience in docking softwares	**9**	**2**	**9**	**4**
		Credits:11		**Hours: 20**	
Module V	Case study of docking of smallmolecules with Covid 19 targets	**8**		**16**	
		Credits: 8		**Hours: 16**	
		Total Credits: 42		**Total Hours: 64**	

General Education course content (Credits: 18)			
Module I	Intellectual property Right (IPR), copyright, patent, patent filing, Ethics of drug testing in animals and humans, Drug marketing, Pharma Industry	**9**	**9**
Module II	Environmentalstudies, Value education, ICT skills, how to acquire critical thinking, problem solving skills	**9**	**9**
		Total Credits: 18	**Total Hours :18**

Total Credits: 60 Total Hours: 82

SKILLED COURSE_DRUG DOCKING_TEACHING PLAN & FACULTY DETAILS

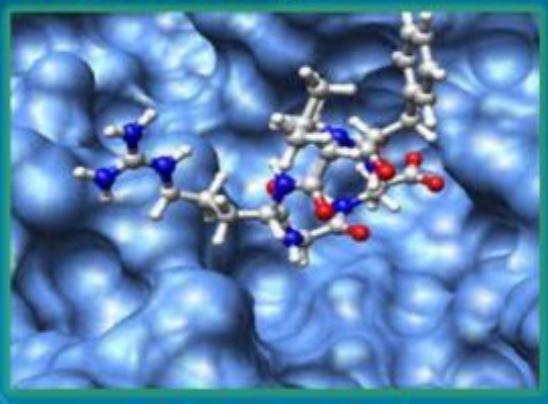
Class Details	Topics	Faculty
Session 1(T)	**Introduction to Computer –Aided Drug Design:** Concept and basic terminologies of Computer-Aided Drug Design, Target, hit, lead, optimization, docking, pharamacophore	Dr. Vidhya R.V. Assistant Professor Dept. of chemistry Sree Narayana College, Chathannur
Session 2(T)	Cheminformatics & Methods in drug design	
Session 3(T)	Basic introduction to Genomics, proteomics, Bioinformatics	
Session 4(P)	Introduction to Biological Databases- Pubchem, RSC PDB,Data formats, downloading.	
Session 5(T)	Virtual screening, combinatorial Chemistry, Role of Chemoinformatics in drug discovery. Pharmacology, reverse pharmacology, toxicology	
Session 6(T)	ADME databases, chemical, biochemical and pharmaceutical databases	
Session 7 (P)	Structure drawing - Molview	
Session 8(T)	Drug discovery pipeline	
Session 9(T)	Molecular modelling_ Various methods, Molecular dynamics of simple molecules- Introduction to molecular modelling and docking	Ms. Shahanas Naisam, Bioinformatician, Accubits Technologies Inc.
Session 10(T)	Theory of X-ray and NMR Structure determination method	
Session 11(T)	Moelcular modelling, Structure Prediction & MD simulation	
Session 12(T)	Fold recognition, Energy minimization, Ramachandran plot, software & tools used for various CASS applicatioins	

Session 13(T)	Modelling softwares, energy minimization techniques	Dr. Vidhya R.V. Assistant Professor Dept. of chemistry Sree Narayana College, Chathannur
Session 14 (T)	Structure analysis tools, Ramachandran plot, Fold recognition.	
Session 15 (P)	Homology modelling, SWISS-MODEL: protein structurehomology-modelling server.	
Session 16 (P)	Structure validation tools: PROCHECK_ stereochemicalquality checks., result interpretation	
Session 17(P)	Verify3D tool _Assessment of protein models with 3-Dsequence profiles. WHAT CHECK tool _ Protein verification tools from the openin new window WHAT-IF program___stereo chemical, steric, nomenclature,and packing quality checks.	
Session 18 (P)	ProSA tool_Fold reliability analysis, Ramachandran plot,and result interpretation	
Session 19(T)	Introduction to drugs, classification	Ms. Muthu S. Assistant Professor Dept. of chemistry Sree Narayana College, Chathannur
Session 20(T)	Drug molecules, Molecular targets, Mechanism of drugaction	
Session 21(T)	Drug toxicity, Lipinski rule, ADME Test, Smile notation	
Session 22(T)	Small Molecule Data bases and representation of Drug molecules	
Session 23(T)	Introduction to QSAR, 2D and 3D QSAR	
Session 24(T)	Pharmacophore Mapping	
Session 25(P)	Cheminformatic Tools and Databases for Pharmacology	
Session 26(P)	KEGG , drug Bank drug database	
Session 27(P)	Pathway maps, Pathway/Brite mapping of disease genes and drug target	
Session 28(P)	QSAR_ McQSAR	

