Sri Lakshmi Narayana Institute of Medical Sciences

Annexure 1

Date 10/06/2021

From
Prof.D.Baba, MS
Professor and Head,
Ophthalmology,
Sri Lakshmi Narayana Institute Of Medical Sciences
Bharath Institute of Higher Education and Research,
Chennai.

To
The Dean,
Sri Lakshmi Narayana Institute Of Medical Sciences
Bharath Institute of Higher Education and Research,
Chennai.

Sub: Permission to conduct value-added course: CHEMICAL INJURIES

Dear Sir,

With reference to the subject mentioned above, the department proposes to conduct a value-added course titled: **CHEMICAL INJURIES** on **JULY 2021 TO OCT 2021**. We solicit your kind permission for the same.

Kind Regards

PROF.D.BABA, MS
HOD, OPHTHALMOLOGY

FOR THE USE OF DEANS OFFICE

Names of Committee members for evaluating the course:
The Dean: Prof.D.Balagurunadhan, M.S,
The HOD: Prof.D.Baba, M.S,
The Expert: Prof.K.Rathnakumar M.S, D.O,
The committee has discussed about the course and is approved.

DEAN
Prof.K.BALAGURUNATHAN M.S
(General surgeon)
SRI LAKSHMI NARAYANA
INSTITUTE OF MEDICAL SCIENCES
OSUDU PONDICHERRY

Subject Expert

HOD
PROFESSOR & HOD
DEPARTMENT OF OPHTHALMOLOGY,
SRI LAKSHMI NARAYANA INSTITUTE OF MEDICAL SCIENCES
PUDUCHERRY-605 502.

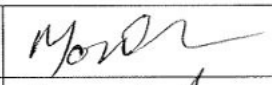
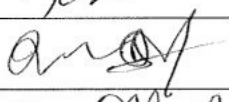
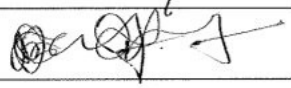
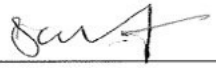
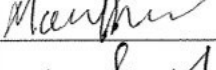
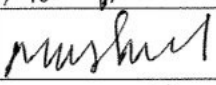
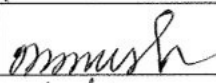
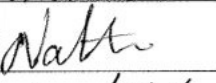
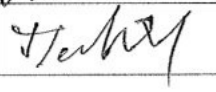
Annexure- II

VALUE ADDED COURSE

Chemical Injuries

4. List of Students Enrolled July-2021 – Oct-2021

Sl. No.	Univ. Reg. No.	Name of the Student	SIGNATURE
61	U16MB311	KAVITHA .M	
62	U16MB312	KAVIYA .K	
63	U16MB313	KEERTHANA .K	
64	U16MB314	KEERTHI K DAS	
65	U16MB315	KUNCHAL BALA VENKATA RAMANA RED	
66	U16MB316	LAKSHMIPURAM VEDA SREEVIDYA	
67	U16MB317	LOGESH BABU J.S	
68	U16MB318	LOKESHWARAN .M	
69	U16MB319	MADHUMITHA .R	
70	U16MB320	MADHUMITHA .S	
71	U16MB321	MANIMAARANE .R	
72	U16MB322	MATHIVAANANE .R	
73	U16MB323	MATHIVANAN .J	
74	U16MB324	MD ALTAF KHAN	
75	U16MB325	MEKALA CHARAN CHOWDARY	
76	U16MB326	MERLIN.S	
77	U16MB327	MERLINE SHEEBA .B	
78	U16MB328	MOHAN .B	
79	U16MB329	MOHIT BHARDWAJ	
80	U16MB330	MONISH PALEI PATRA	
81	U16MB331	MONISHA . S	

82	U16MB332	MONISHA .M	
83	U16MB333	MONISHDEVI .N	
84	U16MB334	MOUNIKA .A	
85	U16MB335	MOUNIKA.B	
86	U16MB336	MUHAMMAD SHEBIN	
87	U16MB337	MUSKAAN SHAMIM	
88	U16MB338	MUSULURI SHYAM SINDHU	
89	U16MB339	NAMITA YADAV	
90	U16MB340	NAMRATA GHORAI	

Prof.K.Rathnakumar, MS,DO

RESOURCE PERSON

Prof.D.Baba, MS, -HOD

COORDINATOR

PROFESSOR & HOD
DEPARTMENT OF OPHTHALMOLOGY,
SRI LAKSHMI NARAYANA INSTITUTE OF MEDICAL SCIENCES
PUDUCHERRY-605 502.

