

**PROGRESS REPORT**

**AY: 2017-18**

**STAR COLLEGE SCHEME**

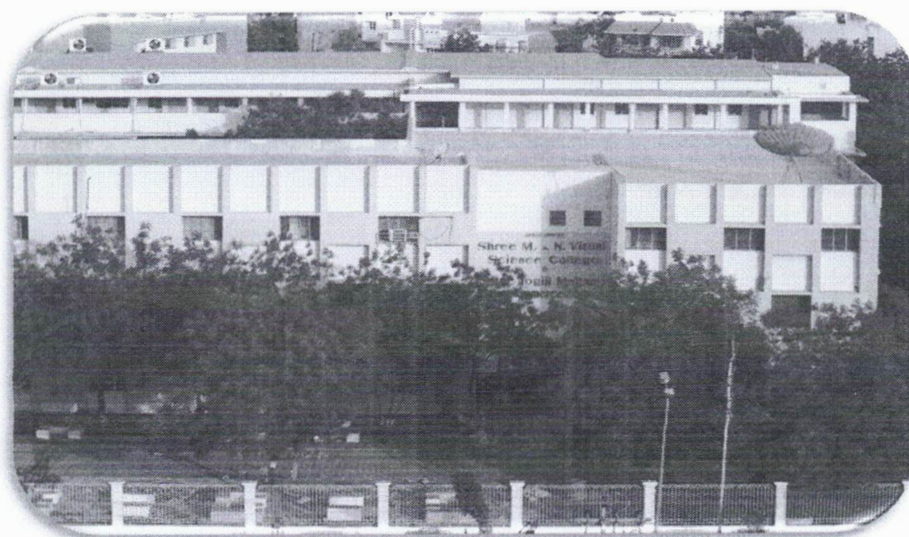
**(Industrial Chemistry, Mathematics, Biology, Physics)**

**Submitted to**

**DEPARTMENT OF BIOTECHNOLOGY**

**MINISTRY OF SCIENCE & TECHNOLOGY**

**GOVERNMENT OF INDIA, NEW DELHI**



**Submitted by**

**Sarvodaya Kelavani Samaj managed**

**ATMIYA GROUP OF INSTITUTIONS**

**Shree Manibhai Virani & Smt. Navalben Virani Science College (Autonomous)**

**(Reaccredited at the 'A' Level by NAAC with 3.28 CGPA &**

**College with Potential for Excellence by the UGC Phase II)**

**All India NIRF Rank 37<sup>th</sup> by MHRD, New Delhi**

**(Affiliated to Saurashtra University, Rajkot)**

**'YOGIDHAM GURUKUL', KALAWAD ROAD, RAJKOT - 360 005 (Gujarat)**

**Phone : (0281) 2562681, Fax : (0281) 2563952**

**E-mail : [admin@vsc.edu.in](mailto:admin@vsc.edu.in), [rstank@vsc.edu.in](mailto:rstank@vsc.edu.in)**

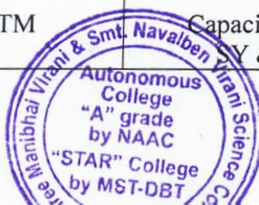
**Website: [www.vsc.edu.in](http://www.vsc.edu.in)**

**DEPARTMENT OF BIOTECHNOLOGY**  
**STAR COLLEGE SCHEME**

**Progress Report for STAR College supported under 'Star College Scheme'**

1. **Name of the College :** Shree Manibhai Virani & Smt. Navalben Virani Science College (Autonomous), Rajkot
2. **Status(Govt./ Govt. Aided/ Autonomous/Pvt)** Govt. Aided ( Autonomous from 2016-17)
3. **Women's College or Co-educational** Co-Educational
4. **Urban/Rural** Urban
5. **No. of departments supported**  
1. Industrial Chemistry (UG & PG)  
2. Mathematics (UG & PG)  
3. Biology (Ancillary Dept.)  
4. Physics (Ancillary Dept.)  
(MST order no: BT/HRD/11/07/2015 Dated: 14/01/2016)
6. **NAAC Ranking + Year** Reaccredited with '**A**' level (3.28 CGPA) by NAAC **Feb 2014**.  
37<sup>th</sup> All India Rank in NIRF-2017.
7. **Details of extramural funding received in the last 3 years (UGC, DBT, DST; duration, period and amount )**

Funding Agency	Details	Duration	Amount in Lacs
UGC	CPE	3 Years F.No. 20-40-38/2010-2014 (NS/PE) dated 16/4/2014	150.0
UGC	Din Dayal Upadhyay Kaushal Kendra	3 Years D.O.No.3-43/2015 (KAUSHAL) dated 14/08/2015	180.0
UGC	B.Voc.	3 Years D.O.No.F.2-2/2014 (B.Voc.) dated 05/05/2014	135.0
DST	FIST	5 Years SR/FST/College-039/2010 dated 31/12/2012	37.85
DBT	STAR Scheme	3 Years No. BT/HRD/ 11/7/2015 dated 14/01/2016	47.0
DBT	STAR Status	3 Years No. BT/HRD/ 11/027/2008 dated 05/05/2014	66.0
DST, GoG	GSBTM	Every Year Capacity Building Program for UG & TY B.Sc. Students	07.35

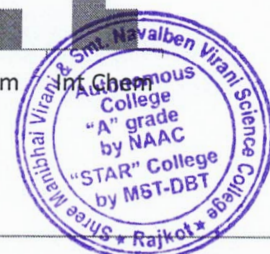
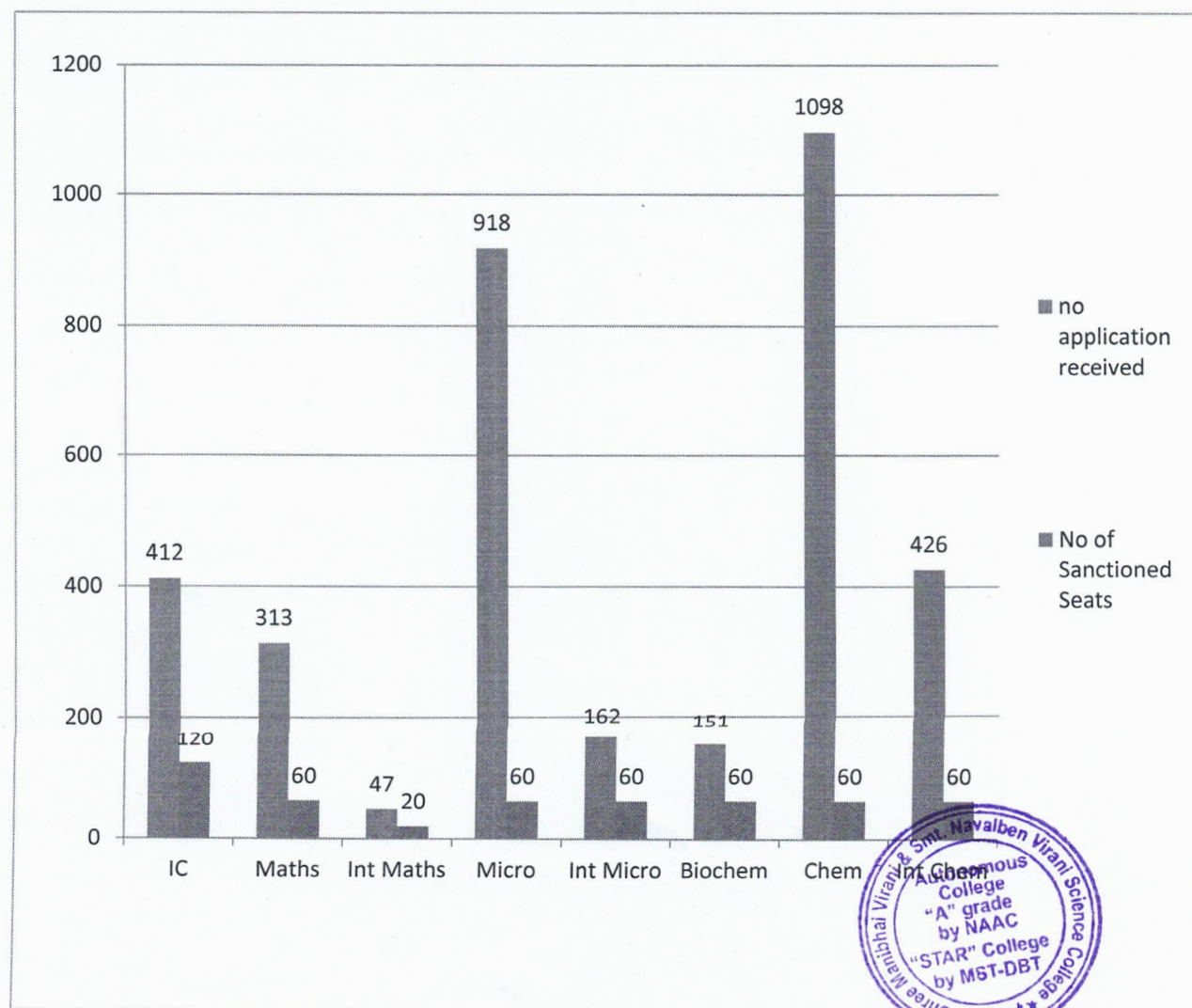




