

Nallamuthu Gounder Mahalingam College, Pollachi (Autonomous)

NAAC Accredited and Affiliated to Bharathiar University

22PCY4VA - ANALYTICAL TECHNIQUES

(A value added course offered by Post Graduate Department of Chemistry)

Offered to: **Students of all streams**

Total Hours: **30Hrs**

Semester of offering: **Even**

MISSION

Provide acquaintance to create healthy, high quality and most accessible personal care and household products for the society by using pure and simple eco-friendly ingredients.

VISION

To become a leading entrepreneur in manufacturing safe and environmentally conscious personal care and household products.

Scope

- This course will train participants with the knowledge and skills required for success in the practical operation of Volumetric analysis
- This course is designed to expertise regulations governing Analytical techniques for using various industries.

Objectives

- To enable the students to attain knowledge on various chromatographic techniques
- To gain knowledge in Volumetric Analysis and Chromatographic techniques.

Course Outcomes

Classify chromatographic techniques and to assess the separation techniques of a chemical compound.

- Comprehend the basic principle, instrumentation and applications of various chromatographic techniques.
- Analyze the various methods involved in analytical techniques.
- Apply the various chromatographic techniques to separate the compounds in the field of research.

Advantages

- To apply the various analytical techniques for industrial purposes.

Employability

- Graduates will be qualified to work in Chromatographic techniques as operators to the expected industry standard.
- Students have the opportunity to undertake an optional placement and enhance their entrepreneur skill by offering valuable experience.

Contact Details:

Dr. K.Poonkodi

Email Id: poonks.che@gmail.com

Mobile Number: 9842990353

Mrs. M.Anusuya

anusuyamk@gmail.com

9497470426

Course fee: Rs. 350/-

Class time: 4.00pm to 5.00 pm

Course starts on 15.02.2023

Course admission: first week of January 2023

Programme code:	M.Sc.	Programme Title :		Master of Chemistry	
Course Code:	22PCY4VA	Value added course Analytical techniques		Batch	2022-2024
				Semester	II / IV
Lecture Hrs/Week:	2	Total Hrs/Sem	30	Credits:	2
Scope					
* This course will train participants with the knowledge and skills required for success in the practical operation of Volumetric analysis					
* This course is designed to expertise regulations governing Analytical techniques for using various industries.					

Course Objectives

Upon completion, the participant should be able to:

- * To enable the students to attain knowledge on various chromatographic techniques.
- * To gain knowledge in Volumetric Analysis and Chromatographic techniques.

Employability

- * Graduates will be qualified to work in Chromatographic techniques as operators to the expected industry standard.
- * Students have the opportunity to undertake an optional placement and enhance their entrepreneur skill by offering valuable experience.

Advantages

- * To apply the various analytical techniques for industrial purposes.

Course Outcomes

- * Classify chromatographic techniques and to assess the separation techniques of a chemical compound.
- * Comprehend the basic principle, instrumentation and applications of various chromatographic techniques.
- * Analyze the various methods involved in analytical techniques.
- * Apply the various chromatographic techniques to separate the compounds in the field of research.

Units	Content	Hrs
Unit I	Volumetric analysis Types of titrations: Acid base, Complexometric, Precipitation, Redox, Theories of Indicators: common indicators used in Acid base, Complexometric, Precipitation and Redox titrations. Concentration: Molarity, Molality, Normality, including exercises on how to prepare different concentrations of various solutes. Standardisation of Volumetric solutions, using primary standards. Calculations in volumetric Analysis	7
Unit II	Chromatographic techniques Adsorption chromatography, Partition chromatography, Paper Chromatography, Thin Layer Chromatography (Qualitative and Quantitative), Gas Chromatography (Qualitative and Quantitative), High Performance Liquid Chromatography (Qualitative and Quantitative).	8
Unit III	Practicals I. TLC Plate preparation, application of sample and development of plates for either one of the following: vitamins composition, a crude plant extract and a synthetic reaction mixture. Paper Chromatography – Separation of various colours of inks used in ball point pens. II. Recording of UV and visible spectrum for organic molecules and finding out of λ_{max} . III. Soil and water analysis 1. Collection of water samples (Field work) 2. Determination of total hardness of water 3. Determination of alkalinity of water 4. Determination of pH of water 5. Determination of conductivity of water 6. Collection of soil samples from fields and study of soil sampling tools. (Field work) 7. Soil sample preparation 8. Determination of bulk density of soil 9. Determination of pH of soil 10. Determination of conductivity of soil	15
Total Contact Hrs		30

Pedagogy

Direct Instruction, Flipped Class, Digital Presentation

Assessment Methods:

Seminar, Quiz, Assignments, Group Task.