OFFICE OF THE DEAN

Sri Lakshmi Narayana Institute of Medical Sciences

OSUDU, AGARAM VILLAGE, VILLIANUR COMMUNE, KUDAPAKKAM POST,
PUDUCHERRY - 605 502.
[Recognised by Medical Council of India, Ministry of Health letter No. U/12012/249/2005-ME (P -II) dt. 11/07/2011]
[Affliated to Bharath University, Chennai - TN]

Ref. No. SLIMS/Dean Off/VAC / OPH06 **Date: 10.06.2021**

From
The Dean
Sri Lakshmi Narayana Institute of Medical sciences,
Pondicherry – 605502

To
The Registrar,
Bharath Institute of Higher Education and Research,
Chennai - 600073.

Respected Sir

Sub: Request for permission and approval of Syllabus for certificate course (Value Added course) for the academic year 2021-2022 - Reg
Ref: Requesting letter received from Departments

*****

With reference to the above, herewith forwarding the proposed list of Value-added courses for necessary permission and approval of syllabus to conduct the same.

1. APPLANATION TONOMETER
2. DRY EYE
3. CHEMICAL INJURIES

This is for your kind information and needful action.

Thanking you

Yours faithfully

[DEAN]

DEAN
Prof.K.BALAGURUNATHAN,M.S
(General Surgeon)
SRI LAKSHMI NARAYANA
INSTITUTE OF MEDICAL SCIENCES
OSUDU, PONDICHERRY

Encl's:

1. Requesting letter received from department
2. Syllabus of the course
3. Details of faculty handling course

Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry

VALUE ADDED COURSE –

4. APPLANATION TONOMETER
5. DRY EYE
6. CHEMICAL INJURIES

COURSE CO-ORDINATOR DETAILS

Faculty Name: Prof.D.Baba, MS

Email ID: ophthalmologyprof@gmail.com

Mobile number: 8585485988

Bharath
INSTITUTE OF HIGHER EDUCATION AND RESEARCH
(Declared as Deemed - to - be - University under section 3 of UGC Act 1956)

Ref. No. BHIER/ VAC / OPH06 **Date: 12.06.2021**

From

The Registrar,
Bharath Institute of Higher Education and Research,
Chennai - 600073.

To

The Dean
Sri Lakshmi Narayana Institute of Medical sciences,
Pondicherry – 605502

Sir / Madam,

Sub: Approval of Syllabus to conduct certificate course (Value Added course)

Ref: Ref. No. SLIMS/Dean Off/VAC /OPH06 Dated: 10.06.2021

*****

With reference to the above, it is to inform that the proposal submitted to conduct Value Added Course has been accepted and approved by BIHER, council meeting. List of the VAC are mentioned below for the academic year 2021– 2022. The abstract of the VAC course completion detail should be submitted to the Registrar office.

1. APPLANATION TONOMETER
2. DRY EYE
3. CHEMICAL INJURIES

Thanking you

Yours faithfully

REGISTRAR

OFFICE OF THE DEAN

Sri Lakshmi Narayana Institute of Medical Sciences

OSUDU, AGARAM VILLAGE, VILLIANUR COMMUNE, KUDAPAKKAM POST,
PUDUCHERRY - 605 502.
[Recognised by Medical Council of India, Ministry of Health letter No. U/12012/249/2005-ME (P -II) dt. 11/07/2011]
[Affliated to Bharath University, Chennai - TN]

Circular

15.06.2021

Sub: Organising Value-added Course: CHEMICAL INJURIES

With reference to the above mentioned subject, it is to bring to your notice that Sri Lakshmi Narayana Institute of Medical Sciences, **Bharath Institute of Higher Education and Research** is organizing **"CHEMICAL INJURIES"**. The course content and registration form is enclosed below."

