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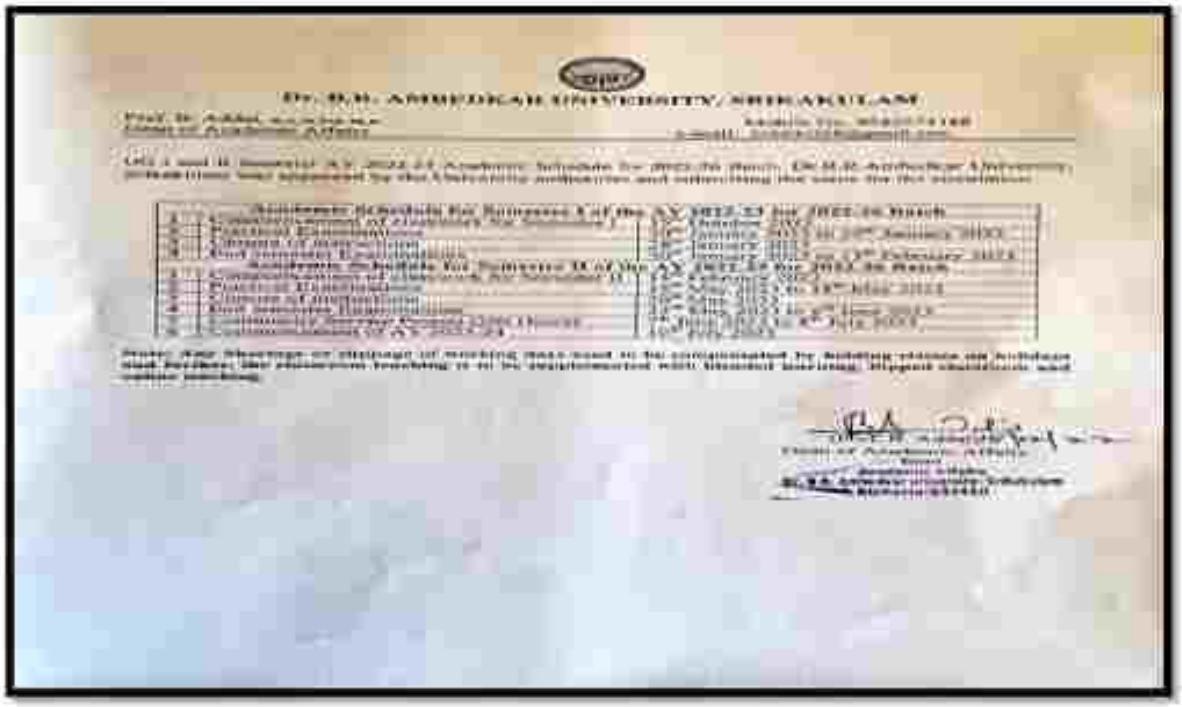
GOVERNMENT DEGREE COLLEGE

NARASANNAPETA-SRIKAKULAM DIST.-532421.

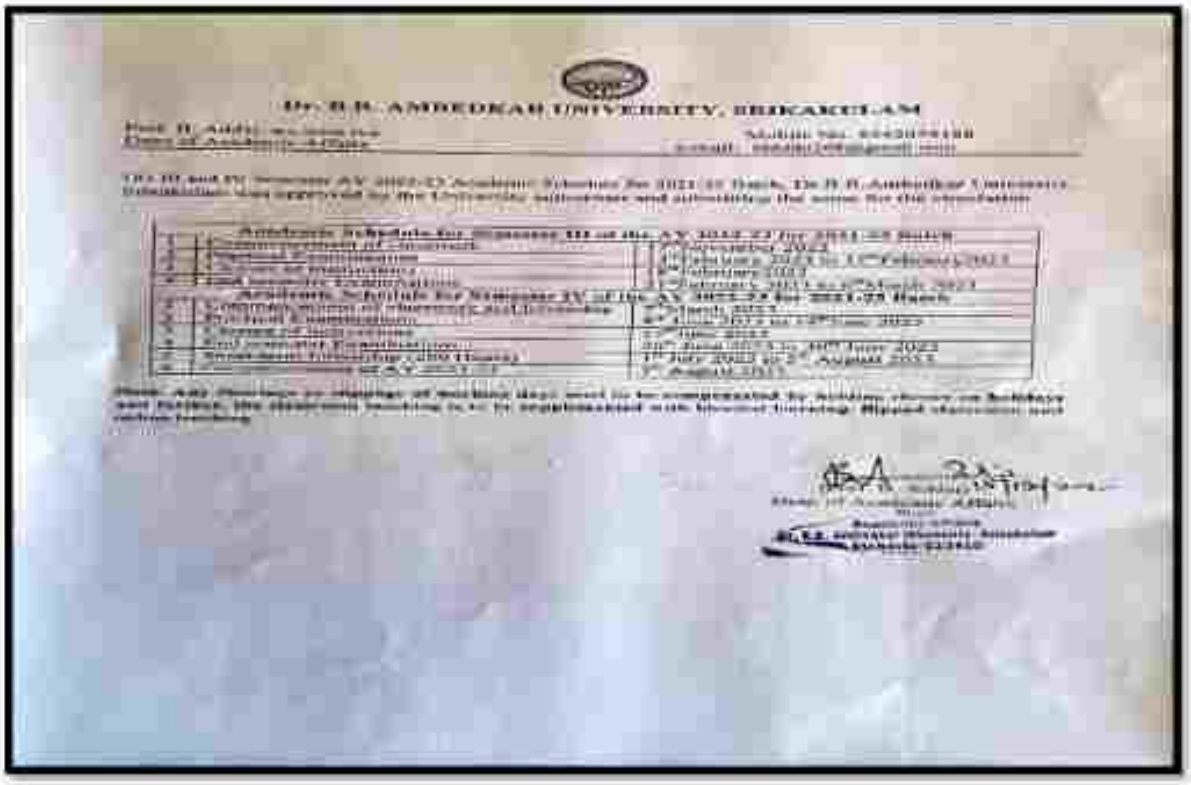
Accredited by NAAC 'B' Grade

(Affiliated to DR.B.R.Ambedkar University)

ACADEMIC CALENDAR 2022-2023



Dr. B.R. AMBEDKAR UNIVERSITY, SRIKAKULAM



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Dr. B.R. AMBEDKAR UNIVERSITY, SRIKAKULAM

Prof. [illegible] Dean of Academic Affairs Mobile No. [illegible] E-mail: [illegible]

UG V and VI Semester A.Y 2022-23 Academic Schedule for 2020-24 Batch, Dr.B.R.Ambedkar University, Srikakulam was approved by the University authorities and submitting the same for the circulation.

Academic Schedule for Semester V of the AY 2022-23 for 2020-24 Batch		
1	Commencement of Internship	[illegible]
2	Closure of Internship	[illegible] March 2023
3	Evaluation of Internship	[illegible] to 11th March 2023
Academic Schedule for Semester VI of the AY 2022-23 for 2020-24 Batch		
1	Commencement of classwork	[illegible] March 2023
2	[illegible]	[illegible] June 2023 to [illegible] June 2023
3	Closure of [illegible]	[illegible] June 2023
4	End semester Examinations	15th June 2023 to [illegible] June 2023

Note: Any shortage or slippage of working days need to be compensated by holding classes on holidays and further, the classroom teaching is to be supplemented with blended learning, flipped classroom and online teaching.

Dean of Academic Affairs

Dean Academic Affairs Dr. B.R. Ambedkar University, Srikakulam

PRINCIPAL
GOVT. DEGREE COLLEGE
NARASANNAPETA-532 421
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Dr. B.R. AMBEDKAR UNIVERSITY, SRIKAKULAM

Etcherla-532410

UG ACADEMIC CALENDER FOR CBCS – 1st, 3rd& 5thSemester 2017-18

Year Admission Schedule:

Sale of Admission Applications and Registration	From 09.05.2017
Last Date for sale and registration of admission applications (Including Instant Intermediate candidates)	17.06.2017
Display of 1st list	24.06.2017
Admission (*) for general category	27.06.2017 to 05.07.2017
Closing of Admissions with late fee of Rs.500/- (Payable to the Registrar, Dr. B.R. Ambedkar University) for General Category	11.07.2017
Closing of Admissions With late fee of Rs. 1000/-(payable to The Registrar, Dr. B.R.Ambedkar University-Srikakulam)	18.07.2017

Note: The Principals of the respective colleges have to send the lists of candidate admitted in totheir colleges in soft and hard copies (with a late fee of Rs.500/- and Rs.1, 000/-) on or before 12.09.2017.

Academic Schedule:

01	Reopening and commencement of class work for 3rd& 5th Semesters	20.06.2017
02	Commencement of Classwork for 1st Semester	06.07.2017
03	Mid-Semester Examinations - I	03.08.2017 to05-08-2017
04	Issue of 1st3rd& 5thSemester Examinations Applications	28.08.2017
05	Mid-Semester Examinations – II	25.09.2017 to 27.09.2017
06	Submission of 1st, 3rd& 5thSemester Examination Applications on or before	16-09-2017
07	Dasara Holidays	28.09.2017 to 02.10.2017
08	Submission of Examination Applications with penal fee of Rs. 500/-	23.09.2017
09	Closure of Instruction for 1st,3rd& 5thSemesters	11.10.2017
10	Submission of attendance particulars of students to the controller of Examinations	12.10.2017
11	Submission of Examination Applications with Condonation fee	12.10.2017
12	Issue of Hall-Tickets	13.10.2017
13	Final Practical Examinations	14.10.2017 to 22.10.2017
14	5thSemester End Examinations Starting from	24.10.2017 to 03.11.2017
15	1st& 3rd Semester End Examinations Starting from	06.11.2017 to 16.11.2017

GOVERNMENT DEGREE COLLEGE

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Dr. B.R. AMBEDKAR UNIVERSITY, SRIKAKULAM

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UG ACADEMIC CALENDER FOR CBCS – 2nd,4th& 6thSemester 2017-18

Academic Schedule:

01	Reopening and commencement of class work	17-11-2017
02	Christmas Holidays	23-12-2017 to 26-12-2017
03	Pongal Holidays	11-01-18 to 15-01-18
04	Mid-Semester Examinations - I	08-01-2018 to 10-01-2018
05	Issue of 2nd,4th& 6thSemester Examinations Applications	09-02-2018
06	Mid-Semester Examinations – II	26-02-2018 to 28-02-2018
07	Submission of Examinations Applications without fine	22-02-2018
08	Submission of Examination Application forms with penal fee Rs. 500/-	28-02-2018
09	Last Instruction Day	07-03-2018
10	Submission of students attendance and Examination Applications With Condonation fee	08-03-2018
11	Issue of Hall-Tickets	09-03-2018
12	Practical Examinations	10-03-18 to 18-03-18
13	6thSemester End Examinations Starting from	20-03-2018 to 31-03-2018
14	2nd& 4thSemester End Examinations Starting from	03-04-2018 to 16-04-2018
15	Summer Holidays	17-04-2018
16	Re-opening of the College for the Next Academic year	06-06-2018

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Dr. B.R. AMBEDKAR UNIVERSITY, SRIKAKULAM
Etcherla-532410
OK ACADEMIC CALENDER FOR CBCS – 2018-19

Year of Admissions Schedule:	
Sale of Admission Application and Registration	From 25.08.2018
Last Date for sale and registration of admission application (including Instant Intermediate candidates)	31.07.2018
Display of Merit	08.06.2018
Admission Of for all the category	12.06.2018 to 16.06.2018
Closing of Admissions with late fee of Rs.250/- (Payable to the Registrar, Dr. B.R. Ambedkar University)	20.06.2018
Closing of Admissions with late fee of Rs.1000/- (payable to The Registrar, Dr. B.R.Ambedkar University-Srikakulam)	23.06.2018

Note: The Principals of the respective colleges have to send the lists of candidates admitted in to their colleges in soft and hard copies (with a late fee of Rs.500/- and Rs.1000/-) on or before 06.07.2018.