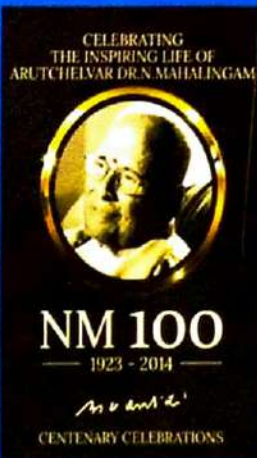
Text Book

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Gurdeep R. Chatwal, Anand, S.K.	Instrumental Methods of Chemical Analysis	Himalaya Publishing House.	2003
2	Sharma, B.K.	Instrumental methods of Chemical analysis.	Krishna Prakashan Media P.Ltd, 18 th Edition	2011

Reference Books

S.NO	AUTHOR	TITLE OF THE BOOK	PUBLISHERS \ EDITION	YEAR OF PUBLICATION
1	Skoog, D.A West, D.M & James Holler, F	Analytical Chemistry – An Introduction	Saunders College publishing	2000
2	Willard, H.H, Merrit L.L & Dean, J.A	Instrumental method of analysis	CBS Publishers & Distributors. 7 th Edition	2002
3	Drago, R.S	Physical methods in Inorganic chemistry	W. B. Saunders Company. 1 st Edition	1992
4	S.M. Khopkar	Basic Concepts of Analytical Chemistry	New Age International Publishers, 3 rd Edn	2008

Course Designed by	Head of the Department	Curriculum Development Cell	Controller of the Examination
Name and Signature	Name and Signature	Name and Signature	Name and Signature
Name: Dr.K.Poonkodi Ms. K.Vimaladevi Ms. R. Mini 1. K.P.H 2. J.K. Vimaladevi 3. R. Mini Signature:	Name: Dr.K.Poonkodi K.P.H Signature:	Name: Mr.K.Srinivasan Signature:	Name: Dr.R.Muthukumaran Signature:
Dr.K.POONKODI HEAD PG DEPARTMENT OF CHEMISTRY (SF) NGM COLLEGE, POLLACHI	K. SRINIVASAN, M.C.A. Co-ordinator Curriculum Development Cell (CDC) NGM College (Autonomous) Pollachi - 642 001.	Dr. R. MANICKA CHEZIAN, M.Sc., M.S., Ph.D. Controller of Examinations NGM College (Autonomous) POLLACHI - 642 001.	



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Value Added Course

This is to certify that ~~Mr.~~/Ms. RAJATHI . M

of IIIrd MSc CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

secured a mark of 56 out of 100

1. C. P. U

COURSE TEACHER

[Signature]

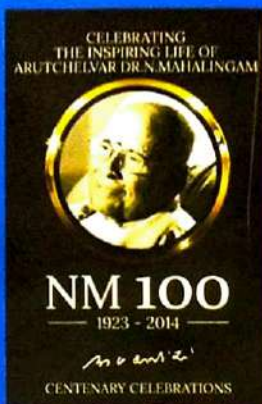
DEAN - ACADEMIC

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IQAC CO-ORDINATOR

[Signature]

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Value Added Course

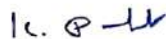
This is to certify that Mr./Ms. SANGEETHA . S

of IInd MSC CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

secured a mark of 61 out of 100



COURSE TEACHER



DEAN - ACADEMIC



IQAC CO-ORDINATOR



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Centenary Celebrations

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Value Added Course

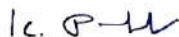
This is to certify that *Mr./Ms.* SHINYA . M . R .