Session 29(T)	Rational Drug Design_ Structure based and Ligand based	Dr. Sruthy B. JPF, KSCSTE-JNTBRI, Palode, TVPM.
Session 30(T)	Drug binding mechanisms, virtual screening	
Session 32(T)	Docking process	
Session 33(T)	Docking methods- preparation of molecules	
Session 34(T)	Combinatorial library, design.	
Session 35(T)	Sampling techniques, scoring methods, errors in docking	
Session 36(T)	Drug target selection, Lead compound discovery and optimization, The role of quantum mechanics in structure-based drug design	
Session 37(T)	Drug receptor interactions	
Session 38(T)	Druggable properties & toxicity checking & validation tools	
Session 39-48 (P)	Drug Docking	
Session 49-64	Case study	
Session 64- 73	Intellectual property Right (IPR), copyright, patent, patent filing, Ethics of drug testing in animals and humans, Drug marketing, Pharma Industry	Dr. N. B. Sreekala Assistant Professor Dept. of chemistry Sree Narayana College, Chathannur
Session 74-82	Environmental studies, Value education, ICT skills, how to acquire critical thinking, problem solving skills	

Department of Chemistry
Sree Narayana College, Chathannur
organises a Seminar on

"Molecular Docking"



Resource Person

Dr. Achuthsankar S. Nair
Professor & HoD.
Dept of Computational Biology & Bioinformatics
University of Kerala

March 10, 2020@ 10 am

Venue:
Seminar Hall, Sree Naryana College, Chathannur

Free Registration

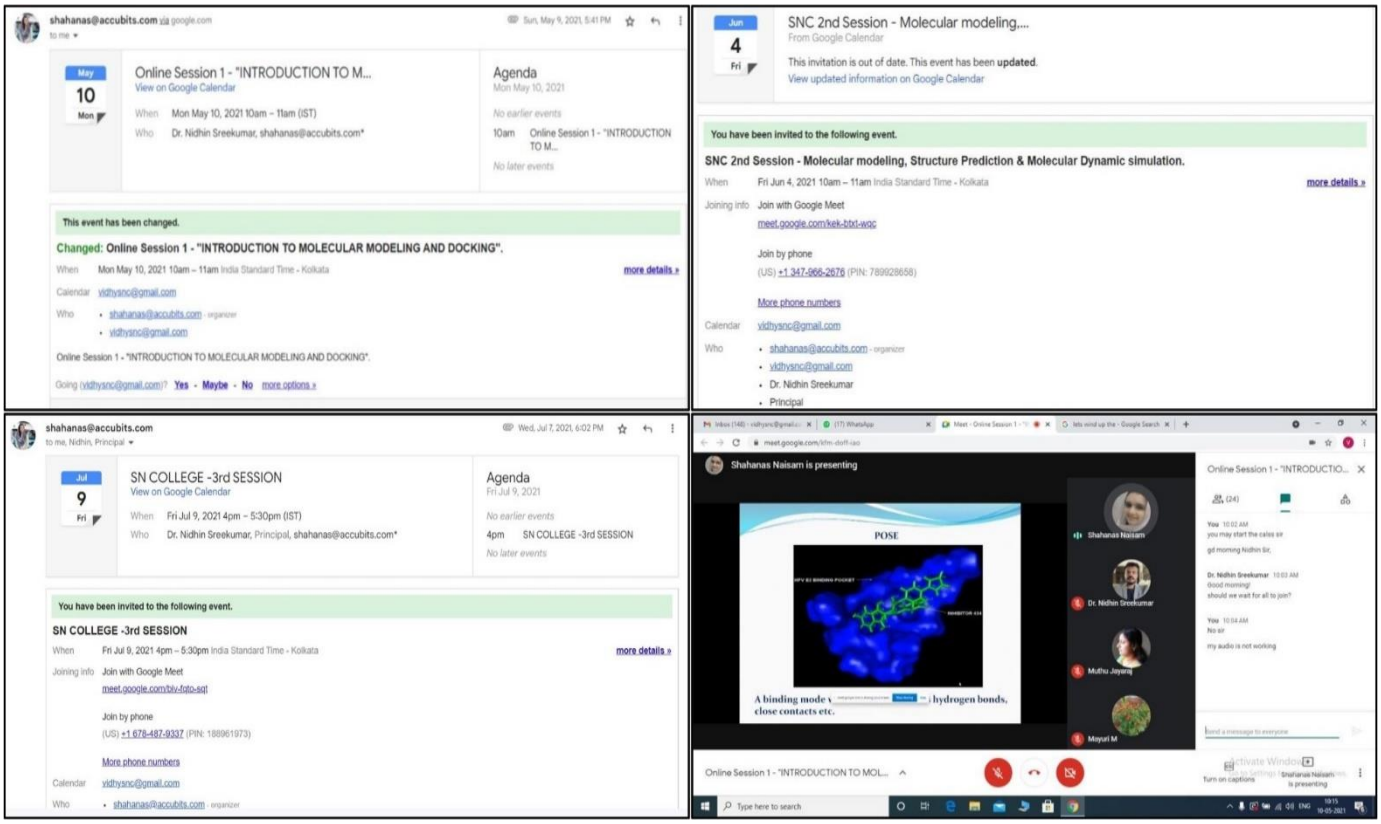
Organizing Committee:

Dr. Latha M.S.
Principal

Dr. N.B. Sreekala
HoD, Dept. of Chemistry

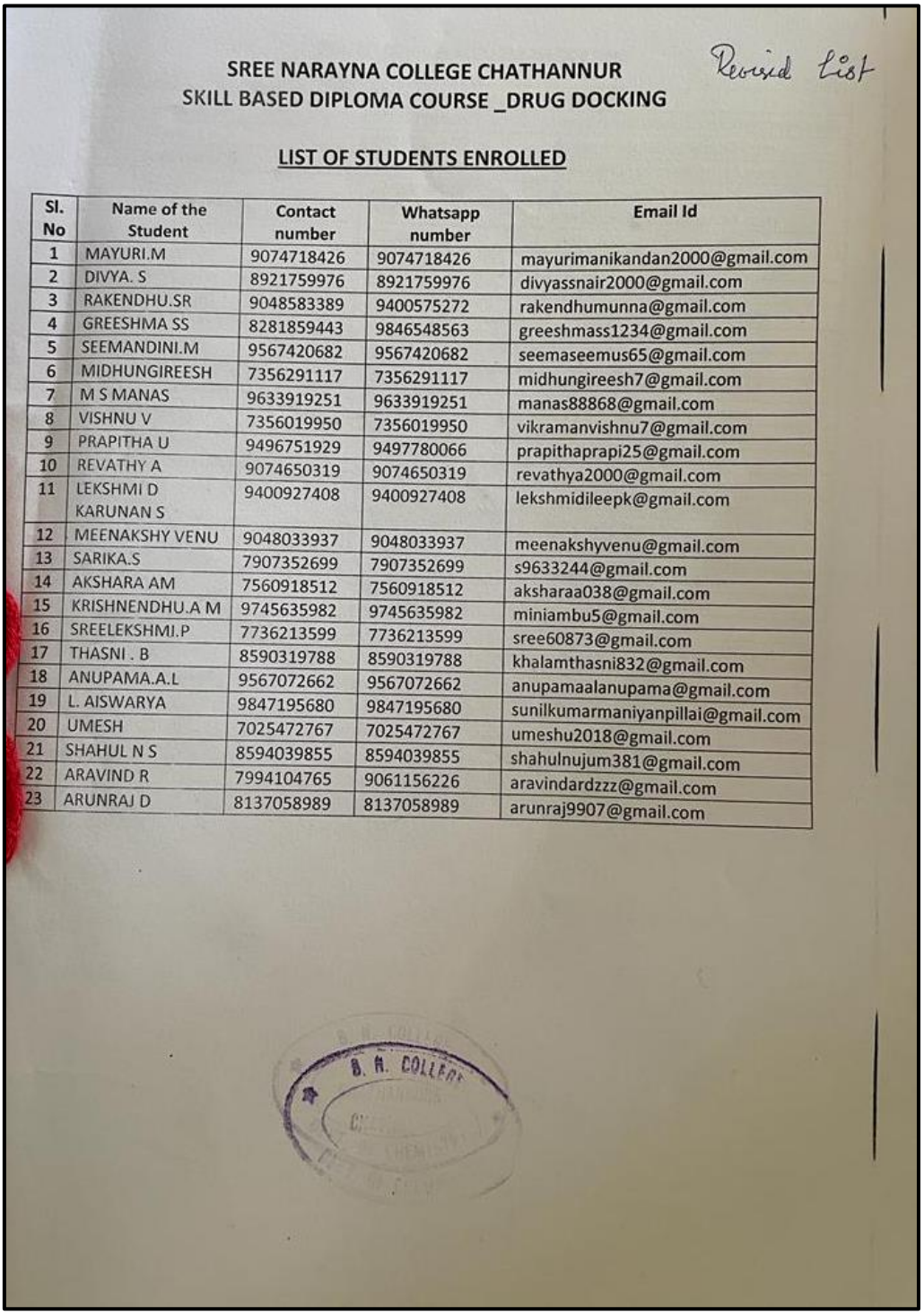
Coordinators
Dr. Vidhya R.V., Assistant Professor, Dept of Chemistry
Ms. Muthu M.S., Assistant Professor, Dept of Chemistry