	Academic Schedule:	Semester-I/III/V	Semester-II/IV/VI
01	College Reopening	07-05-2018 to 19-05-2018	–
02	Reopening of the College	05-06-2018	–
03	Commencement of Classwork	07-06-2018	05-11-2018
04	Commencement of Classwork for 1st Semester	18-06-2018	–
05	Mid Semester Examinations	06-08-2018 to 10-08-2018	07-01-2019 to 11-01-2019
06	Issue of Semester Examination Applications	21-08-2018	22-01-2019
07	a. Inter Collegiate Games & Sports b. South Zone and All India Sports and Games Selections	August & September-2018	–
08	Students participation in South Zone and All India Competitions	–	Dec-2018 & Mar-2019
09	Submission of semester Examination Applications on or before	07-09-2018	14-02-2019
10	Submission of Examination Applications with penal fee of Rs.500/-	14-09-2018	18-02-2019
11	Closure of Instructions for Semesters	06-10-2018	28-02-2019
12	Submission of attendance particulars of students to the controller of Examinations	25-09-2018	20-03-2019
13	Submission of Examination Applications with Condonation fee	25-09-2018	20-03-2019
14	Issue of Hall Tickets	01-10-2018	21-03-2019
15	Science Exhibition	–	28-02-2019
16	Final Practical Examinations	03-10-2018 to 06-10-2018	22-02-2019 to 28-02-2019
17	5th&6th Semester End Examinations	11.10.2018 to 26.10.2018	04-03-2019 to 12-03-2019
18	1st,3rd,2nd&4th Semester End Examinations	29.10.2018 to 09.11.2018	20-03-2019 to 04-04-2019
19	Re-Opening of the College for the Next Academic Year	–	08-06-2019

- **Every of the month Saturday Fieldwork/Outrich/Extension in to service programme are mandatory for students. Faculty must be villages.**

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GOVERNMENT DEGREE COLLEGE

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DR.B.R.AMBEDKAR UNIVERSITY:SRIKAKULAM

List of Holidays/Working Days for U.G. Courses for the Academic Year 2018-2019

Month and Year	Days, Dates and Specifications of Holidays		No. of Holidays	No. of Working Days	Total
June,2018	Second Saturday Sundays Ramzan Id	9 3,10,17,24 15	06	24	30
July,2018	Second Saturday Sundays	14 1,8,15,22,29	06	25	31
August,2018	Second Saturday Sundays Independence Day Bakrid	11 5,12,19,26 15 22	07	24	31
September,2018	Second Saturday Sundays Sri Krishnashtami Vinayakachavithi Muharram	08 2,9,16,23,30 03 13 21	09	21	30
October,2018	Dasara Holidays Second Saturday Sundays Gandhi Jayanti Durgashtami Vijayadasami	10 to 18 13 07,14,21,28 2 17 18	10	21	31
November,2018	Second Saturday Sundays Diwali Milad Un-Nabi	10 04,11,18,25 07 21	07	23	30
December,2018	Second Saturday Sundays Christmas Holidays	08 02,09,16,23,30 23 to 25 Dec	14	17	31
January,2019	Second Saturday Sundays Pongal Holidays Republic Day	12 06,13,20,27 13 to 16 26	22	09	31
February,2019	Second Saturday Sundays	09 03,10,17,24	05	23	28
March,2019	Second Saturday Sundays Maha Sivarathri Holi	09 03,10,17,24,31 04 21	08	23	31
April,2019	Second Saturday Sundays Good Friday Babu Jagjivanram Jayanthi Ugadi Maheveer Jayanthi Dr.B.R.Ambedkar Birthday	13 07,14,21,28 19 05 06 09 14	10	20	30
	Total		98	206	304

Summer Vacation from 01-05-2019 to 30-06-2019 and Campus Will re open on 01-07-2019.

GOVERNMENT DEGREE COLLEGE

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COLLEGE DEVELOPMENT COUNCIL
Dr.B.R.Ambedkar UNIVERSITY-SRIKAKULAM
ETCHERLA-(A.P)-532410

Prof. B.Addaj
M.A.(Pol.Sc), Ph.D
Dean, CDC
Phone No: 08942-240713
Mobile: 9542014180
deancdc.brau@gmail.com

No.BRAU-SKLM/CDC/Comm. Aca.Calendar/2019-20 Date: 27-12-2019

Proceedings of the Hon'ble Vice-Chancellor

Sub: CDC office – Affiliated Colleges runs- All U.G. Degree Colleges (Courses) under CBCS (Semester System)– Common Academic Calendar for the academic year 2019-20– Approval – Orders – Issued.

Read: 1.Letter from Andhra Pradesh State Council of Higher Education (APSCHE) – Universities-Common Academic Calendar 2019-20, dated 06-05-2019.

2.The Meeting of all the principals of the Listed U.G. Degree Colleges affiliated to Dr. B.R.A.U, Srikakulam is scheduled on 20-05-2019 at 3.00PM in the Registrar's chamber.

3.Note for orders of the Hon'ble Vice-Chancellor, date:25-06-2019

Order:

The Hon'ble Vice-Chancellor, having considered Andhra Pradesh State Council of Higher Education (APSCHE) - Universities – Common Academic Calendar read above, is pleased to order that **all the U.G. Degree Courses (Colleges) under CBCS (Semester System), affiliated to Dr. B.R. Ambedkar University, Srikakulam for the Academic year 2019-20 to follow and implementation of the Academic Calendar.** This will be put in the University website.

U.G. Academic Calendar for the year 2019-20

S. No	Particulars	Date (s)
1	Reopening of the College Affiliated Colleges	10-06-2019
2	Commencement of class work for 3rd & 5th Semester students	11-06-2019
3	Commencement of Classwork for 1st Semester	16-06-2019
4	Closure of admissions for various Courses	20-07-2019
5	**Last date of Transfers:** Including students from other State Universities and the Universities within A.P in respect of Restructured/Vocational courses at Degree level. The last date prescribed by the Universities is not for submission of admission application on transfer from other Universities. The admission on transfer from Universities as mentioned above will not be permitted without established equivalency of syllabai, since these courses are not covered under common core scheme. Before the last date of transfer equivalency of syllabai has to be obtained from the University. After last date no application is entertained.	15-07-2019

Contd...

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GOVERNMENT DEGREE COLLEGE

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6	Last date of Submission of the list of transferred candidates to the A.C.E. Dr. B.R.A.U	24-07-2019
7	Last date for submission of Master list of newly admitted 1st semester students of 2019-20 as per the proforma prescribed by the University	31-07-2019
8	Conduct of Mid Exams for 1st, 3rd & 5th Semester students	5th to 9th August, 2019
9	Last date for submission of details of optional papers offered by the colleges in Third year 5th Semester(The list may be submitted to the Coordinator, UG Exams and ACE, D.B.R.A.U) Submission of staff particulars (Degree Colleges service only) for valuation purpose to Coordinator, UG exams, Dr. B.R.A.U (Theory & Practical with cadre-wise experience) along with assigned time-table to teachers	12-08-2019
10	Online registration for 1st, 3rd& 5th Semester Examinations	21-08-2019
11	Inter Collegiate Games & Sports. South Zone Sports and Games Selections	August-October,2019
12	South Zone Inter University Kho-Kho women champion ship 2019-20 (org. Dr.BRAU SKLM)	3rd, 4th & 5th October 2019
13	Submission of 1st, 3rd& 5th semester Examination nominal rolls on or before	11-09-2019
14	Submission of Examination penal fee of Rs. 500/-	16-09-2019
15	Closure of Instruction for Semesters	05-10-2019
16	Submission of attendance particulars of students to the controller of Examinations	25-09-2019
17	Submission of Examination Condonation fee	25-09-2019
18	Issue of Hall-Tickets	28-09-2019
19	Final Practical Examinations	30-09-2019 to 5-10-2019
20	**Commencement of 1st, 3rd& 5th** Semester End Examinations	15-10-2019
21(a)	Commencement of class work for 6th Semester	26-10-2019
21(b)	Commencement of class work for 2nd & 4th Semester	11-11-2019
22	Conduct of Mid Semester Examinations for 2nd, 4th& 6th Semester Students	6th to 10th January, 2020
23	Online registration for 2nd, 4th& 6th Semester Examinations	22-01-2020
24	Student's participation in All India Sports Competitions.	1st October – Feb12, 2020
25	Submission of semester Examination nominal rolls on or before	14-02-2020
26	Submission of Examination penal fee of Rs. 500/-	18-02-2020
27 (a)	Closure of Instruction for Semesters 6th Semester	28-02-2020
27 (b)	Closure of Instruction for Semesters 2nd & 4th Semester	10-03-2019
28	Submission of attendance particulars of students to the controller of Examinations	20-02-2020
29	Submission of Examination Condonation fee	20-02-2020
30	Issue of Hall-Tickets	22-02-2020
31	Science Exhibition	28-02-2020

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32 (a)	Final Practical Examinations for 6th Semester	25-02-2020 to 28-02-2020
32 (b)	Final Practical Examinations for 2nd & 4th Semester	04-03-2020 to 10-03-2020
33 (a)	6th Semester End Examinations	11-03-2020 to 21-03-2020
33 (b)	2nd & 4th Semester End Examinations	23-03-2020 to 06-04-2020
34	Closure of Colleges (Last Working day)	06-04-2020
35	Sumer Vacation starts from	07-04-2020
36	Spot Valuation	22-03-2020 to 21-04-2020
37	Reopening of the Affiliated Colleges having U.G. Courses for the Academic Year 2020-2021	08-06-2020
38	Examination Timings	09:00A.M. to 12:00Noon. & 02:00P.M. to 05:00PM.

(By Order)

Yours Sincerely,

(Prof. B. Addal)
Dean-Colleges Development Council
Dr. B.R. Ambedkar University, Srikakulam
Etcherla-532 410 (A.P)

Copies to:
PA to the Hon'ble Vice-Chancellor, Dr. B.R.A.U, SKLM
The Registrar, Dr. B.R.A.U, SKLM
The Dean of Examinations (UG), Dr. B.R.A.U, SKLM
The Web Designer to upload the U.G Academic Calendar for the year 2019-20 for all U.G. Degree Courses at the appropriate place in the Dr. B.R.A.U website.
The Principals of all U.G. Degree Colleges affiliated to Dr. B.R.A.U, SKLM.
OOF.

GOVERNMENT DEGREE COLLEGE
NARASANNAPETA-SRIKAKULAM DIST.-532421.
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COLLEGE DEVELOPMENT COUNCIL
Dr.B.R. AMBEDKAR UNIVERSITY-SRIKAKULAM
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Prof. B. Addai
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No.BRAU/SKLM/CDC/Comm. Aca.Calendar/2020-21 Date: 05-03-2021

Proceedings of the Hon'ble Vice-Chancellor

Sub: Dr.B.R.Ambedkar University, Srikakulam – CDC office – Affiliated Colleges -**All U.G. Degree Colleges (Courses) under CBCS (Semester System) – Common Academic Calendar for the academic year 2020-21** –Orders – Issued.

Read: 1. Letter from Andhra Pradesh State Council of Higher Education (APSCHE) – Universities-Common Academic Calendar 2020-21, dated 30-10-2020
2. Note orders of the Hon'ble Vice-Chancellor, dated 25-02-2021

Order:

The Hon'ble Vice-Chancellor, having considered Andhra Pradesh State Council of Higher Education (APSCHE) – Universities – Common Academic Calendar read above, is pleased to order that **all the U.G. Degree Courses (Colleges) under CBCS (Semester System), affiliated to Dr. B.R. Ambedkar University, Srikakulam for the Academic year 2020-21 to follow and implementation of the Academic Calendar.** This will be put in the University website.