of IInd MSC CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

secured a mark of 81 out of 100



COURSE TEACHER



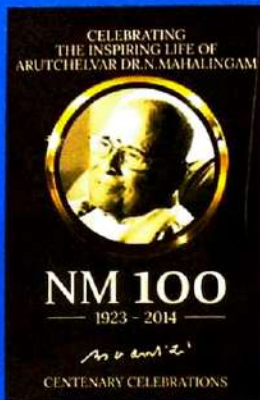
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Value Added Course

This is to certify that ~~Mr./Ms.~~ SRIVARSHINI . A

of 1st MSC CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

secured a mark of 77 out of 100



COURSE TEACHER



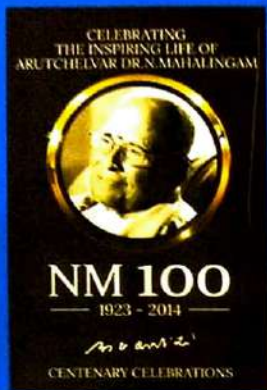
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Value Added Course

This is to certify that Mr./Ms. PRIYADHARSHNI S

of IInd MSc CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

secured a mark of 64 out of 100

Dr. P. H.
COURSE TEACHER

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DEAN - ACADEMIC

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IQAC CO-ORDINATOR

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Value Added Course

CERTIFICATE OF COMPLETION

This is to certify that *Mr./Ms. KARPAGANAGANANTHINI. M.*

of *IInd* *MSC CHEMISTRY* department

has successfully completed a Value Added Course

entitled *ANALYTICAL TECHNIQUES* and

secured a mark of *90* out of 100

l. p. l.
COURSE TEACHER

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Value Added Course



This is to certify that Mr./Ms. GORIKA : D

of IInd MSC CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

secured a mark of 85 out of 100

1c. B-H
COURSE TEACHER

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Value Added Course

This is to certify that *Mr./Ms. ASWATHI. S*

of *IInd MSC CHEMISTRY* department

has successfully completed a Value Added Course

entitled *ANALYTICAL TECHNIQUES* and

secured a mark of *97* out of 100

lc. P. M.

COURSE TEACHER

A. P. S.

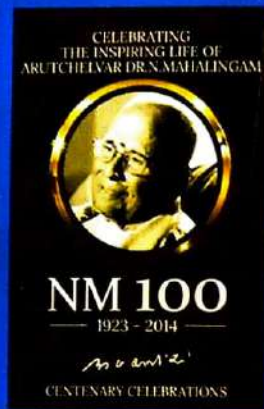
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K. S. L.

IQAC CO-ORDINATOR

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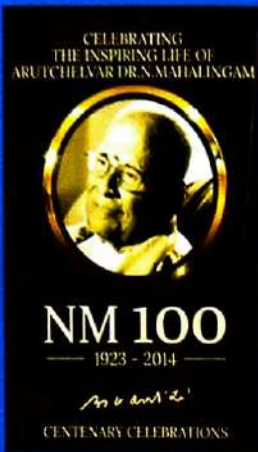
This is to certify that Mr./Ms. NAGAMANIKANDAN . K
of IInd MSC CHEMISTRY department
has successfully completed a Value Added Course
entitled ANALYTICAL TECHNIQUES and
secured a mark of 68 out of 100

K. P. L.
COURSE TEACHER

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IQAC CO-ORDINATOR

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Value Added Course

This is to certify that Mr./Ms. VIVIN . K . S

of IInd MSc CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

secured a mark of 57 out of 100

K. P. U

COURSE TEACHER

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Value Added Course

This is to certify that Mr./Ms. SAINULABUDEEN . A

of IInd MSC CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

secured a mark of 59 out of 100

K. P. M.

COURSE TEACHER

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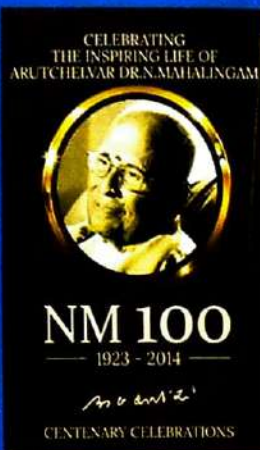
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Value Added Course