The application must reach the institution along with all the necessary documents as mentioned. The hard copy of the application should be sent to the institution by registered/ speed post only so as to reach on or before 20TH JULY 2021. Applications received after the mentioned date shall not be entertained under any circumstances.

Dean

DEAN
Prof.K.BALAGURUNATHAN,M.S
(General surgeon)
SRI LAKSHMI NARAYANA
INSTITUTE OF MEDICAL SCIENCES
OSUDU PONDICHERRY

Encl: Copy of Course content

VALUE ADDED COURSE

1. Name of the programme & Code

Chemical Injury

2. Duration & Period

30 hrs & July-2021 – Oct-2021

3. Information Brochure and Course Content of Value Added Courses

Enclosed as Annexure- I

4. List of students enrolled

Enclosed as Annexure- II

5. Assessment procedures:

Multiple choice questions- *Enclosed as Annexure- III*

6. Certificate model

Enclosed as Annexure- IV

7. No. of times offered during the same year:

July-2021 – Oct-2021 (1)

8. Year of discontinuation: 2021

9. Summary report of each program year-wise

Value Added Course- July-2021 – Oct-2021					
Sl. No	**Course Code**	**Course Name**	**Resource Persons**	**Target Students**	**Strength & Year**
1	**OPH06**	**Chemical Injuries**	Prof.K.Rathnakumar, M.S, D.O,	30	30 2021

10. Course Feed Back

Enclosed as Annexure- V

Prof. K. Rathnakumar, M.S, D.O,
(Prof-Ophthalmology)
RESOURCE PERSON

Prof. D. Baba, M.S,
(Prof & HOD-Ophthal)
COORDINATOR

PROFESSOR & HOD
DEPARTMENT OF OPHTHALMOLOGY,
SRI LAKSHMI NARAYANA INSTITUTE OF MEDICAL SCIENCES
PUDUCHERRY-605 502.

Annexure 2 – Course Proposal

Course Title: CHEMICAL INJURY

Course Objective:

1. **Types of chemical injuries**
2. **Roper hall classification**
3. **Dua classification**
4. **Acid injuries and management**
5. **Alkali injuries and management**
6. **Importance of copius saline wash**
7. **Double lid evertion and examination**
8. **Management of sequel**

Course Outcome: On successful completion of the course the students will be able to classify chemical injuries, their management and determine the extend of damage and plan treatment modalities.

Course Audience: MBBS UNDERGRADUATES

Course Coordinator: PROF.D.BABA, MS,

Course Faculties with Qualification and Designation:

1. **Prof.D.Baba, MS, - HOD Ophthalmology**
2. **Prof.K.Rathnakumar, MS,DO, - Professor Ophthalmology**

Course Curriculum/Topics with schedule (Min of 30 hours)

SlNo	Date	Topic	Time	Hours
1.	18/7/2021	**Types of chemical injuries**	4-6PM	2
2.	20/7/2021	**Roper hall classification**	4-7PM	3
3.	22/7/2021	**Roper hall classification**	4-6PM	3
4.	25/7/2021	**Dua classification**	4-6PM	2
5.	29/7/2021	**Dua classification**	4-7PM	3
6.	10/8/2021	**Acid injuries and management**	4-7PM	3
7.	13/8/2021	**Acid injuries and management**	4-7PM	3
8.	15/8/2021	**Alkali injuries and management**	4-6PM	2
9.	17/8/2021	**Alkali injuries and management**	4-6PM	2
10.	20/8/2021	**Importance of copius saline wash**	4-7PM	3

11.	21/8/2021	**Double lid evertion and examinations**	4-6PM	2
12.	25/8/2021	**Management of sequel**	4-6PM	2
			TOTAL HOURS	30

REFERENCE BOOKS: (Minimum 2)