U.G. Academic Calendar 3rd, 5th & 4th & 6th Semester for the academic year 2020-21

S. No	Particulars	Date (s)
1	**Reopening and Commencement of Class work for 3rd & 5th Semester**	**02-11-2020**
2	Internal Examinations	Dec 1st to 5th, 2020
3	Online registration for, 3rd & 5th Semester Examinations	01-02-2021
4	Submission of 3rd & 5th semester Examination nominal rolls on or before	02-02-2021
5	Submission of Examination penal fee of Rs. 500/-	23rd & 24th Feb, 2021
6	Closure of Instruction for 3rd & 5th Semesters	24-02-2021
7	Submission of attendance particulars of students to the controller of Examinations	25-02-2021
8	Submission of Examination Condonation fee	26-02-2021
9	Issue of Hall-Tickets	26-02-2021
10	Final Practical Examinations	01-03-2021
11	**Commencement of 3rd & 5th Semester end examinations**	**09-03-2021**

(PTO)

12	**Commencement of class work for 4th & 6th Semester**	**25-03-2021**
13	Conduct of Internal Examinations for 4th & 6th Semester Students	June 1st to 5th, 2021
14	Online registration for 4th & 6th Semester Examinations	01-07-2021
15	Submission of semester Examination nominal rolls on or before	22-07-2021
16	Submission of Examination penal fee of Rs. 500/-	23rd & 24th July, 2021
17	Closure of Instruction for Semesters-	06-08-2021
18	Submission of attendance particulars of students to the controller of Examinations	24-07-2021
19	Submission of Examination Condonation fee	26-07-2021
20	Issue of Hall-Tickets	26-07-2021
21	Final Practical Examinations	27-07-2021
22	Semester End Examinations	09-08-2021
23	Examination Timings	09:00 A.M. to 12:00Noon & 02:00 P.M. to 05:00PM

(By Order)

(Prof. B. Addal)
Dean-CDC

Dean-College Development Council
Dr. B.R. Ambedkar University, Srikakulam
Etcherla 532 410 (A.P)

Copies to:

1. The Principals of all U.G. Degree Colleges affiliated to Dr. B.R.A.U, SKLM.
2. The Dean of examinations, Dr. B.R.A.U, SKLM
3. The web center, -With a request to upload the U.G Academic Calendar for the year 2020-21 for all U.G. Degree Courses at the appropriate place in the Dr. B.R.A.U website.
4. PA to the Hon'ble Vice-Chancellor, Dr. B.R.A.U, SKLM
5. PA to the Registrar, Dr. B.R.A.U, SKLM
6. OOF.

GOVERNMENT DEGREE COLLEGE

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COLLEGE DEVELOPMENT COUNCIL
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Dean – CDC

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deancdc.braun@gmail.com

No.BRAU-SKLM/CDC/Comm. Acn.Calendar/2020-21 Date: 05-03-2021

Proceedings of the Hon'ble Vice-Chancellor

Sub: Dr.B.R.Ambedkar University, Srikakulam – CDC office – Affiliated Colleges -**All U.G. Degree Colleges (Courses) under CBCS (Semester System) – Common Academic Calendar for the academic year 2020-21** -Orders – Issued.

Read: 1. Letter from Andhra Pradesh State Council of Higher Education (APSCHE) – Universities-Common Academic Calendar 2020-21, dated 30-10-2020
2. Note orders of the Hon'ble Vice-Chancellor, dated 23-02-2021

Order:

The Hon'ble Vice-Chancellor, having considered Andhra Pradesh State Council of Higher Education (APSCHE) – Universities – Common Academic Calendar read above, is pleased to order that **all the U.G. Degree Courses (Colleges) under CBCS (Semester System), affiliated to Dr. B.R. Ambedkar University, Srikakulam for the Academic year 2020-21 to follow and implementation of the Academic Calendar.** This will be put in the University website.

U.G. Academic Calendar 3rd, 5th & 4th & 6th Semester for the academic year 2020-21

S. No	Particulars	Date (s)
1	**Reopening and Commencement of Class work for 3rd & 5th Semester**	**02-11-2020**
2	Internal Examinations	Dec 1st to 5th, 2020
3	Online registration for 3rd & 5th Semester Examinations	01-02-2021
4	Submission of 3rd & 5th semester Examination nominal rolls on or before	02-02-2021
5	Submission of Examination penal fee of Rs. 500/-	23rd & 24th Feb, 2021
6	Closure of Instruction for 3rd & 5th Semesters	24-02-2021
7	Submission of attendance particulars of students to the controller of Examinations	25-02-2021
8	Submission of Examination Condonation fee	26-02-2021
9	Issue of Hall-Tickets	26-02-2021
10	Final Practical Examinations	01-03-2021
11	**Commencement of 3rd & 5th Semester end examinations**	**09-03-2021**

(PTO)

GOVERNMENT DEGREE COLLEGE
NARASANNAPETA-SRIKAKULAM DIST.-532421.
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12	**Commencement of class work for 4th & 6th Semester**	**25-03-2021**
13	Conduct of Internal Examinations for 4th & 6th Semester Students	June 1st to 5th, 2021
14	Online registration for 4th & 6th Semester Examinations	01-07-2021
15	Submission of semester Examination nominal rolls on or before	22-07-2021
16	Submission of Examination penal fee of Rs. 500/-	23rd & 24th July, 2021
17	Closure of Instruction for Semesters-	06-08-2021
18	Submission of attendance particulars of students to the controller of Examinations	24-07-2021
19	Submission of Examination Condonation fee	26-07-2021
20	Issue of Hall-Tickets	26-07-2021
21	Final Practical Examinations	27-07-2021
22	Semester End Examinations	09-08-2021
23	Examination Timings	09:00A.M to 12:00Noon. & 02:00P.M. to 05:00PM

(By Order)

(Prof. B. Addai)
Dean-CDC

Dean-College Development Council
Dr. B.R. Ambedkar University, Srikakulam
Etcherla-532 410 (A.P)

Copies to:

1. The Principals of all U.G. Degree Colleges affiliated to Dr. B.R.A.U, SKLM.
2. The Dean of examinations, Dr. B.R.A.U, SKLM
3. The web center, -With a request to upload the U.G Academic Calendar for the year 2020-21 for all U.G. Degree Courses at the appropriate place in the Dr. B.R.A.U website.
4. PA to the Hon'ble Vice-Chancellor, Dr. B.R.A.U, SKLM
5. PA to the Registrar, Dr. B.R.A.U, SKLM
6. OOF.

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GOVERNMENT DEGREE COLLEGE

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Dr. B.R. AMBEDKAR UNIVERSITY, SRIKAKULAM

Prof. B. Addi, M.A, M.Phil, Ph.D
Dean of Academic Affairs
Mobile No. 9542074188
e-mail: baddi2008@gmail.com

Academic Schedule for 2nd and 4th Semester of the AY 2021-22, Dr.B.R.Ambedkar University, Srikakulam was approved by the University authorities and submitting the same for the circulation.

Academic Schedule for 4th Semester of the AY 2021-22		
1	Commencement of Class Work	15-07-22
2	First Mid - Semester Examinations	29-08-2022 to 02-09-2022
3	Second Mid - Semester Examinations	29-09-2022 to 01-10-2022
4	Closure of Instructions	31-10-22
5	End Semester Examinations	09-11-22
Academic Schedule for 2nd Semester of the AY 2021-22		
1	Commencement of Class Work	16-06-22
2	First Mid - Semester Examinations	01-08-2022 to 04-08-2022
3	Second Mid - Semester Examinations	01-09-2022 to 05-09-2022
4	Closure of Instructions	30-09-22
5	End Semester Examinations	12-10-22

Dean of Academic Affairs

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Dr.B.R.AMBEDKAR UNIVERSITY,SRIKAKULAM,
ETCHERLA-532410

Dr.S.Uday Bhaskar,
M.Sc, Ph.D
DEAN OF EXAMINATIONS
Mobile Number : 9652457273
Email: sdaybsa@gmail.com

No.Dr.B.R.A.U./UG Exams/9th Sem Notification/2022. **Date: 31.01.2022.**

To

All the Principals of Degree Colleges Affiliated to
Dr.B.R.Ambedkar University, Srikakulam,
Etcherla - 532410.

Sir,

Sub: B.A, B.Sc, B.Com, BBA & BCA Degree Courses -CBCS Pattern - 5th Semester Examinations - February 2022 – Examination Schedule Notification – Intimation – Reg

Ref: 1) Note orders of the Hon'ble Vice Chancellor, Dated: 27-01-2022

*****

With reference to the above, I am by direction to inform you that the following is the Examination schedule of B.A, B.Sc, B.Com, BBA & BCA 5th Semester Examinations under CBCS Pattern to be held in the month of **February - 2022**.

a.	Uploading of Student Data by Principals of Degree Colleges for Online Registration.	From 01-02-2022
b.	Last date for Payment of Examination fee by the candidate without fine.	14-02-2022
c.	Consolidated DD to be drawn by the Principals.	15-02-2022
d.	Last date for submission of hard copies of student data along with consolidated DD.	16-02-2022
e.	i) Payment of Examination Fee with penal fee of Rs.500/- (Rupees Five hundred only)	15-02-2022 to 18-02-2022
	ii) Payment of Examination Fee with penal fee of Rs.2000/- (Rupees Two Thousand only)	19-02-2022
f.	Submission of Students Attendance Particulars	17-02-2022
g.	Downloading of Hall Tickets by Principals of Degree Colleges	21-02-2022
h.	Date of commencement of Practical Examinations, (Semester candidates only)	23-02-2022 to 28-03-2022
i.	Date of Commencement of Fifth Semester Theory Examinations	04-03-2022 From 02.00 P.M to 05.00 P.M

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You are requested to circulate the above Examination schedule among Students of your college and upload the student's data for Online Registration as per the specified dates mentioned above and submit the hard copies of student's data along with consolidated D.Ds addressed to Dean of Examinations, Dr.BRAU, Srikakulam as per the above schedule.

a) For uploading Student data refer to the Website **www.brau.edu.in** for regular & supplementary students.
b) Demand Drafts obtained prior to the date of issue of the Examination Notification will not be accepted.
c) Candidates who have not put in required 75% of attendance in I Semester are not Eligible to write the Examinations.
d) Shortage of attendance of the candidates who have put in minimum 66.66% of attendance will be condoned on medical grounds if the candidates submit Medical Certificates and Pays Rs.1000/-(Rupees One Thousand only) towards prescribed fee for condonation of Shortage of attendance. Such candidates will be allowed to write the Examinations subject to approval of the Vice-Chancellor, Dr.B.R.A.U, Srikakulam.
e) Incomplete and defective Student's data will not be accepted for Online Registration.
f) Candidate who has not appeared for First Semester are not eligible to write Second Semester. Similarly, candidates who have not appeared for Third Semester are not eligible for writing Fourth Semester and Candidates who have not appeared for Fourth Semester are not eligible for writing Fifth Semester.
g) Elective Papers and cluster elective opted by the candidate in sixth semester should be thoroughly checked while uploading the student data.

Dr.S.Uday Bhaskar
DEAN OF EXAMINATIONS (I/c)

Copies to:

1. Secretary to the Vice-Chancellor, Dr.B.R.Ambedkar University, Srikakulam, Etcherla
2. P.A to the Registrar, Dr.B.R.Ambedkar University, Srikakulam, Etcherla
3. Dean, College Development Council, Dr.B.R.Ambedkar University, Srikakulam, Etcherla
4. All Constituent and Affiliated College Principals of Dr. BRAU, Srikakulam
5. Editors of All leading newspapers in Srikakulam District with a request to publish in the press as event news item.
6. Web designer, Dr.BRAU Website
7. O.O.E

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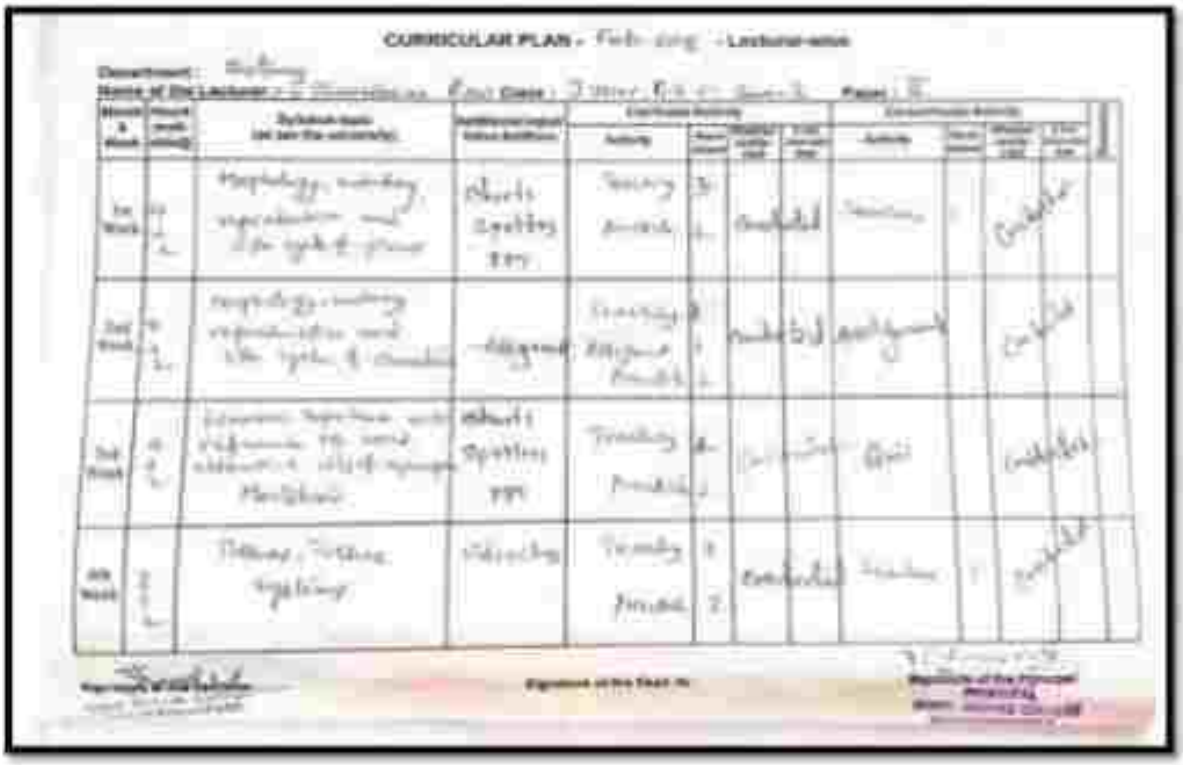
CURRICULAR PLAN - Lecturer-wise