This is to certify that Mr./Ms. YASWANTH . P

of IInd MSc CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

secured a mark of 76 out of 100

lc. P-11
COURSE TEACHER

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Value Added Course

This is to certify that Mr./Ms. ADARSA . R

of IInd MSC CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

secured a mark of 70 out of 100

10.8.11

COURSE TEACHER

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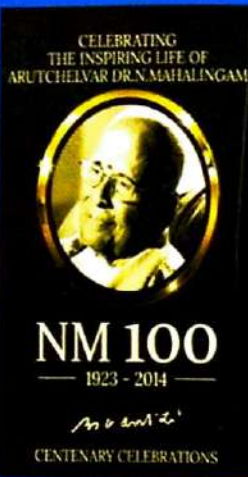
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Value Added Course

This is to certify that *Mr./Ms. ANUSHIYA DEVI . G*

of *IInd MSC CHEMISTRY* department

has successfully completed a Value Added Course

entitled *ANALYTICAL TECHNIQUES* and

secured a mark of *70* out of 100

K. P. U.

COURSE TEACHER

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Value Added Course

This is to certify that Mr./Ms. ANJU . A . K

of IInd MSC CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

secured a mark of 89 out of 100

lc. p-ll

COURSE TEACHER

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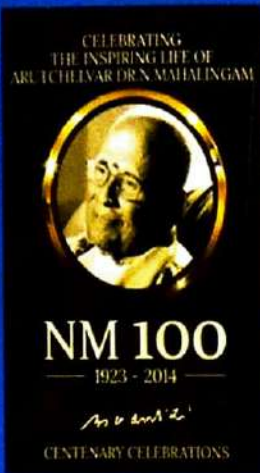
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Value Added Course

This is to certify that Mr./Ms. HABILHARAN . M

of IInd MSC CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

secured a mark of 52 out of 100

K. P. S.
COURSE TEACHER

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Value Added Course

This is to certify that Mr./Ms. JAYAKUMAR . R

of IInd MSC CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

secured a mark of 55 out of 100

[Signature]

COURSE TEACHER

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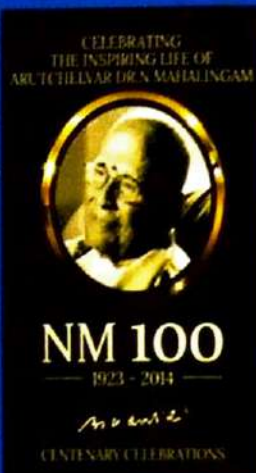
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QAC CO-ORDINATOR

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Value Added Course

This is to certify that Mr./Ms. CHARLES JENITH . R.

of IInd . MSC CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

secured a mark of 53 out of 100



COURSE TEACHER



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Value Added Course

This is to certify that Mr./Ms. ATHUL . A . R.

of IInd MSC . CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

secured a mark of 64 out of 100

ic. P. [Signature]

COURSE TEACHER

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DEAN - ACADEMIC

[Signature]

IQAC CO-ORDINATOR

[Signature]

PRINCIPAL

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Value Added Course

This is to certify that Mr./Ms. ANAND KUMAR . E

of 1st MSc. CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

secured a mark of 54 out of 100

COURSE TEACHER

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IQAC CO-ORDINATOR

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Value Added Course

This is to certify that *Mr./Ms.* VASUNDHARA .B

of IInd MSC CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

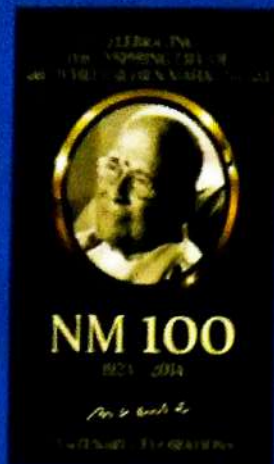
secured a mark of 87 out of 100

COURSE TEACHER

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Value Added Course

This is to certify that Mr./Ms. Vikashini S.