Sample of student certificate.



Screen shot of online class.

LIST OF STUDENTS ENROLLED



SREE NARAYNA COLLEGE CHATHANNUR

Revised List

SKILL BASED DIPLOMA COURSE _DRUG DOCKING

LIST OF STUDENTS ENROLLED

Sl. No	Name of the Student	Contact number	Whatsapp number	Email Id
1	MAYURI.M	9074718426	9074718426	mayurimanikandan2000@gmail.com
2	DIVYA. S	8921759976	8921759976	divyassnair2000@gmail.com
3	RAKENDHU.SR	9048583389	9400575272	rakendhumunna@gmail.com
4	GREESHMA SS	8281859443	9846548563	greeshmass1234@gmail.com
5	SEEMANDINI.M	9567420682	9567420682	seemaseemus65@gmail.com
6	MIDHUNGIREESH	7356291117	7356291117	midhungireesh7@gmail.com
7	M S MANAS	9633919251	9633919251	manas88868@gmail.com
8	VISHNU V	7356019950	7356019950	vikramanvishnu7@gmail.com
9	PRAPITHA U	9496751929	9497780066	prapithaprapi25@gmail.com
10	REVATHY A	9074650319	9074650319	revathya2000@gmail.com
11	LEKSHMI D KARUNAN S	9400927408	9400927408	lekshmidileepk@gmail.com
12	MEENAKSHY VENU	9048033937	9048033937	meenakshyvenu@gmail.com
13	SARIKA.S	7907352699	7907352699	s9633244@gmail.com
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20	UMESH	7025472767	7025472767	umeshu2018@gmail.com
21	SHAHUL N S	8594039855	8594039855	shahulnujum381@gmail.com
22	ARAVIND R	7994104765	9061156226	aravindardzzz@gmail.com
23	ARUNRAJ D	8137058989	8137058989	arunraj9907@gmail.com

Register of Attendance and Fees for the Month of March 2020 - 2021 February Standard .....

Addmission No.	SI.No.	NAME	Days Eng: Date	May	April	May	June	July	August	Tution Fee		Special Fee		Total	Date of Payment	Initials of class Teacher
										Fees Rs. Ps.	Fine Rs. Ps.	Fees Rs. Ps.	Fine Rs. Ps.	Rs. Ps.		
	1	MAYURI. M														
	2	DIVYA. S														
	3	RAKENDHU. S. R														
	4	GREESHMA. S. S														
	5	SEEMANDINI. M														
	6	MIDHUN GIREESH														
	7	M. S. MANAS														
	8	VISHNU. V														
	9	PRAPTHA. U.														
	10	REVATHY. A														
	11	LEKSHMI. D. KARUNAN. S														
	12	MEENAKSHY VENU														
	13	SARIKA. S														
	14	AKSHARA. A. M														
	15	KRISHNENDHU. A. M														
	16	SREELEKSHMI. P														
	17	THASNI. B														
	18	ANUPAMA. A. L														
	19	L. AISWARYA														
	20	UMESH														
	21	SHAHUL. N. S														
	22	ARAVIND. R														
	23	ANURAJ. D.														

Attendance register: Certificate course in 2020-21.