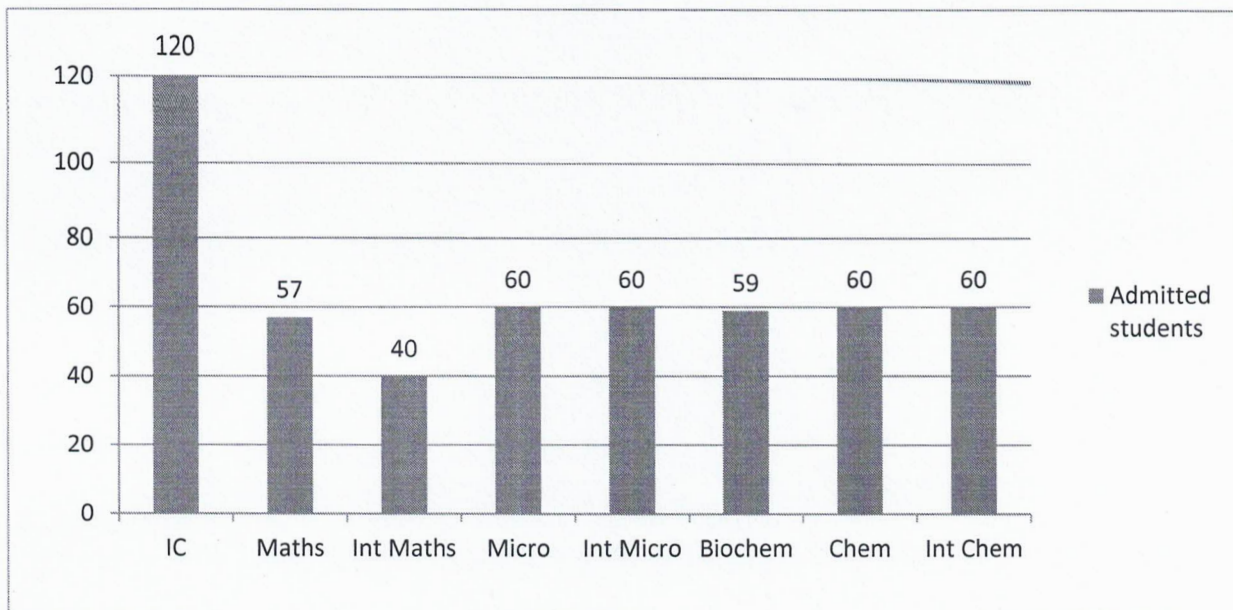
8. No. of applicants vs No. of seats in each department A.Y. 2017-18

Department	Program	No of Sanctioned Seats	Application Received
Industrial Chemistry	B.Sc.-IC	120	412
Mathematics	B.Sc.-Mathematics	60	313
	5 years Integrated B.Sc.-M.Sc. Mathematics	20/60	47
Biology (Botany & Zoology)  (Allied subject to)	B.Sc. Microbiology	60	918
	5 years Integrated B.Sc.-M.Sc. Microbiology	60	162
	B.Sc. Biochemistry	60	151
Physics  (Allied subject to )	B.Sc. Mathematics	60	313
	5 years Integrated B.Sc.-M.Sc. Mathematics	60	47
	B.Sc. Chemistry	60	1098
	5 years Integrated B.Sc.-M.Sc Chemistry	60	426

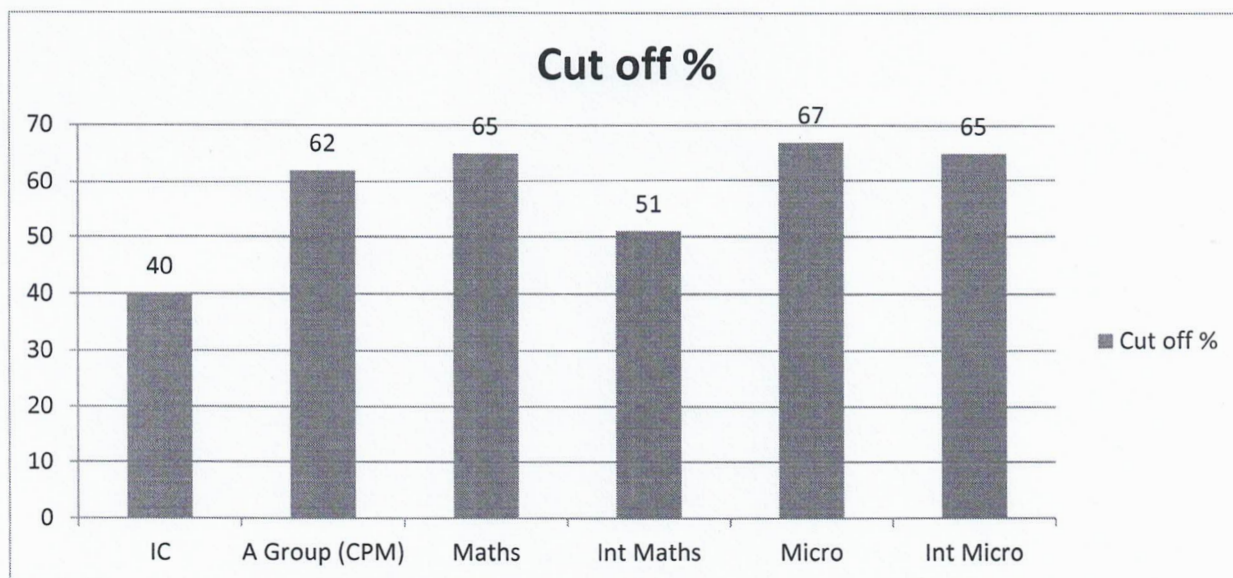
IC = Industrial Chemistry      Int = 5 year Integrated      Maths = Mathematics



9. Number of students admitted year wise in different courses supported under the Star College Scheme



10. Change in the cut off percentage/admission



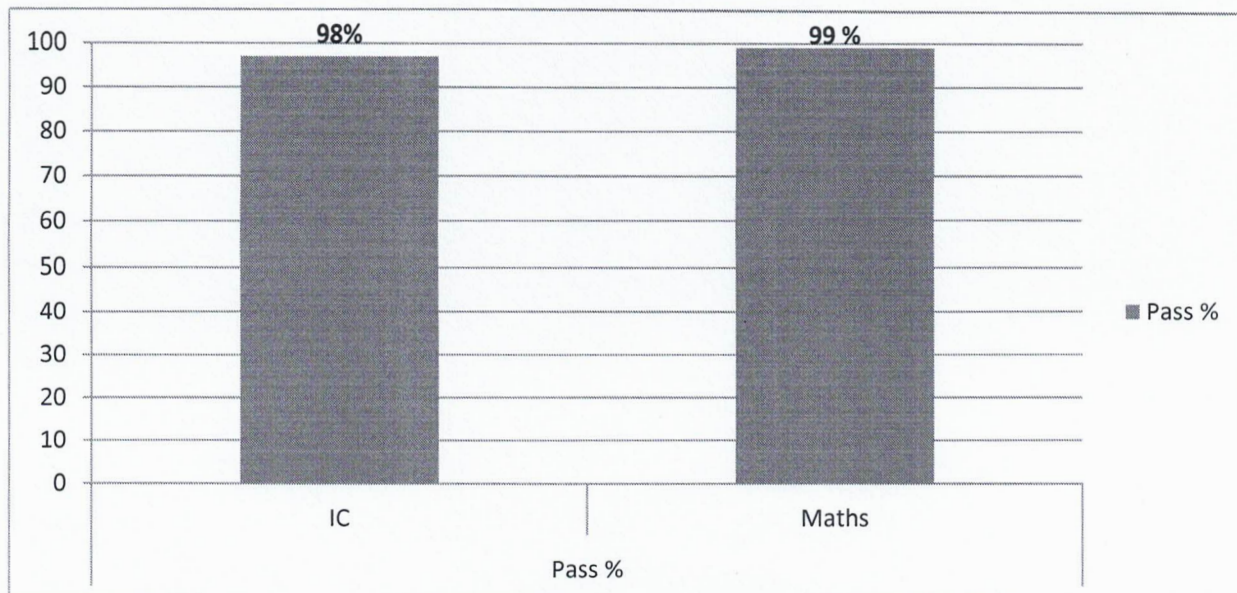
11. Change in the dropout rate

- The overall dropout rate for the institution is between 0.5 to 1.0%.
- After STAR Status it has become almost negligible.