1. JACK J KANSKI clinical ophthalmology a systemic approach-6th edition.
2. PARSON'S Diseases of the eye – 19th edition

OCULAR CHEMICAL INJURIES

- Chemical injuries to the eye can result in mild injury or severe ocular damage.
- Most patients are young.
- Exposure can be industrial/at home/due to criminal assaults.
- Most chemical injuries are due to acids and alkalies , the latter being more common.
- The extent of ocular involvement depends on:

1. Strength of the agent
2. Volume
3. Concentration

Duration of exposure

Common agents

Alkali:

- Ammonia
- Sodium hydroxide
- Magnesium hydroxide-Fireworks
- Calcium hydroxide-Lime-MC cause of chemical injury

Acid:

- Sulphuric acid-Most common
- Sulphurous acid
- Hydrochloric acid
- Hydrofluoric acid-Most serious
- Acetic acid

Chromic acid

Pathophysiology

ALKALIES:

- Penetrate more effectively than acids
- Cause saponification and disruption of fatty acids in cell membranes-cell death
- Cations react with the carboxyl groups of collagen and glycosaminoglycans

Hydration of collagen Hydration of GAGs

Thickening and shortening Loss of stromal clarity

TM distorted and PGs released

IOP rise

OCULAR STRUCTURES DAMAGED:

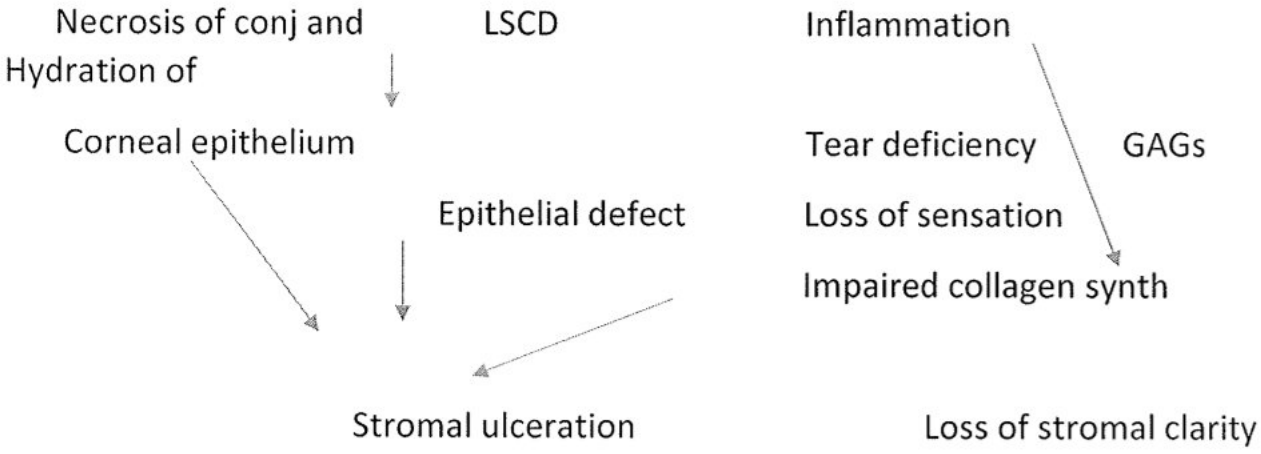
- Cornea
- TM
- Iris

CB

CORNEAL DAMAGE:

- Persistent epithelial defect
- Loss of stromal clarity
- Limbal ischaemia
- Stromal ulceration

Pathogenesis of corneal damage



DAMAGE TO OTHER OCULAR TISSUES:

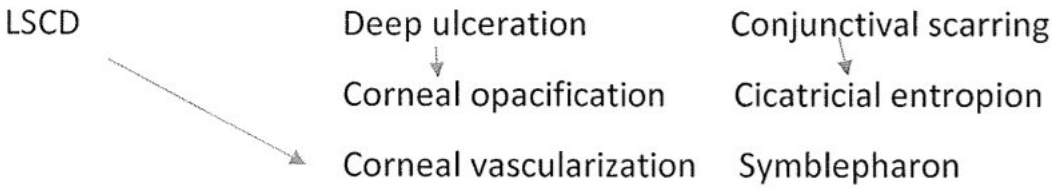
- Iris , CB, TM may be damaged depending on the degree of penetration and the pH of the aqueous.
- pH of more than 11.5 is associated with severe ocular damage.