REPORT:

Department of Chemistry, Sree Narayana College, Chathannur has well-coordinated and successfully consummated its UGC approved one year Skill based Diploma Course (under National Skills Qualification Framework (NSQF), sanctioned to the college in the year 2020. This skill-based program was intended to provide basic expertise to students in computational drug discovery process, starting from CADD fundaments to drug approval process. Course was designed in a such way to cover all the recent developments in the field of CADD and included training sessions in various molecular modelling techniques and in computer aided drug design. The hands-on practice sessions included in this course equipped the students to handle various drug docking tools. This diploma course was inaugurated by Dr. Achuthsankar S. Nair, Professor and Head, Department of computational Biology and Bioinformatics, University of Kerala on 10/03/2020 with an introductory talk "Molecular Docking". A total of twenty-three students enrolled for this programme and the classes were handled by the faculties in chemistry department of this college and our industrial collaborators Accubits Technologies Inc. Due to covid pandemic situation we had to postpone some of the training sessions which necessitated lab facilities and hence got lagged and extended till college reopen. After the successful completion of the course, students were given the course completion certificate.

DIPLOMA COURSE IN MOLECULAR DOCKING 2021-22

(An UGC approved Skill based Diploma course under National Skills Qualification Framework(NSQF))

Department of Chemistry, Sree Narayana College, Chathannur has procured the sanction to conduct UGC approved one year Skill based Diploma Course (under National Skills Qualification Framework (NSQF), in the year 2020. Department of Chemistry successfully conducted the course in the sanctioned year (2020-21) and there up on the second batch of students enrolled in the next academic year 2021-2022. This skill-based program was intended to provide basic expertise to students in computational drug discovery process, starting from CADD fundaments to drug approval process. Course was designed in a way to cover all the recent developments in the field of CADD and included training sessions in various molecular modelling techniques and in computer aided drug design. The hands-on practice sessions included in this course equipped the students to handle various drug docking tools. A total of twenty-seven students enrolled for this programme and the classes were handled by the faculties in chemistry department of this college. After the successful completion of the course, students were given the course completion certificate.

Sree Narayana College

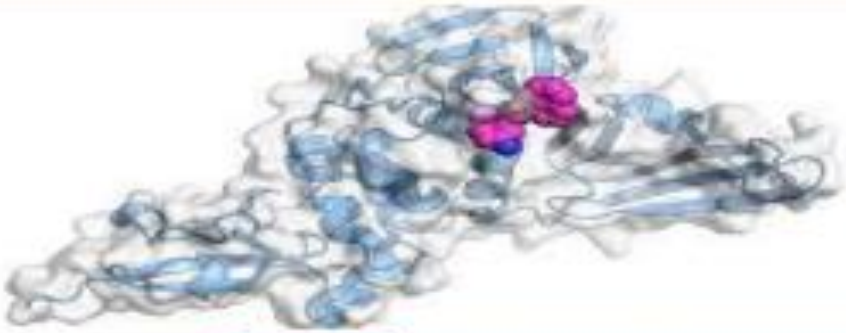
Affiliated to University of Kerala

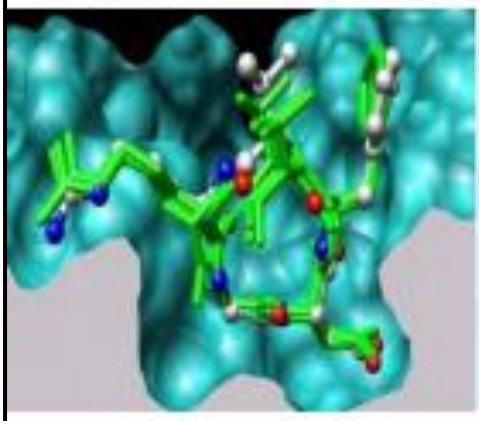
ADMISSION NOTICE

DIPLOMA COURSE

MOLECULAR DOCKING

2021-22 (Duration : I year)





This course will explore the current strategies and techniques for identifying drug targets, lead compounds, and in addition to that, the proposed program will provide training in various molecular modelling techniques that can be applied in computer aided drug design. The Diploma course will provide a skill based learning platform, through which students would acquire excellence in handling bioinformatic / chemoinformatic tools and softwares, modelling molecules, designing combinatorial libraries and also get well versed in designing in silico drug molecules