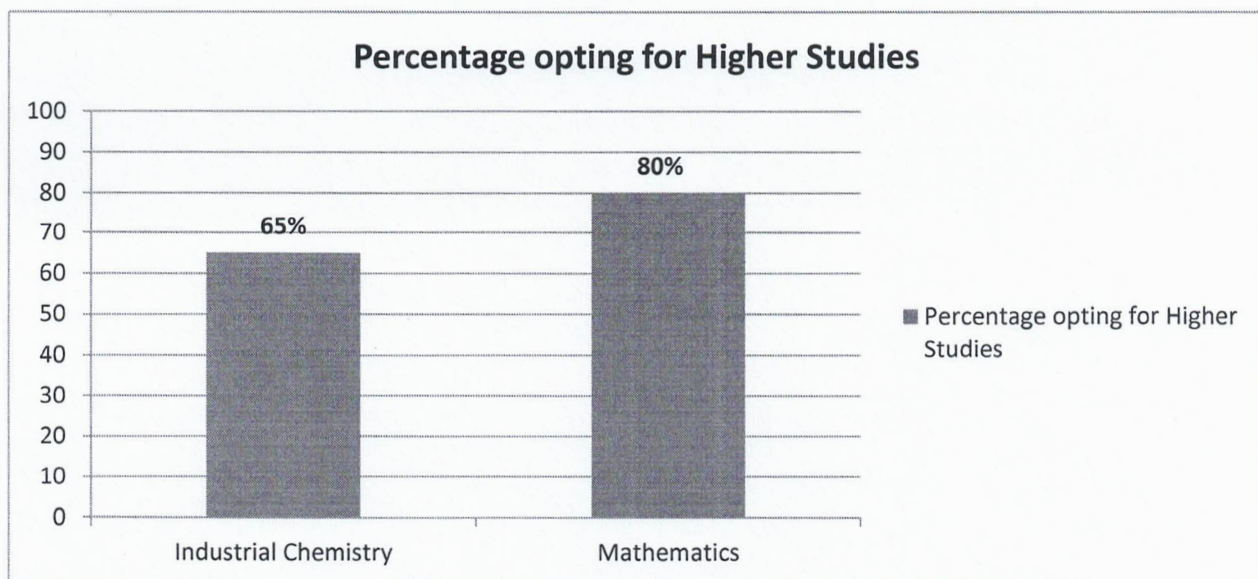




12. Data on pass percentage (UG level)



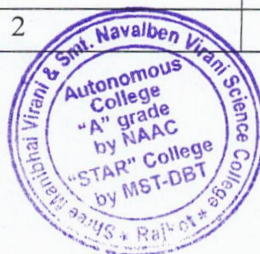
13. Data on how many students opted for PG courses



14. List of additional Practical introduced

Total 60 new Practical were introduced in different departments under STAR scheme.

SN	Department	No. of New Practical Introduced	No. of New Exercise
1	Industrial Chemistry	23	20
2	Mathematics	26	89
3	Biology (Ancillary)	5	5
4	Physics (Ancillary)	2	2



Please refer Annexure 1

**15. List of Minor Projects Implemented, name of students and supervisor**

The Department of Industrial Chemistry, Mathematics, Biology and Physics offer small research problems / projects only to the B.Sc. students.

Year	Department	No. of Projects Undertaken	No. of Students taking Projects
2017-18	Industrial Chemistry	06	23
	Mathematics	12	43
	Biology (Ancillary)	07	20
	Physics (Ancillary)	04	203

Please refer Annexure 2

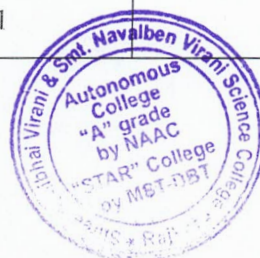
**16. Faculty improvement activities (FIA) such as training courses, seminars etc conducted and their impact**

**A. Shree Manibhai Virani and Smt. Navalben Virani Science College (Autonomous), Rajkot**

Department	FIA Conducted	Total Faculty benefited
Industrial Chemistry	04	15
Mathematics	09	
Biology (Ancillary)	05	
Physics (Ancillary)	02	

**B. FIA conducted by the college for off campus Higher Secondary Schools**

School	FIA Conducted	Total School Faculty benefited
Dholakiya School, Village Mavdi	01	12
Krishna International School, Village Rajkot	01	
Lotus School, Village Padadhari	01	
Atmiya School, City Rajkot	01	
Chanakya School, Village Rajkot	01	



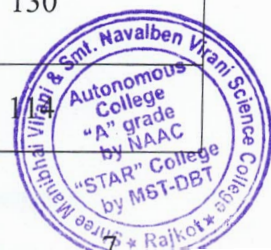
Please refer Annexure 3



**17. Outreach activities conducted and their impact/ follow-up:**

Various Activities like Workshop, Training Programmes, Seminars, Guest talks, and Paper Presentation is conducted with neighboring Colleges of the region and State

Sr. No.	Activity	Date	No. of Participants
1.	Preparation of Environment Audit Report for various industries allotted by GPCB Gandhinagar	01/04/2017 To 31/03/2018	02 Staff members of Department of Industrial Chemistry are recognized Schedule –I auditor of GPCB, Gandhinagar.
2.	Preparation of Soil Health Card under Gujarat Government Project under National Mission for Sustainable Agriculture(NMSA).	01/04/2017 To 31/03/2018	14 students of B.Sc. IC along with 21 students of B.Sc. Chemistry and B.Voc students have participated in the project
3.	Observing “International Yoga Day”	21/06/2017	1000+ students and staff members of the college
4.	Collection of fund from faculty, students and society along with equal or more contribution from the management for “Armed Forces Day (Flag Day)	07/12/2017	1000+ students and staff members of the college
5.	Guest lecture on Applications of mathematics in computer science organised by Department of Mathematics ,Shree Manibhai Virani and Smt. Navalben Virani Science,Rajkot	13/09/2017	65
6.	Guest Lecture on Problem Solving Strategies organised by Department of Mathematics ,Shree Manibhai Virani and Smt. Navalben Virani Science,Rajkot	22/12/2017	70
7.	Guest Lecture on Life and Work of Srinivasa Ramanujan organised by Department of Mathematics ,Shree Manibhai Virani and Smt. Navalben Virani Science, Rajkot	22/12/2017	52
8.	Popular Video Lecture on “All about lights” by Dr. J.J. Rawal	03/02/2018	94
9.	Guest talk delivered by Dr. Biswajit Basu Pharmaceutical Chemistry	01/08/2017	87
10.	Guest talk delivered by Mr. Rajat D. Undadkat On Prospect in Industrial Chemistry	05/08/2017	130
11.	Guest talk delivered by Mr. Sorathiya Viral On Introduction to Ceramic Industries	18/09/2017	





12.	Training workshop on new instruments of Industrial Chemistry by Mr. Vipul Patel of AVM Scientificm Rajkot	29/01/2018	45
<b>Popular Scientific Interaction with 11<sup>th</sup> &amp; 12<sup>th</sup> Standard Students</b>			
13.	Visit to T & L resources of various departments of the college • Krishna School, • Pathak Schools	18/11/2017	87 students from 2 schools of Rajkot District
	Principal, Construction and brief demonstration of Sophisticated Instruments • Atmiya School, • Krishna International Schools	17/11/2017	138 students from 2 Schools of Rajkot District
	Visit of School student from • Dholakiya School (87), Vill: Mavdi • Atmiya School (58), City: Rajkot • Lotus School(72), Vill: Padadhari Demonstrations of Basic Laboratory Techniques, Introduction to Glassware, Titration of acid-base, etc	22-01-2018 23-01-2018 24-01-2018	257 students from 3 Schools of Rajkot District
14.	Active Participation of college students & faculty members in student made cosmetic product display and selling in <b>Samarth-2018</b>	03/02/2018	200+ UG Students of the college and campus

**Impact :**

- Increased Industry-Academic interaction.
- Earn while learn opportunity.
- Enhanced Environment Awareness.
- Augmented Demand ratio.
- Popularization of Scientific temperament in Society.
- Increment in Public Positive perception.
- Skill enhancement.