of II M.Sc. CHEMISTRY department

has successfully completed a Value Added Course

entitled Analytical Techniques and

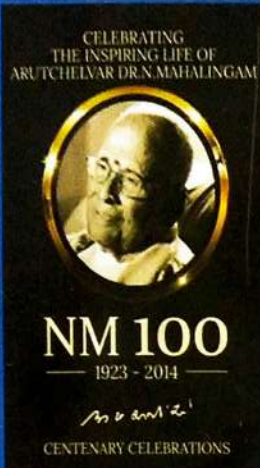
secured a mark of 84 out of 100

COURSE TEACHER

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Value Added Course

This is to certify that Mr./Ms. GOKUL S

of I-M.Sc. CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

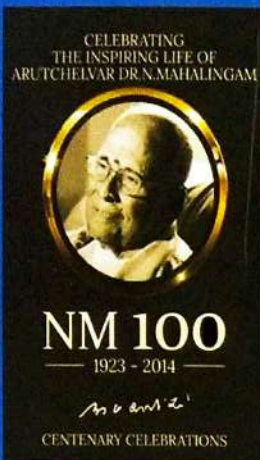
secured a mark of 61 out of 100

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Ranked 72nd among Colleges in India by MHRD - NIRF
Affiliated to Bharathiar University, Coimbatore.



Value Added Course

This is to certify that Mr./Ms. HARI KRISHNAN. K

of I.MSC CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

secured a mark of 56 out of 100

COURSE TEACHER

DEAN - ACADEMIC

QAC CO-ORDINATOR

PRINCIPAL

CELEBRATING
THE INSPIRING LIFE OF
ARUTCHELVAR DR.N.MAHALINGAM



NM 100

1923 - 2014

Arutche

CENTENARY CELEBRATIONS



NGM COLLEGE

(Autonomous), Pollachi

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Affiliated to Bharathiar University, Coimbatore.



EXPANSION WITH
EXCELLENCE

Value Added Course

This is to certify that Mr./Ms. KAVIANANTAM. N

of I. MSC CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

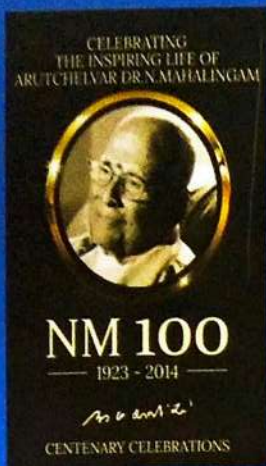
secured a mark of 65 out of 100

COURSE TEACHER

DEAN - ACADEMIC

IQAC CO-ORDINATOR

PRINCIPAL



CERTIFICATE OF COMPLETION



NGM COLLEGE

(Autonomous), Pollachi

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Affiliated to Bharathiar University, Coimbatore.



Value Added Course

This is to certify that Mr./Ms. MUKILAN . S

of I.MSc CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

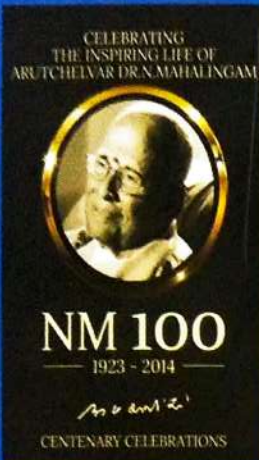
secured a mark of 69 out of 100

COURSE TEACHER

DEAN - ACADEMIC

IQAC CO-ORDINATOR

PRINCIPAL



CERTIFICATE OF COMPLETION



NGM COLLEGE

(Autonomous), Pollachi

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Affiliated to Bharathiar University, Coimbatore.



Value Added Course

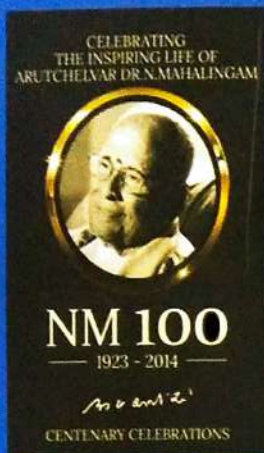
This is to certify that Mr./Ms. SABAREESWARAN . G
of I. MSC CHEMISTRY department
has successfully completed a Value Added Course
entitled ANALYTICAL TECHNIQUES and
secured a mark of 72 out of 100

COURSE TEACHER

DEAN - ACADEMIC

IQAC CO-ORDINATOR

PRINCIPAL



NGM COLLEGE

(Autonomous), Pollachi

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Ranked 72nd among Colleges in India by MHRD - NIRF
Affiliated to Bharathiar University, Coimbatore.