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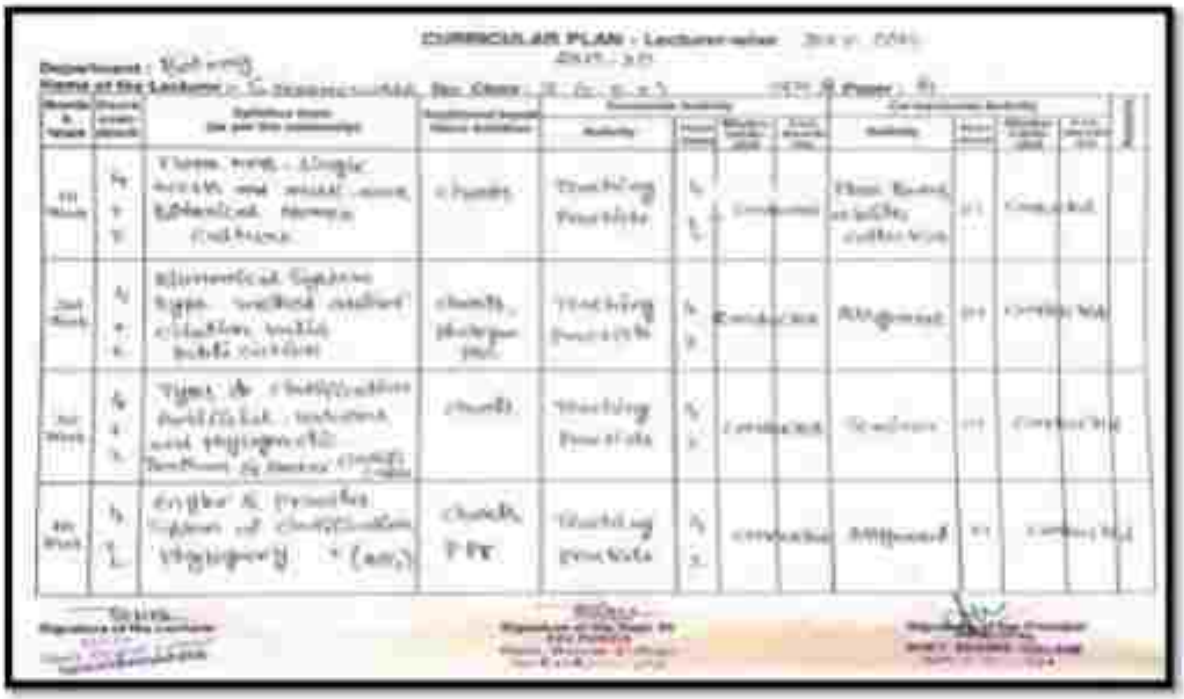

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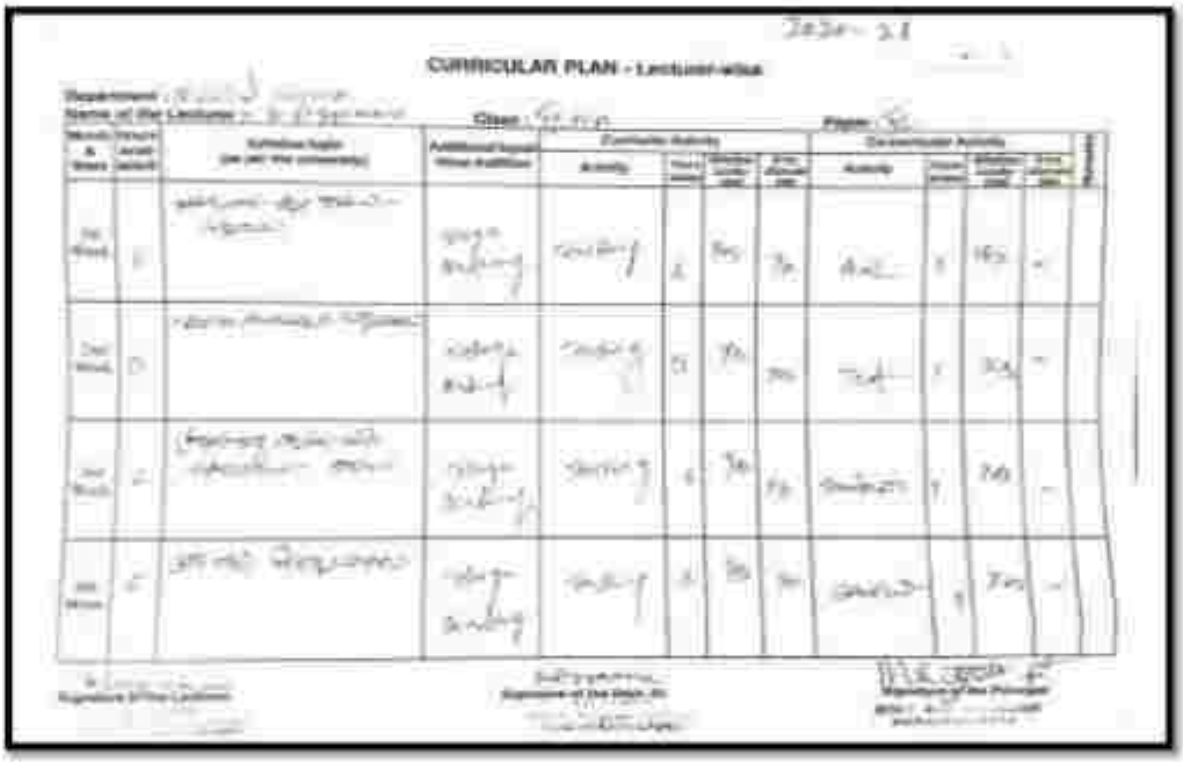

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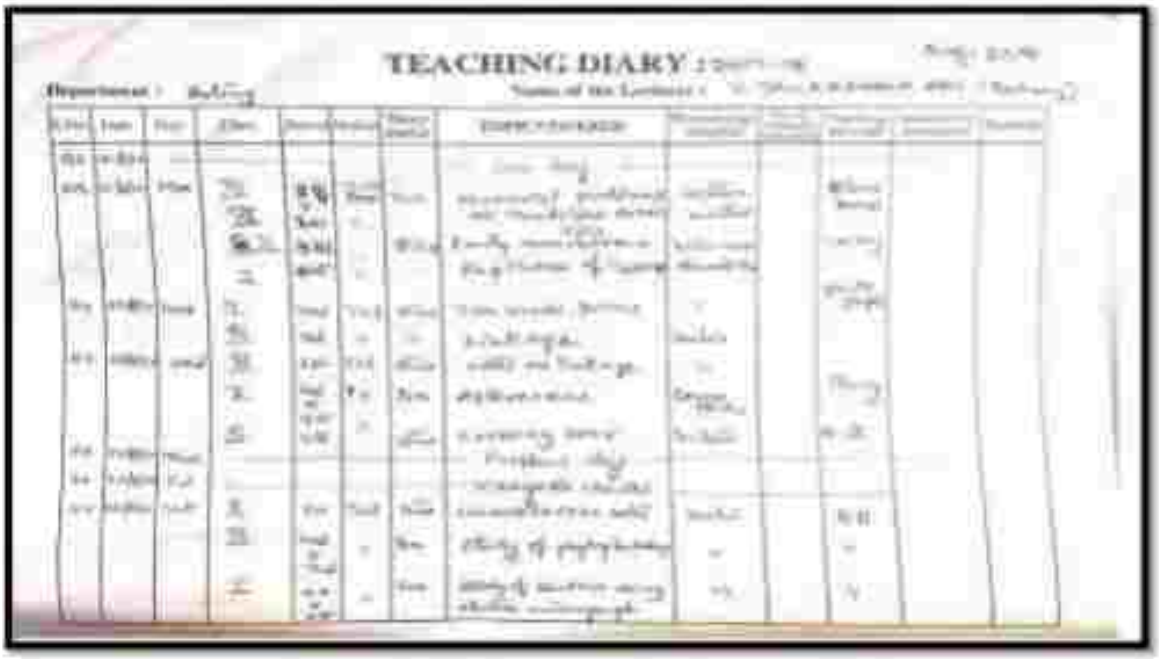

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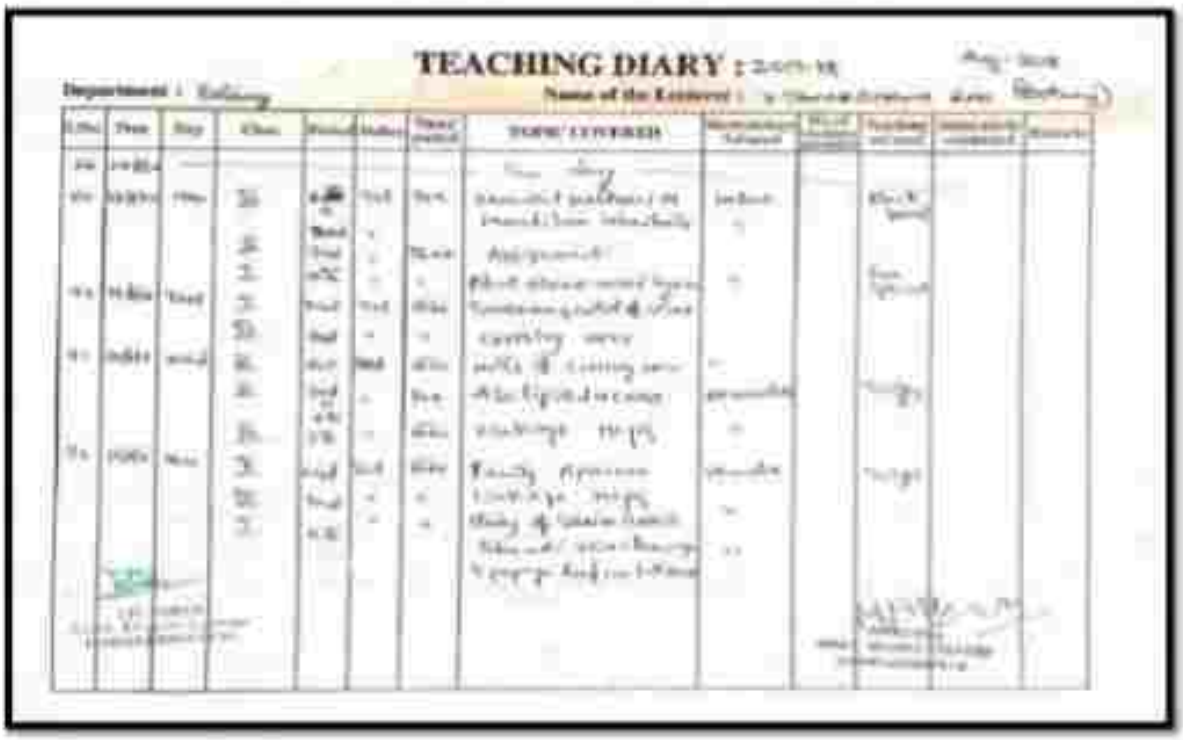