**18. Any outstanding achievement by student/faculty (merit, award, research paper presentation in national/international conference/ etc; full citation to be provided)**

Papers Presentation by Faculty/students at National/ State Level Conference and Seminars:

- FY B.Sc. Industrial Chemistry Sem-2 student Mr. Vrushank Hathi got **1<sup>st</sup> Rank** in 10<sup>th</sup> National Science Symposium-2018 on Recent Trends in Science & Technology organized by Christ College, Rajkot on 11<sup>th</sup> February 2018.

Type of Publication	International	National	Others (State/Regional)
Peer Reviewed Journals	9	4	2
Conference Proceedings	-	2	-

**19. List of Short term training courses/workshops conducted for students and faculty, including title, duration, no. of beneficiaries**

Workshops / Seminar/ Summer School/Training programs conducted= **40**

Please refer **Annexure 4**





**20. Guest Lectures (details like name of scientist, topic, no. of students)**

Total number of Guest Lectures arranged = 10

Please refer Annexure 5

**21. Visits to industries, institutes etc (name of place, duration of visit and no. of students)**

Total number of visits arranged = 05

Please refer Annexure 6

**22. List of Lab manuals/SOPs generated for all participating departments**

Following manuals/SOPs have been generated by the STAR departments under the scheme.

**A. Laboratory Manuals/SOPs generated = 04:**

1. Dyes & Dyeing, Pigments & Paints
2. Unit Operations
3. Analytical Chemical Techniques
4. Unit Processes

**B. Study Material generated = 06:**

1. Unit Operations
2. Dyes & Dyeing, Pigments & Paints
3. Material Science
4. Unit Processes
5. Analytical Chemical Techniques
6. Mass & Energy Balance

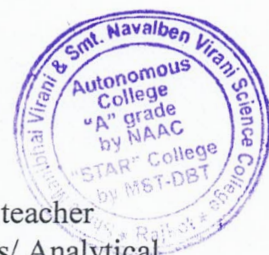
**23. Feedback mechanism adopted for Theory Course/Practical Course**

Feedback is taken on:

- Individual Course (Theory).
- Individual Course (Practical)
- Faculty Handling the Course (both Theory & Practical)
- Question paper

Analysis of the Feedback is done based on following Criteria :

- Relevance of the course the program
- Relevance of the course to real-life situations/applicability
- Positioning of the course the semester
- Its relevance as a fundamental / Application-oriented course
- Understanding of the course in relation to practical, if any
- Facilitation of learning of the course by the teacher
- Information on additional learning / reading resources given by teacher
- Learning value in terms of ( Information/ Knowledge/ Concepts/ Analytical abilities/Physical/Technical skills/ Application)
- Overall rating of the course



## 24. Any special innovative approach adopted by the college in improving the UG education

UG education has been immensely boosted due to the support received from DBT STAR College Scheme of MST-DBT in imparting quality education along with sensitization towards importance and scopes of fundamental sciences.

Due to the scheme the college has promoted following innovative move towards learner centric approach:

- **Interdepartmental & Interdisciplinary Activities** in form exchange of knowledge through Lectures, workshops, Industrial training and field visits.
- **Peer Teaching-** Conduction of Practical for the juniors by senior student peers.
- **Community Education-** through charts, posters & awareness programs.
- **Botanical Herbarium** – Understanding regional medicinal plants (beyond curriculum).
- **Learning Commons** – Theoretical & Practical concept clarification and Problem solving.

## 25. A summary on “how the Scheme helped in strengthening of the UG education and what would not have been possible without this” (not more than 1000 characters)

The college has achieved following qualitative & quantitative improvements due to implementation of the STAR scheme of DBT-MST.

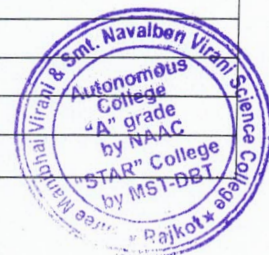
### 1. Students and Faculty:

- There is inclined awareness, involvement, progression towards Research attitude & Higher studies in Science.
- Industrial Visit and Educational visits have been found essential for Skill development and Better placement.
- Outcome based subject content enrichment with better understanding.
- Improvement in creativity of students & faculty.
- Improvement in T/L/E quality and Augmentation in teaching, learning and hands on training for faculty, staff and students.
- Implementation of vocational programs under DDU-KK.
- Better performance in International level/National level/State level competition.
- Quality enrichment in research projects and dissertation.
- Exposure to newer techniques and recent advancements.
- Transformation in the Level of teaching, Vision towards fundamental sciences is increased.
- Development of ICT based teaching - learning content for the students.
- Curriculum enrichment by introduction of new practical, expert talks etc.
- Presentation and Communication Skills, Writing, Reading and Comprehensive Skills of reviewing scientific articles and Research Publications by students and faculties.

### 2. T / L Resources Enrichment:

- **Books/Journals**

Department	No. of Books
Industrial Chemistry	30
Mathematics	256
Biology (Ancillary Department)	24
Physics (Ancillary Department)	10
<b>Total</b>	<b>320</b>





- **Minor Instruments/Equipments**

Department	No. of Instrument/Equipments
Industrial Chemistry	47
Mathematics	10
Biology (Ancillary Department)	17
Physics (Ancillary Department)	01
<b>Total</b>	<b>64</b>

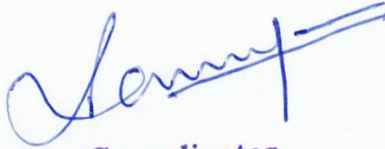
3. Interdisciplinary approach: Strengthening of interdisciplinary approach with other departments of institute for small research projects, expert lectures, visits, Training and awareness programmes.
4. Strengthened alumni interaction.
5. Goodwill & rapport generation and Popularization of STAR college scheme.
6. Improvement in University results and ranks.
7. Increased Academic-Industries interaction.

**Due to the support given by DBT-MST under 'STAR' College Scheme & the implementation; the college have achieved following credentials:**


- All India Rank 37<sup>th</sup> – NIRF-2017, MHRD, New Delhi.
- UGC's 'Autonomous College' Scheme.
- 'A' grade by NAAC Cycle-2.
- Nodal Centre for Capacity Building from GSBTM, DST-GoG.
- GPCB approved Schedule-I Environmental Auditor.
- GSBTM Nodal centre for Capacity Building

**26. Suggestions/feedback for improving the scheme**

- Teacher & Student exchange program across Star colleges may be promoted.