Value Added Course

CERTIFICATE OF COMPLETION

This is to certify that Mr./Ms. VISHNUVARDHAN. S

of I. MSc CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

secured a mark of 72 out of 100

COURSE TEACHER

DEAN - ACADEMIC

IQAC CO-ORDINATOR

PRINCIPAL

CELEBRATING
THE INSPIRING LIFE OF
ARUTCHELVAR DR. N. MAHALINGAM



NM 100
— 1923 - 2014 —

As a part of

CENTENARY CELEBRATIONS



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Affiliated to Bharathiar University, Coimbatore.



EXPANSION WITH
EXCELLENCE

Value Added Course

This is to certify that Mr./Ms. AMMU DHRISHYA . J

of I. MSc CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

secured a mark of 62 out of 100

COURSE TEACHER

DEAN - ACADEMIC

IQAC CO-ORDINATOR

PRINCIPAL

**CERTIFICATE
OF COMPLETION**

CELEBRATING
THE INSPIRING LIFE OF
ARUTHELVAR DR.N.MAIALINGAM



NM 100

1923 - 2014

CENTENARY CELEBRATIONS

CERTIFICATE OF COMPLETION



NGM COLLEGE

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Ranked 72nd among Colleges in India by MHRD - NIRF
Affiliated to Bharathiar University, Coimbatore.



Value Added Course

This is to certify that *Mr./Ms.* **ANGULAKSHMI . B**

of **I.MSc CHEMISTRY** department

has successfully completed a Value Added Course

entitled **ANALYTICAL TECHNIQUES** and

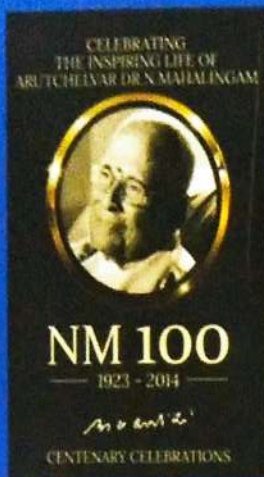
secured a mark of **71** out of 100

COURSE TEACHER

DEAN - ACADEMIC

IQAC CO-ORDINATOR

PRINCIPAL



CERTIFICATE OF COMPLETION



NGM COLLEGE

(Autonomous), Pollachi

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Ranked 72nd among Colleges in India by MHRD - NIRF

Affiliated to Bharathiar University, Coimbatore.



Value Added Course

This is to certify that *Mr./Ms.* **ANSIYA. M**

of **I. MSc CHEMISTRY** department

has successfully completed a Value Added Course

entitled **ANALYTICAL TECHNIQUES** *and*

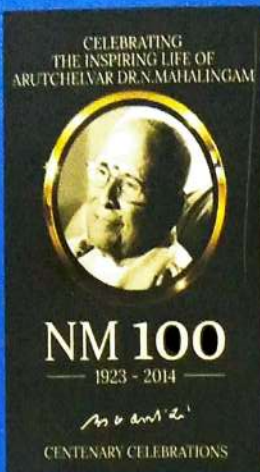
secured a mark of **84** *out of 100*

COURSE TEACHER

DEAN - ACADEMIC

IQAC CO-ORDINATOR

PRINCIPAL



CERTIFICATE OF COMPLETION



NGM COLLEGE

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Affiliated to Bharathiar University, Coimbatore.



Value Added Course

This is to certify that ~~Mr.~~/Ms. **ATHULYA G**

of **I. MSc CHEMISTRY** department

has successfully completed a Value Added Course

entitled **ANALYTICAL TECHNIQUES** and

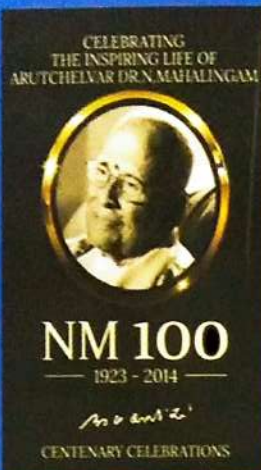
secured a mark of **67** out of 100

COURSE TEACHER

DEAN - ACADEMIC

IQAC CO-ORDINATOR

PRINCIPAL



CERTIFICATE OF COMPLETION



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Value Added Course

This is to certify that *Mr./Ms.* I MAYA VARSHINI. R
of I. MSc CHEMISTRY department
has successfully completed a Value Added Course
entitled ANALYTICAL TECHNIQUES and
secured a mark of 72 out of 100