Last date of submission of application form : I October 2022

SREE NARAYANA COLLEGE CHATHANNOOR

Courses Aligned with National Skills Qualification Framework (NSQF)

(U.G.C. APPROVED)

For further details, kindly contact : 9446035426, 9446569388, 9446112116

SKILL BASED DIPLOMA COURSE IN MOLECULAR DOCKING

This Diploma program in Molecular Docking aims to provide basic expertise in drug discovery process, starting from CADD fundaments to drug approval process. This course will explore the current strategies and techniques for identifying drug targets, lead compounds, and in addition to that, the proposed program will provide training in various molecular modelling techniques that can be applied in computeraided drug design. The hands-on practise sessions included in this course will equip the student to handledrug docking tools and software and the students will learn to design combinatorial libraries. The coursewill also cover the procedural practises in getting approval for newly designed drug and patent acquiringformalities

Scope:

The Diploma course will provide a skill based learning platform, through which students would acquire excellence in handling bioinformatic/chemoinformatic tools and softwares, modelling molecules, designing combinatorial libraries and also get well versed in designing *in silico* drug molecules.

Course Objectives: On course completion the student will;

1. learn basic concepts of drug docking
2. get introduced to various biological and chemical databases
3. get familiarise with bioinformatics and chemoinformatics tools
4. gain expertise in molecular modelling
5. learn various techniques in *insilico* virtual screening & its protocols
6. get exposure in CADD through case studies and hands-on practises

Background

Biology has undergone a transformation from its traditional ethos to that of an information science. Currently, a lot of work in life sciences is centered around biological databases, mainly genomic and proteomic. Many of the tools and techniques of biology have been reborn with an informational flavor. A typical example is that of phylogenetics. The classification of species basedon phenotype (external characteristics) is now recognized as being highly subjective. Its place hasbeen taken by a classification that is based on genotype (genetic makeup).

As the whole world is facing the Covid 19 pandemic, it is imperative that the higher education institutions explore avenues to impart knowledge and skills that are of relevance to it. Moleculardocking is an important skill in the field of modern drug design and development which is being applied the world over,in the hope of discovering a potent molecule that can arrest target molecules of Covid 19. Students of higher education in the field of Chemistry and allied branchessuch as biochemistry and biotechnology will benefit by training in this area, both in terms of research and innovation, as well as enhanced employability in pharma sector. This proposal has been evolved in this backdrop. A 6 month certificate course in Molecular Docking has been designed by the college.

Industrial Relevance of Drug Docking

Identifying a disease and bringing out an effective drug into the market could take anywhere from 10–15 years, cost up to US$800 million, and involve testing of up to 30,000 candidate molecules. The economic significance of the activity thus needs no special emphasis. This costly,time-consuming activity has been traditionally based on a blind search for molecules, rightly termed as serendipitous discovery. Computer aided drug design or rational drug design has cut the cost and time of drug discovery with great effect. Today computationally it is possible to select candidate drug molecules from huge available databases and check whether it can bind tothe active site of the troublesome molecule using computational docking procedures.

Drug Docking: Tools and Techniques

Computer aided drug design is the use of computational techniques to cut down the search for drug molecules. A large class of diseases arises out of an unwelcome molecule, possibly a proteinproduced from the gene of a pathogen, an intruder organism, like a virus. A simplified picture ofdiseases could be given based on “good” and “bad” proteins. The human body can be assumed to be producing proteins P1, P2, P3 ... that are useful and required for the human body. When apathogen, a virus or a bacteria, enters the human body, it could produce its own protein, say X, which is possibly harmful. How exactly is it harmful? X could interact and form a complex, in which two molecules are bound together into a new one, with one of the good proteins, say P1,thereby inhibiting it from its routine activities and causing the onset of a disease. The strategy to combat the disease is to introduce a new molecule, say Y, into the body such that X is more attracted to Y than to P1, thereby freeing P1 to get back to routine work. It must be noted that all diseases do not fit into this model. Sometimes,

our own protein-making machinery can go wrong and produce P1' instead of P1, causing disease.

Docking software such as Hex, Argus Lab, and Autodock (Open Source) are capable of docking the small molecules to selected active sites of target molecules and give a relative score for the binding. The small number of (a few dozen) of molecules thus predicted computationally is thenpassed on to the wet lab for synthesis and clinical trials. Licence softwares are also available.