  
**Co-ordinator,**  
*DBT-STAR Scheme*  
**Shri Manibhai Virani & Smt. Navalben**  
**Virani Science College, Rajkot**

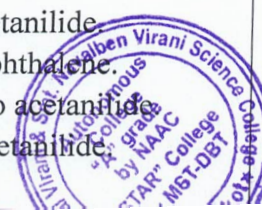


  
**Principal**  
**Shri Manibhai Virani and**  
**Smt. Navalben Virani Science College**  
**(Autonomous) Rajkot.**

**Details of New Practical- Exercise Introduced**

**INDUSTRIAL CHEMISTRY DEPARTMENT**

Semester Course Name	New Practical Introduced
Unit Operations Practicals	<ol style="list-style-type: none"> <li>To perform steam distillation.</li> <li>To study the distillation technique for given sample (Polar &amp; Non-polar solvent)</li> <li>To study the fractional distillation for given mixture of liquid(Polar &amp; Non-polar solvent)</li> <li>To determine the molecular condition of benzoic acid in kerosene and distilled water by the method of partition coefficient.</li> <li>To determine practical yield for crystallization of Benzoic acid ( By Cooling)</li> <li>To determine practical yield for crystallization of Copper Sulphate(By evaporation)</li> <li>To determine practical yield for crystallization of mixture of compounds(Benzoic acid + Copper Sulphate)</li> <li>To determine practical yield for crystallization of Benzoic acid without seeding.</li> <li>To determine practical yield for crystallization of Benzoic acid with seeding.</li> <li>To study filtration rate of given sample.</li> <li>To study the Construction and Working of Tray Drier.</li> </ol>
DYES& DYEING, PIGMENTS &PAINTS PRACTICAL	<ol style="list-style-type: none"> <li>To prepare Lake Red dye</li> <li>To prepare Yellow 4G dye</li> <li>To prepare Methyl Orange dye</li> <li>To prepare Disperse dye</li> <li>To prepare Methyl Red</li> <li>Dyeing of a cotton piece by Crystal Violet</li> <li>Dyeing of a cotton piece by Methylene Blue</li> <li>Dyeing of a cotton piece by Congo Red</li> <li>Dyeing of a cotton piece by Aniline Black</li> </ol>
UNIT PROCESSES PRACTICAL	<ol style="list-style-type: none"> <li>Preparation of Fumaric acid from Maleic acid.</li> <li>Preparation of Benzil from Benzoin.</li> <li>Preparation of m-nitro benzoic acid from Benzoic acid.</li> <li>Preparation of p-nitro benzoic acid from p-nitro toluene.</li> <li>Preparation of Diazo amino benzene from Aniline.</li> <li>Preparation of Phenyl azoβ-Naphthol from Aniline.</li> <li>Preparation of p-bromo acetanilide from Acetanilide</li> <li>Preparation of α-Nitro naphthalene from Naphthalene.</li> <li>Preparation of p-bromo aniline from p-bromo acetanilide</li> <li>Preparation of p-nitro aniline from p-nitro acetanilide</li> <li>Preparation of Sulfanilic acid from Aniline.</li> </ol>






<p>ANALYTICAL CHEMICAL TECHNIQUE PRACTICAL</p>	<ol style="list-style-type: none"> <li>1. Determination the amount of non-volatile dissolved solids in the given sample of water.</li> <li>2. Determination of alkalinity of water sample in terms of carbonate, bicarbonate and hydroxide.</li> <li>3. Determination of amount of chloride in given water sample.</li> <li>4. Determination of hardness of a water sample.</li> <li>5. Determination of the total acidity of the given water sample.</li> <li>6. Determination of the normality of X-N CH<sub>3</sub>COOH solution with the help of 0.5 N NaOH solution by using Conductivity meter.</li> <li>7. Determination of the normality of X-N HCl solution with the help of 0.5 N NaOH solution by using Conductivity meter.</li> <li>8. Determination of the normality of X-N HCl +CH<sub>3</sub>COOH solution with the help of 0.5 N NaOH solution by using Conductivity meter.</li> <li>9. Determination of the normality of X-N CH<sub>3</sub>COOH solution with the help of 0.5 N NaOH solution by using pH meter.</li> <li>10. Determination of the normality of X-N HCl solution with the help of 0.5 N NaOH solution by using pH meter.</li> <li>11. Determination of the normality of X-N CH<sub>3</sub>COOH solution with the help of 0.5 N NaOH solution by using Potentiometer.</li> <li>12. Determination of the normality of X-N HCl solution with the help of 0.5 N NaOH solution by using Potentiometer.</li> <li>13. Determination of the amount of Nickel with the dimethyl glyoxime.</li> <li>14. Determination of the amount of Fe<sup>+3</sup> present in given sample.</li> <li>15. Determination of the amount of NO<sub>2</sub><sup>-1</sup> present in given sample.</li> <li>16. Determination of the % concentration of given solution on basis of angle of rotation by using Polarimeter.</li> </ol>
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**MATHEMATICS DEPARTMENT**

<p>Semester Course Name</p>	<p>New Practical Introduced</p>
<p>Semester-I Geogebra</p>	<ol style="list-style-type: none"> <li>1. Observe the file menu of Geogebra and create one new .ggb file.</li> <li>2. Try view menu and make changes in default views - close and reopen all the views like Graphics view, Algebra view, Spreadsheet view and Input Bar.</li> <li>3. Go to Options &gt;Restore Default Settings to restore views.</li> <li>4. Draw some objects like points, line, line segment, circle, triangle, polygon, ellipse etc.</li> <li>5. Click on file menu to save the file assigning some name in a folder of your choice.</li> <li>6. Save graphic view to clipboard using edit menu and open paint and paste the image by pressing “ctrl + v” and save the file in .jpg or .bmp or .png format. go back in Geogebra window.</li> <li>7. Plot a few point (line, line segment, circle, triangle, polygon, ellipse etc.) and format them to change color, style, size etc.</li> <li>8. Display only name, only value, name and value of various object you have created.</li> <li>9. Using Geometry view draw a line segment (and/or triangle, square, polygon and ellipse etc.) and use move around points to rotate</li> </ol>

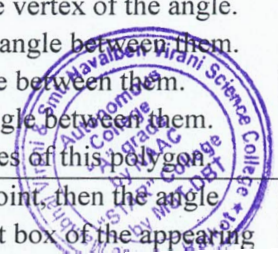




	<ol style="list-style-type: none"> <li>10. Draw a circle or ellipse and plot a point on them using “point on the object tool“ then move the point on that curve.</li> <li>11. Draw any object (like, line, line segment, circle, triangle, polygon, ellipse etc.) then plot a point (say A )on it, using the attach/detach point tool attach/detach the point A from the object.</li> <li>12. Draw any two objects (like, line, line segment, circle, triangle, polygon, ellipse etc.) such that they intersect each other then use “intersect tool ” to find and plot the point of intersection of those curves and identify them.</li> <li>13. Either draw two points or draw any objects like line segment, triangle, polygon etc.) Use “mid-point or center tool” to find the mid-point of two points selected on objects (eg: mid-point of any side or any pair of vertices).</li> <li>14. Use “Complex Number Tool” to plot points as Complex Numbers.</li> <li>15. Use “Line Tool” to plot straight line of your choice.</li> <li>16. Plot two points then Use “Line Tool” to plot straight line.</li> <li>17. Use “Line segment Tool” to plot line segment of your choice.</li> <li>18. Plot two points then Use “Line segment Tool” to plot line segment.</li> <li>19. Use “Line segment with given length tool” to plot a line segment with length 5 units.</li> <li>20. Use “Ray tool” to plot a ray.</li> <li>21. Use “poly line tool” to draw the poly line with 4 line segments.</li> <li>22. Plot two points and draw a vector (Say v) joining those two points.</li> <li>23. Select a point and draw a vector from that point parallel to above vector (v).</li> <li>24. Selecting a line (or a segment) and a point creates a straight line through that point perpendicular to the line (or segment).</li> <li>25. First draw line g and a point A, then Select parallel line tool select the line g and the point A to draw the straight line through A parallel to g.</li> <li>26. Click on either a segment (or interval) s or two points A and B in order to create a perpendicular bisector.</li> <li>27. Angle bisectors can be defined in two ways:       <ol style="list-style-type: none"> <li>(i) Selecting three points A, B, and C produces the angle bisector of the enclosed angle, where point B is the apex.</li> <li>(ii) Selecting two lines produces their two angle bisectors.</li> </ol> </li> <li>28. Select a point and a conic to produce all tangents through the point to the conic.</li> <li>29. Select a line and a conic to produce all tangents to the conic that are parallel to the selected line.</li> <li>30. Plot a set of points then create the best fit line for that set of points using Best Fit Line Tool, as follows :       <ol style="list-style-type: none"> <li>(i) Creating a selection rectangle that contains all points. (ii) Selecting a list of points</li> </ol> </li> </ol>
<p><b>Semester-II Geogebra</b></p>	<ol style="list-style-type: none"> <li>31. Polygon Tool: - Successively select at least three points which will be the vertices of the polygon. Then, click the first point again in order to close the polygon.</li> <li>32. Regular Polygon Tool: - Select two points A and B and specify the number n of vertices in the input field of the appearing dialog window. This gives you a regular polygon with n vertices including points A and B.</li> </ol> 