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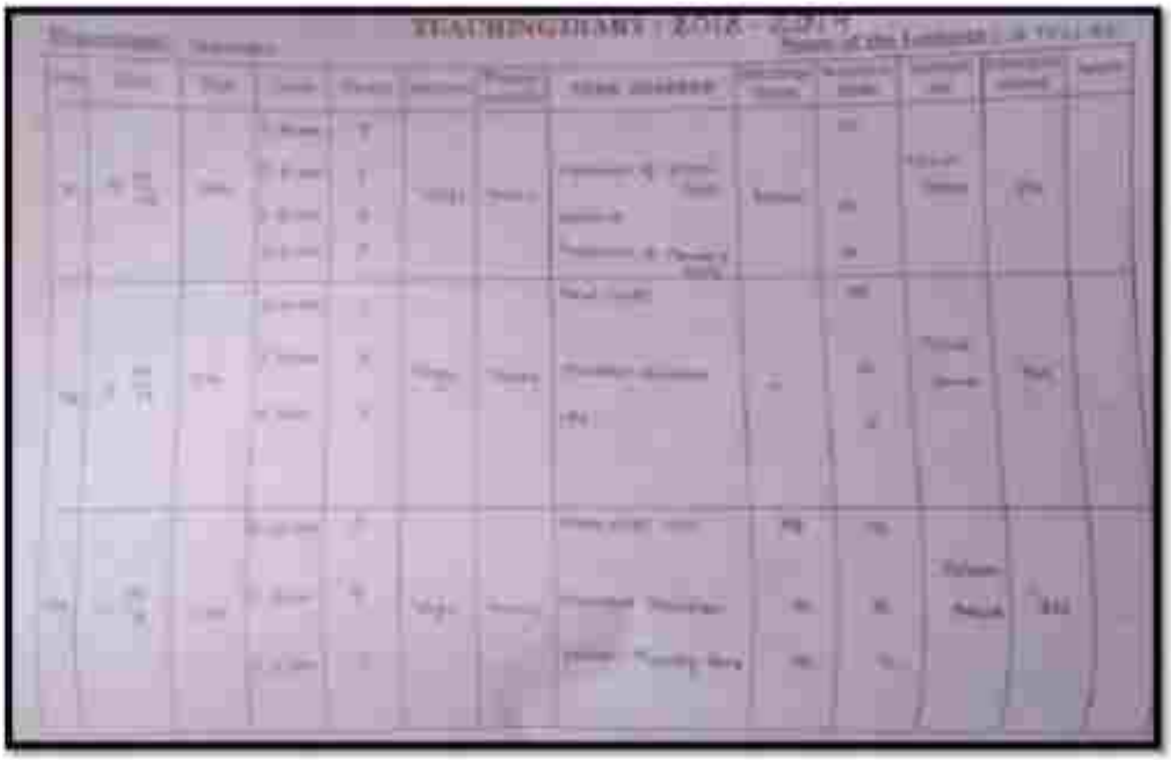

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TEACHING DIARY : FEBRUARY - 2020

Department: Botany

Name of the Lecturer: [illegible]

[illegible]

TEACHING DIARY : JANUARY 2020

Department: Botany

Name of the Lecturer: [illegible]

[illegible]

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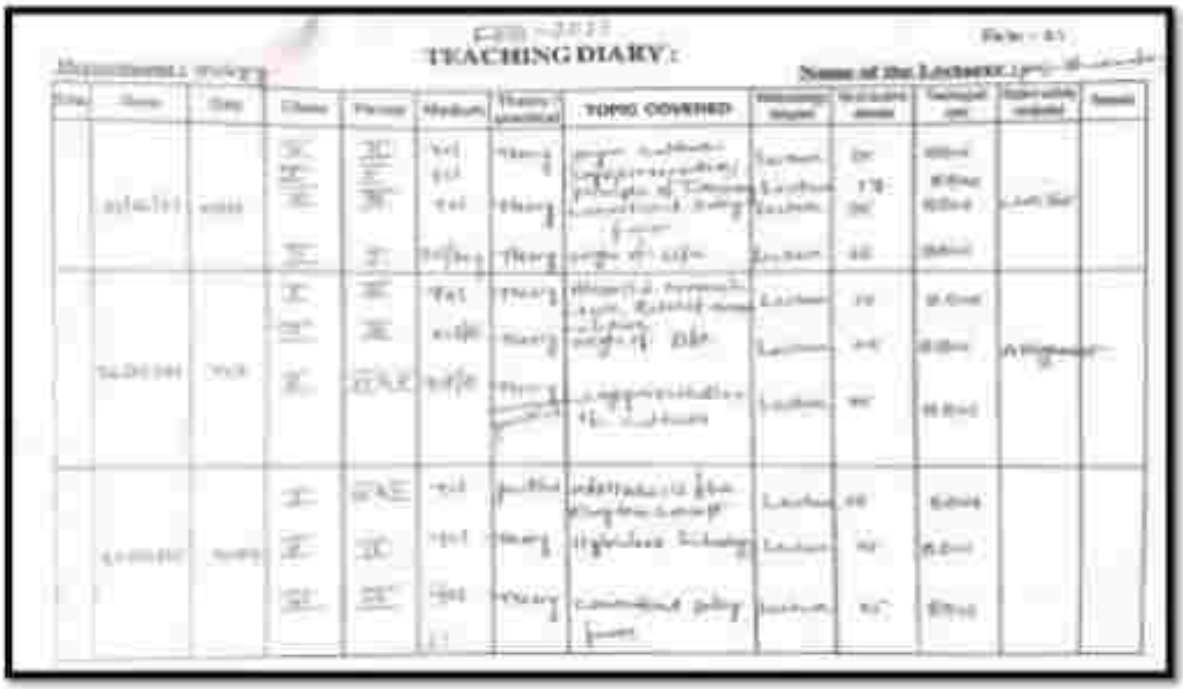
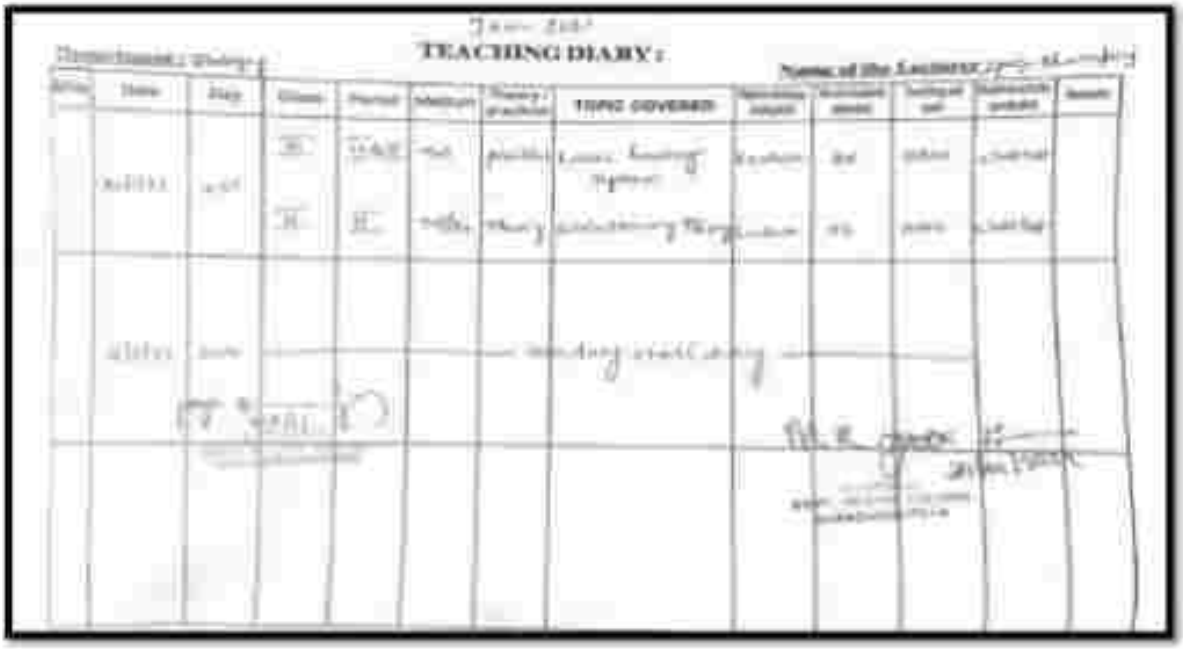


TEACHING DIARY:

Name of the Lecturer:

S.No.	Date	Day	Class	Period	Medium	Theory / practical	TOPIC COVERED	Remarks



TEACHING DIARY:

Name of the Lecturer:

S.No.	Date	Day	Class	Period	Medium	Theory / practical	TOPIC COVERED	Remarks

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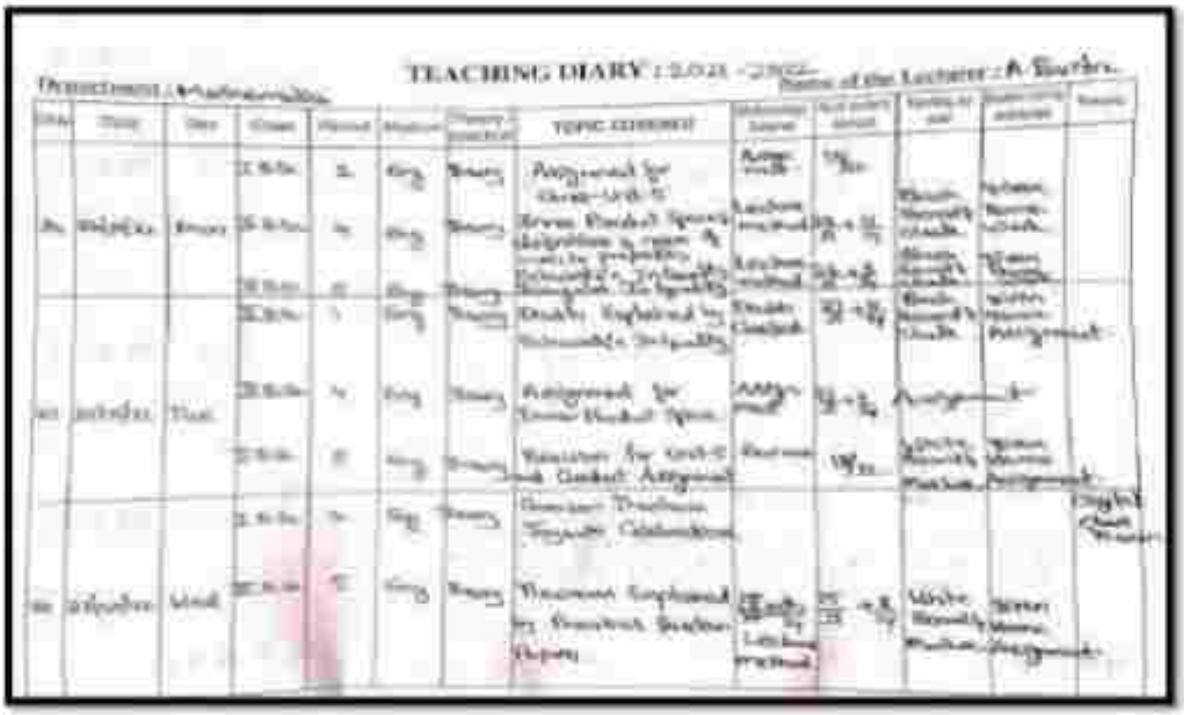
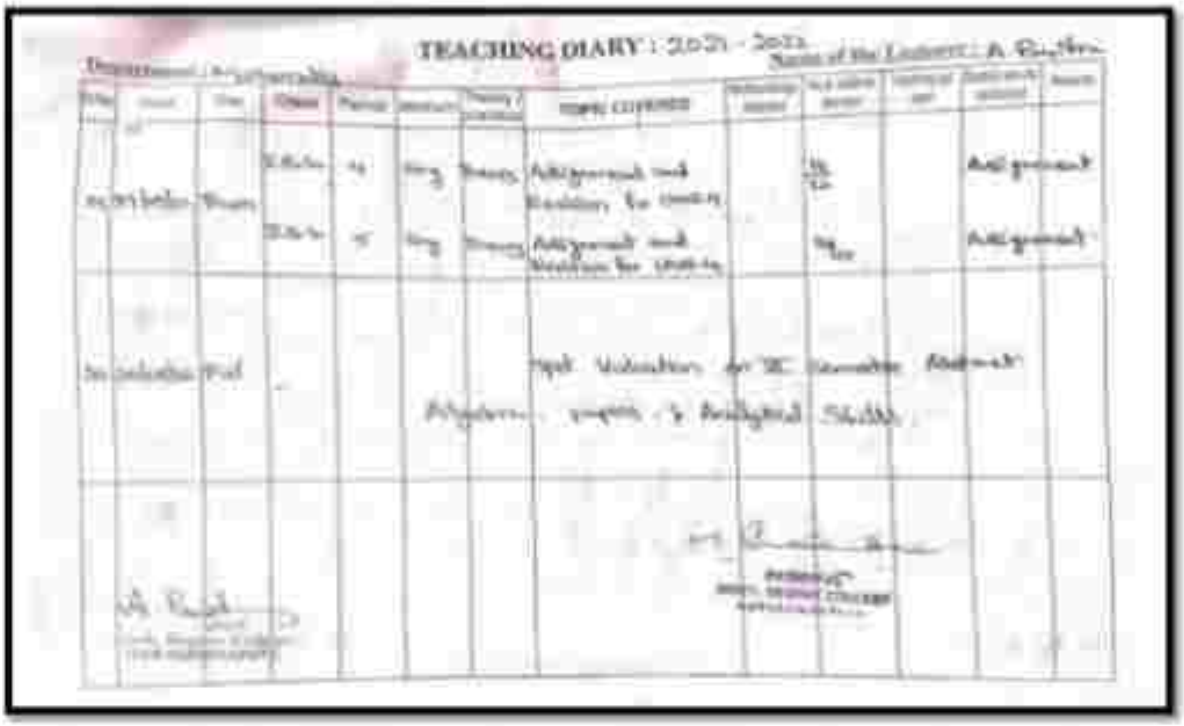