CB damage-decreased ascorbate secretion-decreased ascorbate in aqueous-compromises collagen synthesis and stromal repair

ACIDS:

- Hydrogen ion causes damage due to pH alteration.
- Anion produces protein precipitation and denaturation in the epithelium and superficial stroma.
- This precipitate by itself will act as a barrier to the further penetration in case of weaker acids.
- But stronger acids continue to penetrate deeply.
- If they reach the stroma,damage occurs similar to that caused by alkalies.

Pathogenesis of chronic phase



T o summarize the clinical features are:

ACUTE PHASE	**CHRONIC PHASE**
1.Necrosis of conj and corneal	1.Symblepharon formation
Epithelium	2.Corneal opacification
2.Limbal ischaemia	3.Corneal vascularization
3.Stromal haze	4.Cicatricial entropion
4.Persistent epithelial defects	
5.Sterile ulceration	
6.Perforation	
7.Damage to iris,CB,TM	

Treatment

Acute phase		Chronic phase	
Medical	Surgical	Medical	Surgical
1. Irrigation	1. AMG	1. Correction of	1. LSTT
2. Debridement	2. Tenonplasty	glaucoma	2. DALK
3. Preservative free drops			3. KP
4. BCL			
5. Ascorbate,Tetracycline,citrate			

6. Anti inflammatory
7. Other measures

MEDICAL MANAGEMENT IN THE ACUTE PHASE:

1. **IRRIGATION:**

- Isotonic solution of neutral pH/NS/RL
- 30 minutes till pH is neutral
- Done via iv tubing directly after applying lid speculum
- Double evert lid to remove any solid material with forceps/cotton tipped applicator

Chelation with EDTA may be necessary to remove CaOH

2. **DEBRIDEMENT:**

- To remove necrotic corneal tissue
- Promotes re epithelization
- Removes stimulus for continued inflammation

3. **MEDICATIONS:**

- Kept to a minimum
- Preservatives hinder epithelial healing
- Use preservative free topical antibiotics to prevent infection.
- Preservative free tear substitutes-aids epithelization , reduces recurrent erosion and accelerate visual rehabilitation.

4. **BCLs:**

- Promote epithelial migration
- BM regeneration
- Epithelial-stromal adhesion by preventing windshield wiper effect of eyelids
- Careful F/U is important

- Not healing with all these measures-consider AMG/Tarsorraphy

5. **Topical steroids:**

- Beneficial in the first 7-10 days to reduce inflammation
- Beyond 10-14 days-interfere with wound repair
- Impair keratocyte migration and collagen synthesis
- Substitute steroids with NSAIDs like Ketorolac after the first week.

6. **ASCORBATE:**

- Water soluble vitamin
- Needed for collagen synthesis
- 10% topical solution of Sodium Ascorbate hourly
- 1000mg oral ascorbate QID
- Severe injuries-topical superior to systemic

7. **TETRACYCLINE:**

- Anti collageno lytic effect
- Chelates Zinc at the active site of collagenase enzyme
- May reduce the neutrophil activity by decreasing its ability to produce collagenase.

8. **CITRATE:**

- Calcium chelator
- Decreases the membrane and intracellular levels of calcium within PMNs
- Inhibits-adherence , chemotaxis , phagocytosis and release of lysosomal enzymes
- 10% topical solution applied hourly is better than systemic administration.
- Better than ascorbate in ulcer prophylaxis

9. ACETYLCYSTEINE:

- 10% topical solution hourly
- One of the earliest collagenase inhibitors discovered
- Must be refrigerated
- Penetrates stroma poorly
- Not recommended in severe injuries

10.OTHER MEASURES:

- Prevention of symblepharon formation
- Impending perforation/actual perforation of < 1-2mm→Tissue glue
- Larger perforations-Tectonic keratoplasty
- Large non healing epithelial defects-AMG