33. Rigid Polygon Tool: -Successively select at least three free points which will be the vertices of the polygon. Then, click the first point again in order to close the polygon. The resulting polygon will keep the shape: you can move it and rotate it by moving two vertices.
34. Vector Polygon Tool: -Successively select at least three free points which will be the vertices of the polygon. Then, select the first point again in order to close the polygon. The resulting polygon will keep the shape when the first point is dragged, but the other vertices can be moved freely.
35. Circle with Center through Point Tool: - Selecting a point M and a point P defines a circle with center M through P.
36. Circle with Center and Radius Tool : - Select the center point, then enter the radius in the text field of the appearing dialog window.
37. Compass Tool: - Select a segment or two points to specify the radius. Then, click on a point that should be the center of the new circle.
38. Circle through 3 Points Tool: - Selecting three points defines a circle through these points.
39. Semicircle through 2 Points Tool: - Select two points A and B to create a semicircle above the segment (or interval) AB.
40. Circular Arc Tool: - First, select the center point of the circular arc. Then, select the starting point of the arc and another point that specifies the length of the arc.
41. Circumcircular Arc Tool: - Select three points to create a circular arc through these points. Thereby, the first selected point is the starting point of the arc, the second one lies on the arc, and the third selected point is the endpoint of the arc.
42. Circular Sector Tool: - First, select the center point of the circular sector. Then, select the starting point of the sector's arc and another point that specifies the length of the sector's arc.
43. Circumcircular Sector Tool: - Select three points to create a circular sector through these points. Thereby, the first given point is the starting point of the sector's arc, the second one lies on the arc, and the third given point is the endpoint of the sector's arc.
44. Ellipse Tool: - Select the two foci of the ellipse. Then, specify a third point that lies on the ellipse.
45. Hyperbola Tool: - Select the two foci of the hyperbola. Then, specify a third point that lies on the hyperbola.
46. Parabola Tool: - Select a point (focus) and the directrix of the parabola, in any order.
47. Conic through 5 Points Tool: - Selecting five points produces a conic section through these points.
48. Measurement Tools: -
49. Angle Tool: - Click on three points to create an angle between these points. The second point selected is the vertex of the angle.
- 1) Click on two segments to create the angle between them.
  - 2) Click on two lines to create the angle between them.
  - 3) Click on two vectors to create the angle between them.
  - 4) Click on a polygon to create all angles of this polygon.
50. Angle with Given Size Tool: - Select a leg point, then the angle vertex and type the angle's size into the input box of the appearing





window.

51. Distance or Length Tool: - This tool returns the distance between two points, two lines, or a point and a line as a number. It can also be used to measure the length of a segment (or interval), the circumference of a circle, or the perimeter of a polygon.
52. Area Tool: - This tool gives you the area of a polygon, circle, or ellipse as a number and shows a dynamic text in the Menu view Graphics View.
53. Slope Tool: - By selecting a line, this tool gives you the slope of a line and shows a slope triangle in the Menu view Graphics View.
54. Transformation Tools: -
55. Reflect about Line Tool: - Select the object you want to reflect. Then, click on a line to specify the mirror/line of reflection.
56. Reflect about Circle Tool: - Inverts a geometric object about a circle. Select the object you want to invert. Then, click on a circle to specify the mirror/circle of inversion.
57. Rotate around Point Tool: - Select the object you want to rotate. Then, click on a point to specify the center of rotation and enter the rotation angle into the text field of the appearing dialog window.
58. Translate by Vector Tool: - Select the object you want to translate. Then, click on the translation vector or click twice to make a vector.
59. Dilate from Point Tool: - Select the object to be dilated. Then, click on a point to specify the dilation center and enter the dilation factor into the text field of the appearing dialog window.
60. TEXT tool: - Click in the Menu view on TEXT tool in Graphics View to create a new text at location of your choice.
61. Image Tool: -This tool allows you to insert an image into the Menu view graphics.svg Graphics View. First, specify the location of the image in one of the following two ways: Click in the Menu view Graphics View to specify the position of the image's lower left corner. Click on a point to specify this point as the lower left corner of the image.
62. Pen Tool: - The Pen Tool allows the user to add freehand notes and drawings to the Menu view graphics.svg Graphics View. This makes the Pen Tool particularly useful when using GeoGebra for presentations or with multimedia interactive whiteboards.
63. To add a freehand note onto a region of the Menu view graphics.svg Graphics View, activate the tool and draw on your touch screen or with your mouse by holding the left mouse button
64. Relation Tool: - Select two objects to get information about their relation in a pop-up window.
65. Function Inspector Tool: - Enter function  $f(x) = 0.5x^2 + 3x - 5$  in the input bar then Then choose the Function Inspector tool. In the tab Interval you can specify the interval, where the tool will find minimum, maximum, root, etc. of the function. In the tab Points several points of the function are given (step can be changed). Slope etc. can be found at these points.
66. Freehand Shape Tool: -
67. The Freehand Shape Tool lets you either

**Using INPUT BAR:-**

Draw graphs of the following functions by entering equations in the



**INPUT BAR.**

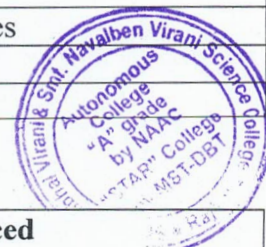
68.  $x=3, y=5$   
 69.  $y=2x+7$   
 70.  $5x+3y+2=0$   
 71.  $x \geq 2, x \leq 5$   
 72.  $x+y < 7$   
 73.  $(x-2)^2+(y-3)^2=25$   
 74.  $x^2/25+y^2/9=1$   
 75.  $x^2/25-y^2/9=1$   
 76.  $x*y=10$   
 77.  $(x-3)^2+y^2 < 4$   
 78.  $y \leq x^2-4$   
 79.  $y=x^5+x^4+x^3+x^2+x+3 \quad x^2 + x y + y^2 = 1$   
 80.  $g(x) = (x-1)(x+2)(x+3)$   
 81.  $g'(x)$   
 82.  $g''(x)$  TWO SINGLE APOSTROPHES!  
 83.  $(x-3)^2 + (y+2)^2 \leq 9$   
 84.  $(x-3)^2 + (y+2)^2 \geq 9$   
 85.  $y=x^5+x^4+2*x^3+7*x^2+3*x+3$   
 86.  $y=x^5+x^4+x^3+x^2+x+3$   
 87.  $f(x) = 2x + 3$   
 88.  $x^3 - y^2 + 2 = 0$   
 89.  $x^3 - y^2 - 3x + 2 = 0$   
 90.  $3x^3 + 5xy^2 + 5x^2 - 5y^2 = 0$   
 91.  $x^3 + xy^2 - 2x^2 + y^2 - 4x - 4y + 4 = 0$   
 92. Create a slider n then enter each of these in the input line:  
 93. Circle[(1,2), n]  
 94. Polygon[(0,0), (1,-1), n]

**BIOLOGY DEPARTMENT**

Semester Course Name	New Practical Introduced
<b>B.Sc. Semester I</b>	Observations of cell structures from different chlorophyceae algae under microscopes
	To determine blood group and Rh factor
<b>B.Sc. Semester II</b>	Preparation and use of Digital herbarium
	Total RBC count by Haemocytometer
	Total WBC count by Haemocytometer
	Differential WBC count
<b>B.Sc. Semester III</b>	Plant Tissue culture techniques
	Identification of poisonous and non-poisonous snakes
<b>B.Sc. Semester IV</b>	Isolation of DNA from different medicinal plants
	Isolation of DNA from Blood samples

**PHYSICS DEPARTMENT**

Semester Course Name	New Practical Introduced
<b>B.Sc. Semester II</b>	Viscosity of different fluids by its flow through a uniform capillary tube.
	Geiger-Muller counter



## Details of Student Research Projects

➤ **Department of Industrial Chemistry:**

Sr. No	Title of the Project	Name of Students	Name of guide
1.	Characterization of Industrial Effluents	Sitapara Ajit Sojitra Brijesh Pagdar Navnit Sudani Kevinkumar Tarpara Milan	Er. Ravi S. Tank
2.	Study on Synthesis of Methyl Salicylate & Its Derivatives	Nikunj D. Rakholiya Dhruvrajsinh Y. Gohil Mahavirsinh M. Gohil	Mr. Prashant S. Gajera
3.	Preparation of Perovskite based catalyst by co-precipitation, citrate & Sol-Gel method	Akbari Vivek B. Mehta Manthan R. Mendapara Akash	Er. Dhaval A. Tank
4.	Hydrogel preparation for the removal of dyes from chemical waste	Bhuva Vaibhav Bhimani Harsh Gadara Dharmil Mehta Mohit Bhanderi Khodidas	Mr. Viral H. Karia
5.	Synthesis of Chalcone & its Derivatives	Mehul Rudani Rathod Sahil	Mr. Pankaj M. Akbari
6.	Synthesis of Oxazole derivatives and its characterisation	Khanpara Nikhil Kachhi Mohit Gadhiya Himanshu Parekh Karan Parakhiya Pritesh	Mr. Govind V. Vagadiya