TEACHING DIARY : 2021 - 2022


TEACHING DIARY : 2021 - 2022

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TEACHING NOTES

2017-22

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TEACHING NOTES

2017-18

2017-18

Name of the Department / Subject : Botany

Name of the Lecturer : V. Jayardhana Rao

Course / Group : B.Sc (I+II+III)

Paper : IV

Name of the Topic : Mineral nutrition & Enzymes

Hours required : 12 hrs

Learning Objectives : Knowledge, understanding, analysis

Previous knowledge to be reminded : Through Question & Answers

(Continue on the reverse side if needed)

Topic Synopsis : 1) Mineral nutrition:
Essential elements (Macro and micronutrients) and their role in plant metabolism.
deficiency Symptoms
2) Mineral ion uptake (Active and passive uptake)
3) nitrogen Metabolism : biological N fixation

Examples / Illustrations : Yes

Additional inputs : Internet material

Teaching Aids used : Black board, Virtual class room

References cited : Devlin, R.M., plant physiology

Student Activity Planned after the teaching : Seminar, Quiz

Activity planned outside the Class room, if any : charts preparation

Any other activity : —

Signature of the Lecturer
LECTURER
Govt. Degree College
NARASANNAPETA

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2017-18

Name of the Department / Subject	: History / History
Name of the Lecturer	: G. Babu Rao
Course / Group	: III BA / HEP
Paper	: IV Modern World History
Name of the Topic	: [illegible]
Hours required	: 6 Hours
Learning Objectives	: "
Previous knowledge to be reminded	: Yes Reminded

(Continue on the reverse side if needed)

Topic Synopsis	: [illegible] 1. [illegible] 2. [illegible] 3. [illegible] 4. [illegible]
Examples / Illustration	: Yes.
Additional inputs	: "
Teaching Aids used	: Chart Maps notes
References cited	: Yes Modern World History.
Student Activity Planned after the teaching	: Assignment, Test Debate
Activity planned outside the Class room, if any	: Debate
Any other activity	: Yes

Signature of the Lecturer

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TEACHING NOTES

2018-19

2018-2019

Name of the Department / Subject : Botany

Name of the Lecturer : S. PARAMESWARA RAO

Course / Group : B.Sc (B.Z.C)

Paper : 5(i)

Name of the Topic : plant Biodiversity

Hours required : 12 hrs

Learning Objectives : knowledge, understand, Application

Previous knowledge to be reminded : Question and Answers.

Topic Synopsis : (Continue on the reverse side if needed)

1) Definition, Levels of Biodiversity - Genetics, Species & Ecosystem.

2) Biodiversity hot spots - criteria Biodiversity hot spots in India (P.T.O)

Examples / Illustration : Yes

Additional inputs : Internet Images.

Teaching Aids used : Google search

References cited : Kochhar, P.L (1994): Plant-Ecology (4th Edition)

Student Activity Planned after the teaching : Given notes.

Activity planned outside the Class room, if any : Given Assignment

Any other activity :

Signature of the Lecturer
LECTURER
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2018 -2019

Name of the Department / Subject : Hindi

Name of the Lecturer : P. Lakshmana Rao

Course / Group : II B.A / B.Sc

Paper : I

Name of the Topic : भक्ति आंदोलन का उद्भव और विकास

Hours required : one

Learning Objectives : ज्ञान

Previous knowledge to be reminded : ज्ञान

(Continue on the reverse side if needed)

Topic Synopsis :

I. परिचय

II. उद्भव

(1) दक्षिण भारत में भक्ति का उद्भव

(2) भक्ति का अखिल भारतीय प्रसार

(3) भक्ति आंदोलन के उदय के कारण

III. भक्ति का विकास

Examples / Illustrations : ज्ञान

Additional inputs : ज्ञान

Teaching Aids used : Blackboard

References cited : Text book

Student Activity Planned after the teaching : Assignment

Activity planned outside the Class room, if any : ज्ञान

Any other activity : ज्ञान

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Signature of the Lecturer
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TEACHING NOTES
2019-20

2019 - 2020

Name of the Department / Subject : [illegible] / B.Sc

Name of the Lecturer : A.PALLAVI

Course / Group : B.Sc MPC

Paper : II

Name of the Topic : Frequency distribution, Tabulation

Hours required : 20

Learning Objectives : To impart knowledge to the [illegible]

Previous knowledge to be reminded : knowledge related to frequency

(Continue on the reverse side if needed)

Topic Synopsis : Frequency distribution, tabulation, diagrammatic and graphic presentation

Examples / Illustration : Example related to the topic are given

Additional inputs : -

Teaching Aids used : Blackboard, chalkpiece

References cited : Relevant publishers

Student Activity Planned after the teaching : Questions and Answers

Activity planned outside the Class room, if any : Questions

Any other activity :

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A.Pallavi
Signature of the Lecturer

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Govt. Degree College
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2019-20

Name of the Department / Subject	:	Botany
Name of the Lecturer	:	T. RAGHAVA RAJU
Course / Group	:	III BSc (MPC, MPCS)
Paper	:	VII
Name of the Topic	:	Bio Energy
Hours required	:	2
Learning Objectives	:	Knowledge, understanding
Previous knowledge to be reminded	:	previous lesson

(Continue on the reverse side if needed)

Topic Synopsis	:	Energy from biomass Sources of biomass Different forms Conversion of biomass in to fuels Energy through fermentation
Examples / Illustrations	:	
Additional inputs	:	
Teaching Aids used	:	Black board & Talk
References cited	:	Untext & Telugu Academy books
Student Activity Planned after the teaching	:	Asked Questions
Activity planned outside the Class room, if any	:	Reading Imp Questions
Any other activity	:	Assignment

Signature of the Lecturer

LECTURER

Govt. Degree College

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TEACHING NOTES

2020-21

Name of the Department / Subject	: Botany
Name of the Lecturer	: [illegible]
Course / Group	: II B.Sc (CBZ) - Sem-III
Paper	: III
Name of the Topic	: Pteridophytes
Hours required	: 12 hrs
Learning Objectives	: Knowledge, understanding, Analysis skill
Previous knowledge to be reminded	: Through Question and Answers

(Continue on the reverse side if needed)

Topic Synopsis	: • General characteristics of Pteridophyta. classification of Smith (1955) upto divisions. • Structure, morphology, anatomy, reproduction (developmental details are briefly) and life history of any Lycopsida (Lycopodium) or Sphenopsida (Equisetum) or Filicopsida (Pteris)
Examples / Illustrations	: yes
Additional inputs	: Internet, web portal
Teaching Aids used	: Virtual classroom, PPT, Charts, Specimens
References cited	: Sporne, K.R. (1974) An introduction to Embryophyta, Volume I, Pteridophytes, Hutchinson & Co.
Student Activity Planned after the teaching	: Seminars & Assignments
Activity planned outside the Class room, if any	: Collection of Pteridophytes specimens
Any other activity	: —

Signature of the Lecturer
Lecturer
Govt. Degree College
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ANIMAL BIOTECHNOLOGY 2020-2021

Name of the Department / Subject : zoology

Name of the Lecturer : pooja Bharadwaj

Course / Group : III B.Sc (CBZ)

Paper : V - animal biotechnology

Name of the Topic : cloning vectors, use of linkers & adaptors

Hours required : 06

Learning Objectives : knowledge, understanding, application.

Previous knowledge to be reminded : yes, previous knowledge to be reminded from Academic and Some publication textbooks
(Continue on the reverse side if needed)

Topic Synopsis : The process of joining of two different DNA to make a hybrid is called DNA is called genetic engineering.

→ cloning vectors are the vehicles which transfer different gene in to a host cell.

Examples / Illustrations : Yes given

Additional inputs : Internet materials

Teaching Aids used : PPT, charts, sticks, models

References cited : Academic text books

Student Activity Planned after the teaching : Notes given

Activity planned outside the Class room, if any : Assignment

Any other activity : charts preparation

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TEACHING NOTES

2021-22

2021 - 2022

Name of the Department / Subject : COMMERCE / FA

Name of the Lecturer : A. Pattani

Course / Group : I - BCom

Paper : I

Name of the Topic : Trial balance

Hours required : 10

Learning Objectives : To impart knowledge on trial balance

Previous knowledge to be reminded : Knowledge acquired in the accounting

(Continue on the reverse side if needed)

Topic Synopsis : Meaning, Advantages of trial balance, methods, Errors, Rectification of errors, Types of errors

Examples / Illustrations : Example related to the topic are given

Additional Inputs : —

Teaching Aids used : Blackboard

References cited : Different publishers

Student Activity Planned after the teaching : Questions and answers

Activity planned outside the Class room. If any : Exercise

Any other activity :

Signature of the Lecturer

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2021 - 2022

Name of the Department / Subject : Mathematics

Name of the Lecturer : A. Pavitra

Course / Group : III B.Sc (M.P.C, M.P.Cs)

Paper : XI - Sem - V

Name of the Topic : Vector Differentiation

Hours required : 12

Learning Objectives : Definitions, Theorems, Solving Problems

Previous knowledge to be reminded : Differentials, and Scalars & Vectors, Theorems to be reminded

(Continue on the reverse side if needed)

Topic Synopsis : Vector Differentiation.

Vector Differentiation, ordinary derivatives of Vectors, Differentiability, Gradient, Divergence, Curl operators, Formulae involving these operators.

Examples / Illustrations : Examples & Illustrations from Class Text Book

Additional Inputs : by using black app board.

Teaching Aids used : White Board & marker, Digital Class Room.

References cited : Text Book.

Student Activity Planned after the teaching : given Home work.

Activity planned outside the Class room, if any : Given Home work.

Any other activity :

A. Pavitra
Signature of the Lecturer

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SYLLABUS FOR 2017-2018

Andhra Pradesh State Council of Higher Education
CBCS B.A./B.Sc. **Mathematics** Course Structure
w.ef. 2015-16(Revised in April, 2016)

Year	Semester	Paper	Subject	Hrs.	Credits	IA	EA	Total
1	I	I	Differential Equations & Differential Equations Problem Solving Sessions	6	5	25	75	100
	II	II	Solid Geometry & Solid Geometry Problem Solving Sessions	6	5	25	75	100
2	III	III	Abstract Algebra & Abstract Algebra Problem Solving Sessions	6	5	25	75	100
	IV	IV	Real Analysis & Real Analysis Problem Solving Sessions	6	5	25	75	100

3	V	V	Ring Theory & Vector Calculus & Ring Theory & Vector Calculus Problem Solving Sessions	5	5	25	75	100
		VI	Linear Algebra & Linear Algebra Problem Solving Sessions	5	5	25	75	100
	VI	VII	**Electives:(any one)** VII-(A) Laplace Transforms VII-(B) Numerical Analysis VII-(C) Number Theory & Elective Problem Solving Sessions	5	5	25	75	100
		VIII		5	5	25	75	100
			Cluster Electives: VIII-A-1 Integral Transforms VIII-A-2 Advanced Numerical Analysis VIII-A-3 *Project work*or	5	5	25	75	100
			VIII-B-1: Principles of Mechanics VIII-B-2:Fluid Mechanics VIII-B-3:*Project work* or	5	5	25	75	100
			VIII-C-1:Graph Theory VIII-C-2: Applied Graph Theory VIII-C-3:*Project work*					

Andhra Pradesh State Council of Higher Education
w.e.f. 2015-16(Revised in April, 2016)
B.A./B.Sc. FIRST YEAR MATHEMATICS SYLLABUS

SEMESTER –I, PAPER - 1

DIFFERENTIAL EQUATIONS

60 Hrs*UNIT – I (12 Hours), Differential Equations of first order and first degree :*

Linear Differential Equations; Differential Equations Reducible to Linear Form; Exact Differential Equations; Integrating Factors; Change of Variables.