SURGICAL MANAGEMENT IN THE ACUTE PHASE

1. AMG:

- Best for ocular chemical burns with limbal stem cell deficiency
- Can be performed in conjunction with LSTT
- AMG helps in:

✓ Re epithelization

✓ Reducing inflammation

✓ Partly restoring limbal stem cell function

✓ Restoring conjunctival and corneal surface

✓ Preventing symblepharon formation

2. **ALKALI BURN.** When this patient with a grade III alkali burn was initially evaluated,**(1)** corneal clouding and intense intraocular inflammation were evident, **(2)** along with limbal ischemia. At this time, vision was counting fingers. **(3)** One week later, the first amniotic membrane transplantation was performed for poor epithelial healing; all told, two amniotic membrane grafts were required. **(4)** One month later. **(5)** Two months later, the patient's vision had improved

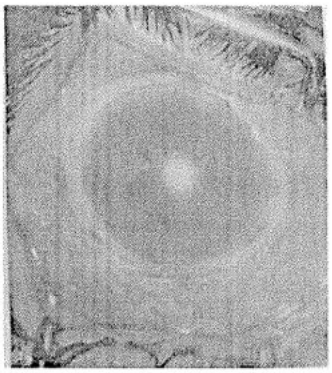
3. **Tenonplasty:**

- Helps in preventing anterior segment necrosis
- Prevents sterile corneal ulceration
- Not very helpful in re establishing normal epithelial phenotype
- Procedure:

  -All necrotic conjunctival and episcleral tissue is excised

  -Blunt separation of tenon's from equatorial segment of the globe and from extra ocular muscles

  -The tenon's flap with its carefully preserved vascular supply is then advanced to the limbus and sutured to the sclera tightly.



MANAGEMENT IN THE CHRONIC PHASE

- Correction of glaucoma
- Limbal stem cell transplantation
- DALK
- Keratoprosthesis

Limbal stem cell transplantation:

- Proposed by Kenyon and Tseng
- Helpful in re establishing normal epithelial phenotype
- Useful in unilateral and bilateral cases
- Tissue engineered strategies using autologous corneal or oral mucosal epithelial sheet transplantation has reduced the risk of immune suppression related complications.
- Helps in reconstruction of epithelial layer or at the most the anterior corneal stroma
- But does not clear the deep stromal opacification.
- For this a subsequent lamellar or penetrating keratoplasty will be needed.

DALK:

- There is usually lot of deep stromal vascularization occurring with chemical burns.
- This predisposes to increased chances of graft rejection with PKP.
- The prognosis is virtually hopeless if there are other ocular abnormalities like glaucoma , hyptony , AC memb formation , RD.
- DALK instead of PKP helps reduce the risk of allograft rejection because endothelium is not replaced.
- When combined with LSTT it helps providing a healthy , stable ocular surface besides providing a clear cornea.

Keratoprosthesis:

- B/L , severe chemical injury
- Hopeless prognosis for PKP due to repeated graft rejection , irrepairable damage to ocular surface
- Some types used are:

✓ Boston Keratoprosthesis-maintains good media clarity and anatomical retention in general;but high rates of extrusion in chemical injury patients

✓ OOKP-Uses autologous tooth as carrier for PMMA;good retention as well as restoration of media clarity.

✓ With advances in technology and refinements in techniques,along with a better understanding of the pathophysiology of chemical injuries and timing of treatment , multiple modalities are available for the management of chemical injury.

✓ Timely management in the acute phase is of essence to prevent complications-OPHTHALMIC EMERGENCY

✓ In general they are poor candidates for PKP and would benefit from LSTT+DALK.