➤ Department of Physics

S. N.	Title of the Project	Name of Students	Name of guide
1	Power supply wise mobile chargers	All autonomous DSE allied B.Sc. Students of chemistry and Mathematics (Physics)	Dr B.A. Joshi & Dr D. J. Dave
2	Capacitor parallel and series	All autonomous DSE allied integrated M.Sc. Students of chemistry and Mathematics (Physics)	
3	Resister in Series and Parallel	All autonomous DSE allied B.Sc. Students of chemistry and Mathematics (Physics)	Dr B.A. Joshi & Dr D. J. Dave
4	Logic Gate Circuit	Students of S.Y.P.C.M	Dr.B.S.Trivedi

➤ Department of Mathematics :

Sr. No	Title of the Project	Name of Students	Year
1.	The Dihedral Group	1. Methaniya Renish- 385 2. Gadara Chirag-380 3. Sakhiya Akshay- 390 4. Gajera Hiren- 381	2017-2018
2.	Introduction to Geogebra	1. Manan A. Mehta- 384 2. Milan N. Patadiya- 388	2017-2018
3.	Ordinary Differential Equation	1. Satapara Kinal M.- 372 2. Kundariya Kajal H.- 363 3. Bhoraniya Priya V.- 354	2017-2018
4.	Number Theory	1. Serasiya Vahidhusen H.- 392 2. Kukadiya Kishan H.- 383 3. Motla Nimeah M.- 386 4. Sherasiya Kayum A.- 393	2017-2018
5	Real Life Problems Solved by Graph Theory	1. Desai Krishna - 356 2. Patel Krishna - 367 3. Rathod Vibha- 369	2017-2018
6	Let's Try to Crack IIT-JAM	1. Astha Bhalodiya- 352 2. Sweta Bhatt- 353 3. Krupali Sorathiya- 375 4. Miral Kotadia- 362	2017-2018
7	Calculus	1. Shubham Rathod- 380 2. Paresh Sardhara - 391 3. Yashdeepsinh Jadeja- 382 4. Nitin Vadher- 395	2017-2018

8	Introduction to Topology	1. Makadiya Priya- 364 2. Gadara Dhara- 357 3. Mandaviya Gopi- 365 4. Chikani Vibha - 355 5. Sapariya Dharti – 371	2017-2018
9	Statistical Methods	1. Mehta Dinkal- 366 2. Reshma Baburaj- 370 3. Kinjal Kholiya- 361	2017-2018
10	Partial Differential Equation and Its Applications	1. Prashant K. Parmar- 387 2. Nilesh H. Bagada- 377 3. Ravi R. Vataliya- 396 4. Vipul K. Susara- 394	2017-2018
11	Abacus and Vedic Mathematics	1. Khushbu Siyapara-374 2. Aarzu Kapuriya- 359 3. Milisha Joshi- 358 4. Naisargi Shingala- 373	2017-2018
12	Problems and Solutions of Group Theory	1. Ramavat Krishna B.- 368 2. Karkar Payal M.- 360 3. Teraiya Rushita G.- 376	2017-2018





## Faculty Improvement Activities Conducted and Training Undertaken

### ➤ Department of Industrial Chemistry:

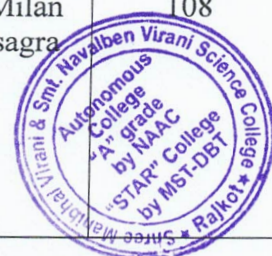
Sr. No	Name of Workshop Seminars Conducted	Duration	Conducted by	No of participants	Year
1.	Poster Presentation on "Recent Trends in Chemical Sciences"	10/01/2018	Department Of Industrial Chemistry	100	2017
2.	Online Patent Searching and Overview of IPR Tools	24/06/2017	Dr. A.K. Kothari	24	2017
3.	Introduction to IPR and patent searching strategy	1/8/2017	Dr. A. K. Kothari	15	2017
4.	Right Brain Management	11/8/2017	Dr. V. K. Tripathi	78	2017
5.	Workshop Traditional to Transformational Education	02/12/2017 To 04/12/2017	Prof. Sheela Ramachandran	103	2017

### ➤ Department of Physics:

Sr. No	Name of Workshop Seminars Conducted	Duration	Conducted by	No of participants	Year
1	Sky grazing workshop	29/12/2017	Dr. Dipak Dave	34	2017
2	LIGO theory	8/1/2017	Dr. Hitaishi Bhatt	19	2017

### ➤ Department of Mathematics :

Sr. No	Name of Workshop Seminars Conducted	Duration	Conducted by	No of participants	Year
1.	Workshop on Goal setting and career planning organised by Department of Mathematics ,Shree Manibhai Virani and Smt. Navalben Virani Science,Rajkot	14/06/2017 to 21/06/2017	Mr. Jignasu Chauhan	57	2017
2.	Seminar on Introduction to GeoGebra organised by Department of Mathematics ,Shree Manibhai Virani and Smt. Navalben Virani Science,Rajkot	24/06/2017	Mr. Jignasu Chauhan	71	2017
3.	Workshop on Problem solving strategies in mathematics competitions organised by Department of Mathematics ,Shree Manibhai Virani and Smt. Navalben Virani Science,Rajkot	01/09/2017	Dr. Milan Kansagra	108	2017



4.	Seminar on Introduction to SAGE organised by Department of Mathematics ,Shree Manibhai Virani and Smt. Navalben Virani Science,Rajkot	15/12/2017	Mr. Jignasu Chauhan	58	2017
5.	Seminar on Introduction to GeoGebra organised by Department of Mathematics ,Shree Manibhai Virani and Smt. Navalben Virani Science,Rajkot	16/12/2017	Mr. Jignasu Chauhan	82	2017
6.	Awareness Seminar on Stand-alone Solar Power System organised by Department of Mathematics ,Shree Manibhai Virani and Smt. Navalben Virani Science,Rajkot	19/09/2018	Mr. Rakesh Oza	73	2018
7.	State Level Workshop on Introduction to GeoGebra organised by Department of Mathematics ,Shree Manibhai Virani and Smt. Navalben Virani Science,Rajkot	14/10/2018	Mr. Jignasu Chauhan	35	2018
8.	Regional Level Workshop on Introduction to GeoGebra organised by Department of Mathematics ,Shree Manibhai Virani and Smt. Navalben Virani Science,Rajkot	19/12/2018 to 20/12/2018	Mr. Jignasu Chauhan	102	2018
9.	Workshop on Study of Mathematics as a Career organised by Department of Mathematics ,Shree Manibhai Virani and Smt. Navalben Virani Science,Rajkot	02/03/2019	Dr. Samir K. Vaidhya	66	2019





**Details of Seminars/ Workshop/ Training - Attended/Participated**➤ **Department of Industrial Chemistry:**

Sr. No	Details of the summer training	No of students	Date
1.	Sam Fine Organic Chemical Ltd, GIDC Hadamtatala, Rajkot	04	02/05/2017 to 14/06/2017
2.	Nirma Ltd, Bhavanagar	05	02/05/2017 to 14/06/2017
3.	Western Irrigation System Pvt, Ltd.,	05	02/05/2017 to 14/06/2017
4.	Helsinki Ltd, Finland	01	02/05/2017 to 14/06/2017
5.	Shree Ganesh Chemicals, Ankleshwar	01	02/05/2017 to 14/06/2017
6.	Tapee Cement Pvt, Ltd.	10	02/05/2017 to 14/06/2017
7.	Uma Plastic Pvt, Ltd., Dhrol.	04	02/05/2017 to 14/06/2017
8.	Balson Polyplast Pvt, Ltd., Rajkot	01	02/05/2017 to 14/06/2017
9.	Disman Pharma Pvt, Ltd, Ahmedabad.	08	02/05/2017 to 14/06/2017
10.	Orchev Pharma Pvt, Ltd., Rajkot	06	02/05/2017 to 14/06/2017
11.	Gujarat Narmada Valley Fertilzers & Chemicals Ltd, Bharuch	02	02/05/2017 to 14/06/2017
12.	Gujarat Heavy Chemicals Limited, Sutrapada, India	06	02/05/2017 to 14/06/2017
13.	Hi-Bond Cement, Rajkot	10	02/05/2017 to 14/06/2017
14.	Siddhi Cement, Pvt, Ltd., Veraval	02	02/05/2017 to 14/06/2017
15.	Apollo Cement Pvt, Ltd., Bhunava, Gondal.	04	02/05/2017 to 14/06/2017
16.	Western Cement Pvt, Ltd., GIDC Hadamtatala, Rajkot	05	02/05/2017 to 14/06/2017
17.	Blue Stone Oinorganic Pvt, Ltd., GIDC Hadamtatala, Rajkot	10	02/05/2017 to 14/06/2017
18.	Oliva Ceramics Pvt, Ltd., Morbi		02/05/2017 to 14/06/2017
19.	Ban Lab Pvt, Ltd.,Rajkot		02/05/2017 to 14/06/2017
20.	Senis Ceramics Pvt, Ltd., Morbi		02/05/2017 to 14/06/2017