UNIT – II (12 Hours), Orthogonal Trajectories.

Differential Equations of first order but not of the first degree :

Equations solvable for p; Equations solvable for y; Equations solvable for x; Equations that do not contain x (or y); Equations of the first degree in x and y – Clairaut's Equation.

UNIT – III (12 Hours), Higher order linear differential equations-I :

Solution of homogeneous linear differential equations of order n with constant coefficients; Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators.

General Solution of $f(D)y=0$

General Solution of $f(D)y=Q$ when Q is a function of x.

$\frac{1}{f(D)}$ is Expressed as partial fractions.

P.I. of $f(D)y = Q$ when $Q = be^{ax}$

P.I. of $f(D)y = Q$ when Q is $b\sin ax$ or $b\cos ax$.

UNIT – IV (12 Hours), Higher order linear differential equations-II :

Solution of the non-homogeneous linear differential equations with constant coefficients.

P.I. of $f(D)y = Q$ when $Q = bx^k$

P.I. of $f(D)y = Q$ when $Q = e^{ax}V$

P.I. of $f(D)y = Q$ when $Q = xV$

P.I. of $f(D)y = Q$ when $Q = x^nV$

UNIT –V (12 Hours), Higher order linear differential equations-III :

Method of variation of parameters; Linear differential Equations with non-constant coefficients; The Cauchy-Euler Equation.

Reference Books :

1. Differential Equations and Their Applications by Zafar Ahsan, published by Prentice-Hall of India Learning Pvt. Ltd. New Delhi-Second edition.
2. A text book of mathematics for BA/BSc Vol I by N. Krishna Murthy & others, published by S. Chand & Company, New Delhi.
3. Ordinary and Partial Differential Equations Raisinghania, published by S. Chand & Company, New Delhi.
4. Differential Equations with applications and programs – S. Balachandra Rao & HR Anuradha- universities press.

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on Application of Differential Equations in Real

UNIT – VI (12 Hrs) : The Plane :

Equation of plane in terms of its intercepts on the axis, Equations of the plane through the given points, Length of the perpendicular from a given point to a given plane, Bisectors of angles between two planes, Combined equation of two planes, Orthogonal projection on a plane

UNIT – II (12 hrs) : The Line :

Equation of a line, Angle between a line and a plane; The condition that a given line may lie in a given plane; The condition that two given lines are coplanar; Number of arbitrary constants in the equations of straight line; Sets of conditions which determine a line; The shortest distance between two lines; The length and equations of the line of shortest distance between two straight lines; Length of the perpendicular from a given point to a given line;

UNIT – III (12 hrs) : Sphere :

Definition and equation of the sphere; Equation of the sphere through four given points; Plane sections of a sphere, Intersection of two spheres; Equation of a circle; Sphere through a given circle; Intersection of a sphere and a line; Power of a point; Tangent plane; Plane of contact; Polar plane; Pole of a Plane; Conjugate points; Conjugate planes;

UNIT – IV (12 hrs) : Sphere & Cones :

Angle of intersection of two spheres; Conditions for two spheres to be orthogonal; Radical plane; Coaxial system of spheres, Simplified from of the equation of two spheres

Definitions of a cone; vertex; guiding curve; generators; Equation of the cone with a given vertex and guiding curve; Enveloping cone of a sphere; Equations of cones with vertex at origin are homogeneous; Condition that the general equation of the second degree should represent a cone; Condition that a cone may have three mutually perpendicular generators;

UNIT – V (12 hrs) Cones & Cylinders :

Intersection of a line and a quadric cone; Tangent lines and tangent plane at a point; Condition that a plane may touch a cone; Reciprocal cones; Intersection of two cones with a common vertex; Right circular cone; Equation of the right circular cone with a given vertex; axis and semi-vertical angle.

Definition of a cylinder; Equation to the cylinder whose generators intersect a given conic and are parallel to a given line; Enveloping cylinder of a sphere; The right circular cylinder; Equation of the right circular cylinder with a given axis and radius.

Reference Books :

1. Analytical Solid Geometry by Shanti Narayan and P.K. Mittal, Published by S. Chand & Company Ltd. 7th Edition.

2. A text book of Mathematics for BA/B.Sc Vol I, by V Krishna Murthy & Others, Published by S. Chand & Company, New Delhi.

3. A text Book of Analytical Geometry of Three Dimensions, by P.K. Jain and Khaleel Ahmed, Published by Wiley Eastern Ltd , 1999.

4. Co-ordinate Geometry of two and three dimensions by P. Balasubrahmanyam,K.Y. Subrahmanyam,
G.R. Venkataraman published by Tata-MC Graw-Hill Publishers Company Ltd., New Delhi.

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on Application of Solid Geometry in Engineering

B.A./B.Sc. SECOND YEAR MATHEMATICS SYLLABUS

SEMESTER – III, PAPER - 3

ABSTRACT ALGEBRA

60 Hrs

UNIT – 1 : (10 Hrs) GROUPS : -

Binary Operation – Algebraic structure – semi group-monoid – Group definition and elementary properties Finite and Infinite groups – examples – order of a group. Composition tables with examples.

UNIT – 2 : (14 Hrs) SUBGROUPS : -

Complex Definition – Multiplication of two complexes Inverse of a complex-Subgroup definition – examples-criterion for a complex to be a subgroups.

Criterion for the product of two subgroups to be a subgroup-union and Intersection of subgroups.

Co-sets and Lagrange's Theorem :-

Cosets Definition – properties of Cosets–Index of a subgroups of a finite groups–Lagrange's Theorem.

UNIT –3 : (12 Hrs) NORMAL SUBGROUPS : -

Definition of normal subgroup – proper and improper normal subgroup–Hamilton group – criterion for a subgroup to be a normal subgroup – intersection of two normal subgroups – Sub group of index 2 is a normal sub group – simple group – quotient group – criteria for the existence of a quotient group.

UNIT – 4 : (10 Hrs) HOMOMORPHISM : -

Definition of homomorphism – Image of homomorphism elementary properties of homomorphism – Isomorphism – automorphism definitions and elementary properties–kernel of a homomorphism – fundamental theorem on Homomorphism and applications.

UNIT – 5 : (14 Hrs) PERMUTATIONS AND CYCLIC GROUPS : -

Definition of permutation – permutation multiplication – Inverse of a permutation – cyclic permutations – transposition – even and odd permutations – Cayley's theorem.

Cyclic Groups :-

Definition of cyclic group – elementary properties – classification of cyclic groups.

Reference Books :

1. Abstract Algebra, by J.B. Fraleigh, Published by Narosa Publishing house.
2. A text book of Mathematics for B.A. / B.Sc. by B.V.S.S. SARMA and others, Published by S.Chand & Company, New Delhi.
3. Modern Algebra by M.L. Khanna.

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on Group theory and its applications in Graphics and Medical image Analysis

B.A/B.Sc. SECOND YEAR MATHEMATICS SYLLABUS

SEMESTER – IV, PAPER- 4

REAL ANALYSIS

60 Hrs

UNIT – I (12 hrs) : REAL NUMBERS :

The algebraic and order properties of R, Absolute value and Real line, Completeness property of R, Applications of supreme property; intervals. No. Question is to be set from this portion.

Real Sequences: Sequences and their limits, Range and Boundedness of Sequences, Limit of a sequence and Convergent sequence.

The Cauchy's criterion, properly divergent sequences, Monotone sequences, Necessary and Sufficient condition for Convergence of Monotone Sequence, Limit Point of Sequence, Subsequences and the Bolzano-weierstrass theorem – Cauchy Sequences – Cauchey's general principle of convergence theorem.

UNIT –II (12 hrs) : INFINITIE SERIES :

Series : Introduction to series, convergence of series. Cauchey's general principle of convergence for series tests for convergence of series, Series of Non-Negative Terms.

1. P-test
2. Cauchey's n^{th} root test or Root Test.
3. D'-Alemberts' Test or Ratio Test.
4. Alternating Series – Leibnitz Test.

Absolute convergence and conditional convergence, semi convergence.

UNIT – III (12 hrs) : CONTINUITY :

Limits : Real valued Functions, Boundedness of a function, Limits of functions. Some extensions of the limit concept, Infinite Limits. Limits at infinity. No. Question is to be set from this portion.

Continuous functions : Continuous functions, Combinations of continuous functions, Continuous Functions on intervals, uniform continuity.

UNIT – IV (12 hrs) : DIFFERENTIATION AND MEAN VALUE THEORMS :

The derivability of a function, on an interval, at a point, Derivability and continuity of a function, Graphical meaning of the Derivative, Mean value Theorems; Role's Theorem, Lagrange's Theorem, Cauchhy's Mean value Theorem

UNIT – V (12 hrs) : RIEMANN INTEGRATION :

Riemann Integral, Riemann integral functions, Darboux theorem. Necessary and sufficient condition for R – integrability, Properties of integrable functions, Fundamental theorem of integral calculus, integral as the limit of a sum, Mean value Theorems.

Reference Books :

1. Real Analysis by Rabert & Bartely and D.R. Sherbart, Published by John Wiley.
2. A Text Book of B.Sc Mathematics by B.V.S.S. Sarma and others, Published by S. Chand & Company Pvt. Ltd., New Delhi.
3. Elements of Real Analysis as per UGC Syllabus by Shanthi Narayan and Dr. M.D. Raisinghania Published by S. Chand & Company Pvt. Ltd., New Delhi.

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on Real Analysis and its applications

B.A /B.Sc. THIRD YEAR MATHEMATICS SYLLABUS

SEMESTER – V, PAPER-5

RING THEORY & VECTOR CALCULUS

60 Hrs

UNIT – 1 (12 hrs) RINGS-I : -

Definition of Ring and basic properties, Boolean Rings, divisors of zero and cancellation laws Rings, Integral Domains, Division Ring and Fields, The characteristic of a ring - The characteristic of an Integral Domain, The characteristic of a Field. Sub Rings, Ideals

UNIT – 2 (12 hrs) RINGS-II : -

Definition of Homomorphism – Homorphic Image – Elementary Properties of Homomorphism – Kernel of a Homomorphism – Fundamental theorem of Homomorfiphism – Maximal Ideals – Prime Ideals.

UNIT –3 (12 hrs) VECTOR DIFFERENTIATION : -

Vector Differentiation, Ordinary derivatives of vectors, Differentiability, Gradient, Divergence, Curl operators, Formulae Involving these operators.

UNIT – 4 (12 hrs) VECTOR INTEGRATION : -

Line Integral, Surface Integral, Volume integral with examples.

UNIT – 5 (12 hrs) VECTOR INTEGRATION APPLICATIONS : -

Theorems of Gauss and Stokes, Green's theorem in plane and applications of these theorems

Reference Books :-

1. Abstract Algebra by J. Fraleih, Published by Narosa Publishing house.
2. Vector Calculus by Santhi Narayana, Published by S. Chand & Company Pvt. Ltd., New Delhi
3. A text Book of B.Sc., Mathematics by B.V.S.S.Sarma and others, published byS. Chand & Company Pvt. Ltd., New Delhi.
4. Vector Calculus by R. Gupta, Published by Laxmi Publications
5. Vector Calculus by P.C. Matthews, Published by Springer Verlagpublicattions.
6. Rings and Linear Algebra by Pundir & Pundir, Published by Pragathi Prakashan

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on Ring theory and its applications

B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS

SEMESTER – V, PAPER-6

LINEAR ALGEBRA

60 Hrs

UNIT – I (12 hrs) : Vector Spaces-I :

Vector Spaces, General properties of vector spaces, n-dimensional Vectors, addition and scalar multiplication of Vectors, internal and external composition, Null space, Vector subspaces, Algebra of subspaces, Linear Sum of two subspaces, linear combination of Vectors, Linear span Linear independence and Linear dependence of Vectors.