COURSE TEACHER

DEAN - ACADEMIC

IQAC CO-ORDINATOR

PRINCIPAL

CELEBRATING
THE INSPIRING LIFE OF
ARUTCHELVAR DR. N. MAHALINGAM



NM 100

1923 - 2014

CENTENARY CELEBRATIONS

CERTIFICATE OF COMPLETION



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EXPANSION WITH
EXCELLENCE

Value Added Course

This is to certify that ~~Mr./Ms.~~ **JOONA J**

of **I. MSc CHEMISTRY** department

has successfully completed a Value Added Course

entitled **ANALYTICAL TECHNIQUES** and

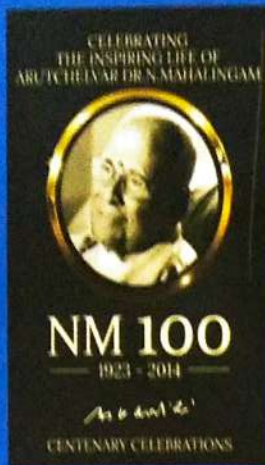
secured a mark of **77** out of 100

COURSE TEACHER

DEAN - ACADEMIC

IQAC CO-ORDINATOR

PRINCIPAL



CERTIFICATE OF COMPLETION



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Value Added Course

This is to certify that ~~Mr.~~/Ms. KAVIYA.P

of I.MSC CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

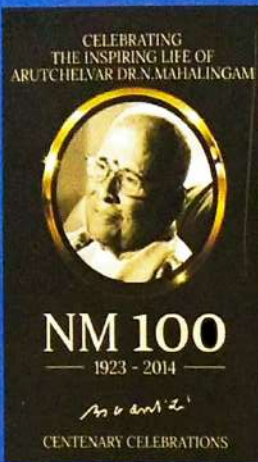
secured a mark of 91 out of 100

COURSE TEACHER

DEAN - ACADEMIC

IQAC CO-ORDINATOR

PRINCIPAL



CERTIFICATE OF COMPLETION



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Value Added Course

This is to certify that ~~Mr./Ms.~~ **KEERTHI. M**

of **I.MSc CHEMISTRY** department

has successfully completed a Value Added Course

entitled **ANALYTICAL TECHNIQUES** and

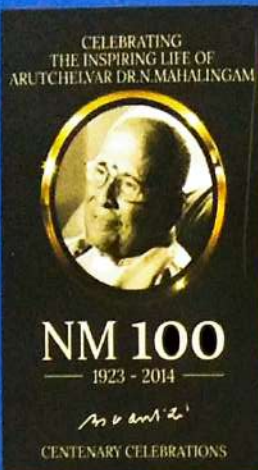
secured a mark of **72** out of 100

COURSE TEACHER

DEAN - ACADEMIC

IQAC CO-ORDINATOR

PRINCIPAL



NGM COLLEGE

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Value Added Course

CERTIFICATE OF COMPLETION

This is to certify that ~~Mr.~~/Ms. MISNA H

of I. MSc CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

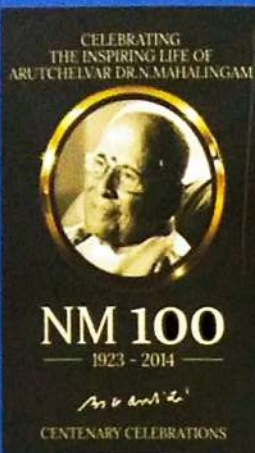
secured a mark of 71 out of 100

COURSE TEACHER

DEAN - ACADEMIC

IQAC CO-ORDINATOR

PRINCIPAL



CERTIFICATE OF COMPLETION



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Affiliated to Bharathiar University, Coimbatore.