21.	Malvin Pharma Pvt, Ltd, Rajkot	04	02/05/2017 to 14/06/2017
22.	Lenz Ceramics Pvt, Ltd., Morbi	01	02/05/2017 to 14/06/2017
23.	Indian Rayon, Veraval.	01	02/05/2017 to 14/06/2017

➤ **Department of Physics:**

Sr. No	Details of the summer training	No of students	Date
1.	Advance Physics BSc training at St. Xavier's college organized by VSSC, St. Xavier's college	01 student	1 month

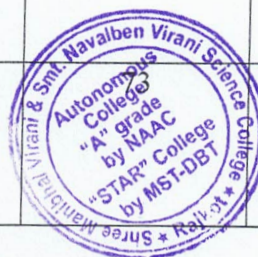
➤ **Department of Mathematics :**

Sr. No	Name of Workshop/Seminar/ Training organized	No of participants	Duration
6.	<b>Lecture on Higher Mathematical Dimension and it's impact and interpretation in real life</b> organised by <b>Department of Mathematics , Shree Manibhai Virani and Smt. Navalben Virani Science, Rajkot</b>	200	06/01/2017
7.	<b>Lecture on Introduction to GeoGebra</b> organised by <b>Department of Mathematics , Shree Manibhai Virani and Smt. Navalben Virani Science, Rajkot</b>	74	07/01/2017
8.	<b>Lecture on Introduction to SAGE</b> organised by <b>Department of Mathematics , Shree Manibhai Virani and Smt. Navalben Virani Science, Rajkot</b>	61	12/01/2017
9.	<b>Workshop on Goal setting and career planning</b> organised by <b>Department of Mathematics , Shree Manibhai Virani and Smt. Navalben Virani Science, Rajkot</b>	57	14/06/2017 to 21/06/2017
10.	<b>Lecture on Review Article writing in Mathematics</b> organised by <b>Department</b>		23/06/2017





	<b>of Mathematics , Shree Manibhai Virani and Smt. Navalben Virani Science, Rajkot</b>		
11.6.	<b>Seminar on Introduction to GeoGebra</b> organised by <b>Department of Mathematics , Shree Manibhai Virani and Smt. Navalben Virani Science, Rajkot</b>	71	24/06/2017
12.	<b>Workshop on Problem solving strategies in mathematics competitions</b> organised by <b>Department of Mathematics , Shree Manibhai Virani and Smt. Navalben Virani Science, Rajkot</b>	108	01/09/2017
13.	<b>Seminar on Introduction to SAGE</b> organised by <b>Department of Mathematics , Shree Manibhai Virani and Smt. Navalben Virani Science, Rajkot</b>	58	15/12/2017
14.	<b>Seminar on Introduction to GeoGebra</b> organised by <b>Department of Mathematics , Shree Manibhai Virani and Smt. Navalben Virani Science, Rajkot</b>	82	16/12/2017
15.	<b>Poster Presentation Competition</b> organised by <b>Department of Mathematics , Shree Manibhai Virani and Smt. Navalben Virani Science, Rajkot</b>	74	24/03/2018
16.	<b>Review Article Writing in Mathematics</b> organised by <b>Department of Mathematics , Shree Manibhai Virani and Smt. Navalben Virani Science, Rajkot</b>	88	05/07/2018
17.	<b>Awareness Seminar on Stand-alone Solar Power System</b> organised by <b>Department of Mathematics , Shree</b>		19/09/2018



	<b>Manibhai Virani and Smt. Navalben Virani Science, Rajkot</b>		
18.	<b>State Level Workshop on Introduction to GeoGebra</b> organised by <b>Department of Mathematics , Shree Manibhai Virani and Smt. Navalben Virani Science, Rajkot</b>	35	14/10/2018
19.	<b>Regional Level Workshop on Introduction to GeoGebra</b> organised by <b>Department of Mathematics , Shree Manibhai Virani and Smt. Navalben Virani Science, Rajkot</b>	102	19/12/2018 to 20/12/2018
20.	<b>Rangoli Competition on Mathematical Concepts (Celebration of National Mathematics Day-2018)</b> organised by <b>Department of Mathematics , Shree Manibhai Virani and Smt. Navalben Virani Science, Rajkot</b>	49	22/10/2018
21.	<b>Workshop on Study of Mathematics as a Career</b> organised by <b>Department of Mathematics , Shree Manibhai Virani and Smt. Navalben Virani Science, Rajkot</b>	66	02/03/2019





Guest Lecturers

## ➤ Department of Industrial Chemistry:

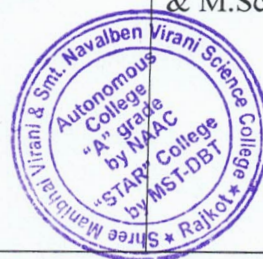
Sr. No	Title of Guest Lectures	Date	Delivered by	Audience	Year
1.	“Talk Show With Successful Entrepreneur” Sponsored by: Ban Labs (P) Ltd., Rajkot	8 <sup>th</sup> January, 2018	Maulesh Ukani	TY B.Sc.	2017
2.	Pharmaceutical Chemistry	01/08/2017	Dr. Biswajit Basu	TY B.Sc. Students	2017
3.	Prospect in Industrial Chemistry	05/08/2017	Mr. Rajat D. Undadkat	SY/TY B.Sc. Students	2017
4.	Introduction to Ceramic Industries	18/09/2017	Mr. Sorathiya Viral	FY B.Sc. Students	2017

## ➤ Department of Physics:

Sr. No	Title of Guest Lectures	Date	Delivered by	Audience	Year
1	A Video lecture on All about lights	03/02/2018	Dr. J. J. Raval	SY B.Sc. Students	2017

## ➤ Department of Mathematics:

Sr. No	Title of Guest Lectures	Date	Delivered by	Audience	Year
1.	Guest lecture on Applications of mathematics in computer science organised by Department of Mathematics ,Shree Manibhai Virani and Smt. Navalben Virani Science,Rajkot	13/09/2017	Anil Parmar	S.Y. & T.Y. B.Sc.	2017
2.	Guest Lecture on Problem Solving Strategies organised by Department of Mathematics ,Shree Manibhai Virani and Smt. Navalben Virani Science,Rajkot	22/12/2017	Dr. Sachin Gajjar	T.Y B.Sc. & M.Sc.	2017
3.	Guest Lecture on Life and Work of Srinivasa Ramanujan organised by Department of Mathematics ,Shree Manibhai Virani and Smt. Navalben Virani Science, Rajkot	22/12/2017	Mr. Bhavesh Pathak	T.Y B.Sc. & M.Sc.	2017



## Annexure 6

**INDUSTRIAL/ EDUCATIONAL VISITS BY THE STUDENTS****Department of Industrial Chemistry**

S.No.	CLASS	No. of Students	INSTITUTE VISITED	DATE	Dept.
1.	T.Y. B.Sc. S.Y. B.Sc.	39	VP & RPTP Science College, Vidyanagar, Gujarat	23/08/2017	Industrial Chemistry
2.	TY B.Sc.	48	Reine Lifescience, Anleshwar	02 /09/2017	Industrial Chemistry
3.	TY B.Sc.	48	Shree Ganesh Remedied Pvt. Ltd., Ankleshwar	02/09/2017	Industrial Chemistry
4.	Faculty and SY B.Sc.	23	Shreeji GauShala, Khandheri Rajkot	27/12/2017	Industrial Chemistry
5.	SY B.Sc.	103	Regional Community Science Centre, Rajkot	01/01/2018	Physics