Kavitha. M
UMB 311

SRI LAKSHMI NARAYANA INSTITUE OF HIGHER EDUCATON AND RESEARCH

Annexure - IV

10

CHEMICAL INJURY

MULTIPLE CHOICE QUESTIONS

Course Code: OPH06

I. ANSWER ALL THE QUESTIONS

1. Most common cause of alkaline chemical injury
   a. Lime
   b. Amon onia
   c. Sodium hydrochloride
   d. Mg2(OH)4
2. Excent of ocular chemical injury depends on all except
   a. Strength of agent
   b. Concentration
   c. Purloin
   d. Container of the alkali
3. During chemical injury include all except
   a. Cornea
   b. Conjunctiva
   c. Eye lid
   d. Retina
4. Chemical injuries are more common in
   a. Industries
   b. Park
   c. Home
   d. School

5. Immediate treatment of chemical injury
   a. Common saline irrigation
   b. Antibiotics
   c. Lubricants
   d. Antifungal

6. Steroid can be started after of injury
   a. 1st week
   b. 2nd week
   c. 3rd week
   d. 4th week

7. Surgical managements of chemical injury includes all excepts
   a. Debridement
   b. Ama
   c. Tenoplasty
   d. Tarsorrhaphy

8. Which is ophthalmic emergency
   a. Conjunctivitis
   b. Chemical injury
   c. Dry eye
   d. Hypertentive retinopathy

9. Acid injury cause
   a. Protein coagulation
   b. Liquidation
   c. Hydantoin
   d. Apoptins

10 Medical management includes all excepts

a. Injection

b. AMG

c. BCL

d. Lubricate

Sri Lakshmi Narayana Institute of Medical Sciences

Affiliated to Bharath Institute of Higher Education & Research
(Deemed to be University under section 3 of the UGC Act 1956)

CERTIFICATE OF MERIT

This is to certify that KAVITHA .M (U16MB311) has actively participated in the Value Added Course on CHEMICAL INJURY held during JULY 2021 TO OCT 2021 Organized by Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry- 605 502, India.

Prof.K.Rathnakumar, MS, DO,
RESOURCE PERSON

Prof.D.Baba, MS,
COORDINATOR

Sri Lakshmi Narayana Institute of Medical Sciences

Affiliated to Bharath Institute of Higher Education & Research
(Deemed to be University under section 3 of the UGC Act 1956)

CERTIFICATE OF MERIT

This is to certify that KAVIYA .K (U16MB312) has actively participated in the Value Added Course on CHEMICAL INJURIES held during JULY 2021 TO OCT 2021 Organized by Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry- 605 502, India.

Prof.K.Rathnakumar, MS, DO,
RESOURCE PERSON

Prof.D.Baba, MS,
COORDINATOR

Student Feedback Form

Course Name: **CHEMICAL INJURY**

Subject Code: **OPH06**

Name of Student: _____ Roll No.: _____

We are constantly looking to improve our classes and deliver the best training to you. Your evaluations, comments and suggestions will help us to improve our performance

Sl. NO	Particulars	1	2	3	4	5
1	Objective of the course is clear				✓	
2	Course contents met with your expectations				✓	
3	Lecturer sequence was well planned				✓	
4	Lectures were clear and easy to understand				✓	
5	Teaching aids were effective				✓	
6	Instructors encourage interaction and were helpful				✓	
7	The level of the course				✓	
8	Overall rating of the course	1	2	3	4	5

** Rating: 5 – Outstanding; 4 - Excellent; 3 – Good; 2– Satisfactory; 1 - Not-Satisfactory*

Suggestions if any:

Kavitha M
Signature

Date:

Annexure 5

Date : 29/10/2021

From
Prof.D.Baba, MS,
Professor and Head,
Ophthalmology,
Sri Lakshmi Narayana Institute Of Medical Sciences
Bharath Institute of Higher Education and Research,
Chennai.

Through Proper Channel

To
The Dean,
Sri Lakshmi Narayana Institute Of Medical Sciences
Bharath Institute of Higher Education and Research,
Chennai.
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Sub: Completion of value-added course: CHEMICAL INJURY

Dear Sir,

With reference to the subject mentioned above, the department has conducted the value-added course titled: **CHEMICAL INJURY** for 30students in JULY-OCT 2021. We solicit your kind action to send certificates for the participants, that is attached with this letter. Also, I am attaching the photographs captured during the conduct of the course.

Kind Regards

Prof.D.Baba, MS

HOD ,Ophthalmology

Encl: Certificates

Photographs