Value Added Course

This is to certify that ~~Mr.~~/Ms. **PRINCY. S**

of **I.MSc CHEMISTRY** department

has successfully completed a Value Added Course

entitled **ANALYTICAL TECHNIQUES** and

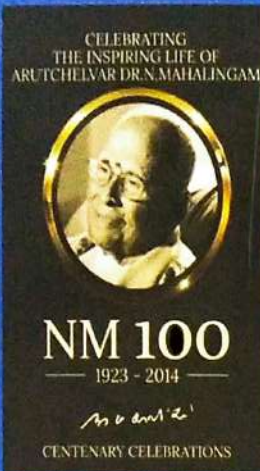
secured a mark of **78** out of 100

COURSE TEACHER

DEAN - ACADEMIC

IQAC CO-ORDINATOR

PRINCIPAL



CERTIFICATE OF COMPLETION



NGM COLLEGE

(Autonomous), Pollachi

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Value Added Course

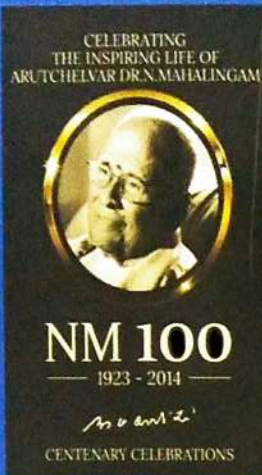
This is to certify that Mr./Ms. PRIYA. D
of I. MSc CHEMISTRY department
has successfully completed a Value Added Course
entitled ANALYTICAL TECHNIQUES and
secured a mark of 66 out of 100

COURSE TEACHER

DEAN - ACADEMIC

IQAC CO-ORDINATOR

PRINCIPAL



CERTIFICATE OF COMPLETION



NGM COLLEGE

(Autonomous), Pollachi

Re-Accredited by NAAC and ISO 9001 : 2015 Certified Institution
Ranked 72nd among Colleges in India by MHRD - NIRF
Affiliated to Bharathiar University, Coimbatore.



Value Added Course

This is to certify that ~~Mr.~~/Ms. VISHALINI. M

of I. MSc CHEMISTRY department

has successfully completed a Value Added Course

entitled ANALYTICAL TECHNIQUES and

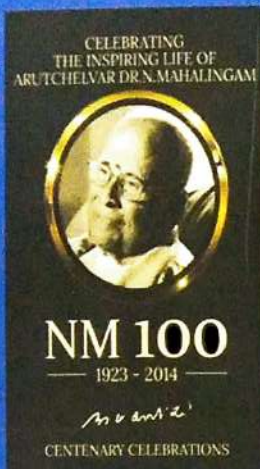
secured a mark of 69 out of 100

COURSE TEACHER

DEAN - ACADEMIC

IQAC CO-ORDINATOR

PRINCIPAL



CERTIFICATE OF COMPLETION



NGM COLLEGE

(Autonomous), Pollachi

Re-Accredited by NAAC and ISO 9001 : 2015 Certified Institution
Ranked 72nd among Colleges in India by MHRD - NIRF
Affiliated to Bharathiar University, Coimbatore.



Value Added Course

This is to certify that ~~Mr./Ms.~~ **VISMAYA . D**

of **I. MSC CHEMISTRY** department

has successfully completed a Value Added Course

entitled **ANALYTICAL TECHNIQUES** and

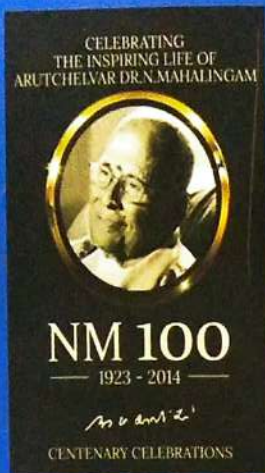
secured a mark of **60** out of 100

COURSE TEACHER

DEAN - ACADEMIC

IQAC CO-ORDINATOR

PRINCIPAL



CERTIFICATE OF COMPLETION



NGM COLLEGE

(Autonomous), Pollachi

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Ranked 72nd among Colleges in India by MHRD - NIRF
Affiliated to Bharathiar University, Coimbatore.



Value Added Course

This is to certify that ~~Mr./Ms.~~ **PRIYA VARDHINI . M**

of **I. MSc CHEMISTRY** department

has successfully completed a Value Added Course

entitled **ANALYTICAL TECHNIQUES** and

secured a mark of **60** out of 100

COURSE TEACHER

DEAN - ACADEMIC

IQAC CO-ORDINATOR

PRINCIPAL