Curricula and Credit System for the course:

Total credits: 60

Credits for Skill development Component (70%)	:	42
General Education (30%)	:	18

Total number of students enrolled in the programme	**:**	**27**

COURSE STRUCTURE AND CONTENT

Skill Development Component:(Credits: 42)					
Course Curriculum : Molecular Docking					
	Course Content	**Credits**		**Hours**	
	Course content	**Theory**	**Lab**	**Theory**	**Lab**
Module I	**Introduction to Computer –Aided Drug Design:** Concept and basic terminologies of Computer-Aided Drug Design, Target, hit, lead, optimization, docking, pharmacophore- Informatics & Methods in drug design; Introduction to genomics, proteomics, Bioinformatics, chemoinformatics, combinatorial chemistry.- Role of chemoinformatics in drug discovery. Pharmacology, reverse pharmacology, toxicology, ADME databases, chemical, biochemical and pharmaceutical databases. Drug Discovery pipeline	**6**	**1**	**6**	**2**
		Credits: 7		**Hours: 8**	
Module II	**Molecular Modelling and docking:** Introduction, Molecular Dynamics of simple molecules, structure predicting tools, homology modelling, Ab-Initio modelling, protein 3D structure prediction, Modelling softwares, energy minimization techniques, Ramachandran plot, Fold recognition.	**6**	**2**	**6**	**4**
		Credits: 8		**Hours: 10**	
Module III	**Drug targets and molecules:** Drug Molecules, Mechanism of Drug Action; Drug like compounds, Prediction of drug toxicity, Small Molecule Data bases and representation of Drug molecules; QSAR, pharmacophore mapping	**6**	**2**	**6**	**4**

		Credits: 8		**Hours: 10**	
Module IV	**Various approaches in drug design**: Rational drug design,Structure based drug design, Ligand based Drug Design, drug binding mechanisms, virtual screening, Docking andscoring, Docking methods –preparation of molecules, Combinatorial library design. sampling techniques, scoring, errors in docking, drug target selection, Lead compound discovery and optimization, The role of quantummechanics in structure-based drug design, Drug receptor interactions, Checking ADME properties in drugdesign, hands-on experience in docking softwares	**9**	**2**	**9**	**4**
		Credits:11		**Hours: 20**	
Module V	Case study of docking of smallmolecules with Covid 19 targets	**8**		**16**	
		Credits: 8		**Hours: 16**	
		Total Credits: 42		**Total Hours: 64**	

General Education course content(Credits: 18)			
Module I	Intellectual property Right (IPR), copyright, patent, patent filing, Ethics of drug testing in animals and humans, Drug marketing, Pharma Industry	**9**	**9**
Module II	Environmental studies, Value education, ICT skills, how to acquire critical thinking, problem solving skills	**9**	**9**
		Total Credits: 18	**Total Hours :18**

Total Credits: 60 **Total Hours: 82**

Attendance register: Certificate course in 2021-22.

SREE NARAYANA COLLEGE
CHATHANNUR

CERTIFICATE OF COMPLETION

This is to certify that Mr/Mr Shijina S. has successfully completed the skill Based Diploma Course in Molecular Docking 2021-2022 organised by Department of Chemistry, Sree Narayana College, Chathannur

DR.M.S LATHA
PRINCIAL

PRINCIPAL
SREE N.ARAYANA COLLEGE
CHATHANNUR

S. N. COLLEGE
CHATHANNOOR
DEPT. OF CHEMISTRY

DR.VIDHYA R.V
COURSE COORDINATOR

Sample of student certificate.

REPORT:

Department of Chemistry, Sree Narayana College, Chathannur has procured the sanction to conduct UGC approved one year Skill based Diploma Course (under National Skills Qualification Framework (NSQF), in the year 2020. Department of Chemistry successfully conducted the course in the sanctioned year (2020-21) and there up on the second batch of students enrolled in the next academic year 2021-2022. This skill-based program was intended to provide basic expertise to students in computational drug discovery process, starting from CADD fundaments to drug approval process. Course was designed in a way to cover all the recent developments in the field of CADD and included training sessions in various molecular modelling techniques and in computer aided drug design. The hands-on practice sessions included in this course equipped the students to handle various drug docking tools. A total of twenty-seven students enrolled for this programme and the classes were handled by the faculties in chemistry department of this college. After the successful completion of the course, students were given the course completion certificate.