UNIT –II (12 hrs) : Vector Spaces-II :

Basis of Vector space, Finite dimensional Vector spaces, basis extension, co-ordinates, Dimension of a Vector space, Dimension of a subspace, Quotient space and Dimension of Quotientspace.

UNIT –III (12 hrs) : Linear Transformations :

Linear transformations, linear operators, Properties of L.T, sum and product of LTs, Algebra of Linear Operators, Range and null space of linear transformation, Rank and Nullity of linear transformations – Rank – Nullity Theorem.

UNIT –IV (12 hrs) : Matrix :

Matrices, Elementary Properties of Matrices, Inverse Matrices, Rank of Matrix, Linear Equations, Characteristic Roots, Characteristic Values & Vectors of square Matrix, Cayley – Hamilton Theorem.

UNIT –V (12 hrs) : Inner product space :

Inner product spaces, Euclidean and unitary spaces, Norm or length of a Vector, Schwartz inequality, Triangle in Inequality, Parallelogram law, Orthogonality, Orthonormal set, complete orthonormal set, Gram – Schmidt orthogonalisation process. Bessel's inequality and Parseval's Identity.

Reference Books :

1.Linear Algebra by J.N. Sharma and A.R. Vasista, published by Krishna Prakashan Mandir, Meerut- 250002.

2.Matrices by Shanti Narayana, published by S.Chand Publications.

3. Linear Algebra by Kenneth Hoffman and Ray Kunze, published by Pearson Education (low priced edition),New Delhi.

4. Linear Algebra by Stephen H. Friedberg et al published by Prentice Hall of India Pvt. Ltd. 4th Edition 2007

Suggested Activities:

Seminar/ Quiz/ Assignments/ Project on "Applications of Linear algebra Through Computer Sciences"

B.A /B.Sc. THIRD YEAR MATHEMATICS SYLLABUS

SEMESTER – VI, PAPER – VII-(A)

ELECTIVE-VII(A): LAPLACE TRANSFORMS

60 Hrs

UNIT – 1 (12 hrs) Laplace Transform I : -

Definition of - Integral Transform – Laplace Transform Linearity, Property, Piecewise continuous Functions, Existence of Laplace Transform, Functions of Exponential order, and of Class A.

UNIT – 2 (12 hrs) Laplace Transform II : -

First Shifting Theorem, Second Shifting Theorem, Change of Scale Property, Laplace Transform of the derivative of f(t), Initial Value theorem and Final Value theorem.

UNIT – 3 (12 hrs) Laplace Transform III : -

Laplace Transform of Integrals – Multiplication by t, Multiplication by t^n – Division by t. Laplace transform of Bessel Function, Laplace Transform of Error Function, Laplace Transform of Sine and cosine integrals.

UNIT –4 (12 hrs) Inverse Laplace Transform I : -

Definition of Inverse Laplace Transform. Linearity, Property, First Shifting Theorem, Second Shifting Theorem, Change of Scale property, use of partial fractions, Examples.

UNIT –5 (12 hrs) Inverse Laplace Transform II : -

Inverse Laplace transforms of Derivatives-Inverse Laplace Transforms of Integrals – Multiplication by Powers of 'P'– Division by powers of 'P'– Convolution Definition – Convolution Theorem – proof and Applications – Heaviside's Expansion theorem and its Applications.

Reference Books :-

1. Laplace Transforms by A.R. Vasistha and Dr. R.K. Gupta Published by Krishna Prakashan Media Pvt. Ltd. Meerut.
2. Fourier Series and Integral Transforms by Dr. S. SreenadhPublished by S.Chand and Co., Pvt. Ltd., New Delhi.
3. Laplace and Fourier Transforms by Dr. J.K. Goyal and K.P. Gupta, Published by Pragathi Prakashan, Meerut.
4. Integral Transforms by M.D. Raisinghania, - H.C. Saxsena and H.K. Dass Published by S. Chand and Co., Pvt.Ltd., New Delhi.

Suggested Activities:

Seminar/ Quiz/ Assignments.

B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS

SEMESTER – VI, PAPER –VII-(B)

ELECTIVE–VII-(B); NUMERICAL ANALYSIS

60 Hrs

UNIT- I: (10 hours)

Errors in Numerical computations :Errors and their Accuracy, Mathematical Preliminaries, Errors and their Analysis, Absolute, Relative and Percentage Errors, A general error formula, Error in a series approximation.

UNIT – II: (12 hours)

Solution of Algebraic and Transcendental Equations: The bisection method, The iteration method, The method of false position, Newton Raphson method, Generalized Newton Raphson method. Muller's Method

UNIT – III: (12 hours) Interpolation - I

Interpolation : Errors in polynomial interpolation, Finite Differences, Forward differences, Backward differences, Central Differences, Symbolic relations, Detection of errors by use of Differences Tables, Differences of a polynomial

UNIT – IV: (12 hours) Interpolation - II

Newton's formulae for interpolation Central Difference Interpolation Formulae, Gauss's central difference formulae, Stirling's central difference formula, Bessel's Formula, Everett's Formula.

UNIT – V : (14 hours) Interpolation - III

Interpolation with unevenly spaced points, Lagrange's formula, Error in Lagrange's formula, Divided differences and their properties, Relation between divided differences and forward differences, Relation between divided differences and backward differences Relation between divided differences and central differences, Newton's general interpolation Formula, Inverse interpolation.

Reference Books :

1. Numerical Analysis by S.S.Sastry,published by Prentice Hall of India Pvt. Ltd., New Delhi. (Latest Edition)
2. Numerical Analysis by G. Sankar Rao published byNew Age International Publishers, New – Hyderabad.
3. Finite Differences and Numerical Analysis by H.C Saxena published by S. Chand and Company, Pvt.

Ltd., New Delhi.

4. Numerical methods for scientific and engineering computation by M.K.Jain, S.R.K.Iyengar, R.K. Jain.

Suggested Activities:

Seminar/ Quiz/ Assignments

B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS

SEMESTER – VI, PAPER – VII-(C)

ELECTIVE–VII-(C): NUMBER THEORY

UNIT-I (12 hours)

Divisibility – Greatest Common Divisor – Euclidean Algorithm – The Fundamental Theorem of Arithmetic

UNIT-II (12 hours)

Congruences – Special Divisibility Tests - Chinese Remainder Theorem- Fermat's Little Theorem – Wilson's Theorem – Residue Classes and Reduced Residue Classes – Solutions of Congruences

UNIT-III (12 hours)

Number Theory from an Algebraic Viewpoint – Multiplicative Groups, Rings and Fields

UNIT-IV (12 hours)

Quadratic Residues - Quadratic Reciprocity – The Jacobi Symbol

UNIT-V (12 hours)

Greatest Integer Function – Arithmetic Functions – The Moebius Inversion Formula

Reference Books:

1. "Introduction to the Theory of Numbers" by Niven, Zuckerman & Montgomery (John Wiley & Sons)
2. "Elementary Number Theory" by David M. Burton
3. Elementary Number Theory,by David, M. Burtonpublished by 2nd Edition (UBS Publishers)
4. Introduction to Theory of Numbers,by Davenport H., Higher Arithmetic published by5th Edition (John Wiley & Sons) Niven,Zuckerman & Montgomery.(Camb, Univ, Press)
5. Number Theory by Hardy & Wright published byOxford Univ, Press.
6. Elements of the Theory of Numbersby Dence, J. B & Dence T.Ppublished by Academic Press.

B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS,
SEMESTER – VI, CLUSTER – A, PAPER –VIII-A-1
Cluster Elective-VIII-A-1: INTEGRAL TRANSFORMS

60 Hrs

UNIT – 1 (12 hrs) Application of Laplace Transform to solutions of Differential Equations : -

Solutions of ordinary Differential Equations.
Solutions of Differential Equations with constants co-efficient
Solutions of Differential Equations with Variable co-efficient

UNIT – 2(12 hrs) Application of Laplace Transform : -

Solution of simultaneous ordinary Differential Equations.
Solutions of partial Differential Equations.

UNIT – 3 (12 hrs) Application of Laplace Transforms to Integral Equations : -

Definitions : Integral Equations-Abel's, Integral Equation-Integral Equation of Convolution Type, Integro Differential Equations Application of L.T. to Integral Equations.

UNIT –4 (12 hrs) Fourier Transforms-I : -

Definition of Fourier Transform – Fourier's in Transform – Fourier cosine Transform – Linear Property of Fourier Transform – Change of Scale Property for Fourier Transform – sine Transform and cosine transform shifting property – modulation theorem.

UNIT – 5 (12 hrs) Fourier Transform-II : -

Convolution Definition – Convolution Theorem for Fourier transform – parseval's Indentify – Relationship between Fourier and Laplace transforms – problems related to Integral Equations.

Finte Fouriet Transforms : -

Finte Fourier Sine Transform – Finte Fourier Cosine Transform – Inversion formula for sine and cosine Transforms only statement and related problems.

Reference Books :-

1. Integral Transforms by A.R. Vasistha and Dr. R.K. Gupta Published by Krishna Prakashan Media Pvt. Ltd. Meerut.
2. A Course of Mathematical Analysis by Shanthi Narayana and P.K. Mittal, Published by S. Chand and Company pvt. Ltd., New Delhi.
3. Fourier Series and Integral Transforms by Dr. S. Sreenadh Published by S.Chand and Company Pvt. Ltd., New Delhi.
4. Lapalce and Fourier Transforms by Dr. J.K. Goyal and K.P. Gupta, Published by FragatiuPrakashan, Meerut.

5.Integral Transforms by M.D. Raisinghania, - H.C. Saxsena and H.K. Dass Published by S.Chand and Company pvt. Ltd., New Delhi.

Suggested Activities:

Seminar/ Quiz/ Assignments

B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS

SEMESTER – VI: PAPER –VIII-A-2

ELECTIVE – VIII-A-2: ADVANCED NUMERICAL ANALYSIS

60 Hrs

Unit – I (10 Hours)

Curve Fitting: Least – Squares curve fitting procedures, fitting a straight line, nonlinear curve fitting, Curve fitting by a sum of exponentials.

UNIT- II : (12 hours)

Numerical Differentiation: Derivatives using Newton's forward difference formula, Newton's backward difference formula, Derivatives using central difference formula, stirling's interpolation formula, Newton's divided difference formula, Maximum and minimum values of a tabulated function.

UNIT- III : (12 hours)

Numerical Integration: General quadrature formula on errors, Trapozoidal rule, Simpson's 1/3 – rule, Simpson's 3/8 – rule, and Weddle's rules, Euler – Maclaurin Formula of summation and quadrature, The Euler transformation.

UNIT – IV: (14 hours)

Solutions of simultaneous Linear Systems of Equations: Solution of linear systems – Direct methods, Matrix inversion method, Gaussian elimination methods, Gauss-Jordan Method ,Method of factorization, Solution of Tridiagonal Systems, Iterative methods Jacobi's method, Gauss-siedal method.

UNIT – V (12 Hours)

Numerical solution of ordinary differential equations: Introduction, Solution by Taylor's Series, Picard's method of successive approximations, Euler's method, Modified Euler's method, Runge – Kutta methods.

Reference Books :

1. Numerical Analysis by S.S Sastry, published by Prentice Hall India (Latest Edition).
2. Numerical Analysis by G. Sankar Rao, published by New Age International Publishers, New – Hyderabad.
3. Finite Differences and Numerical Analysis by H.C Saxenapublished by S. Chand and Company, Pvt Ltd., NewDelhi.

4.Numerical methods for scientific and engineering computation by M.K Jain, S.R.K.Iyengar, R.K. Jain.

Suggested Activities:

Seminar/ Quiz/ Assignments

B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS
SEMESTER – VI, CLUSTER-B, PAPER – VIII-B-1

Cluster Elective – VIII-B-1 : PRINCIPLES OF MECHANICS

60 Hrs

Unit – I : (10 hours)

D'Alembert's Principle and Lagrange's Equations some definitions – Lagrange's equations for a Holonomic system – Lagrange's Equations of motion for conservative, nonholonomic system.

Unit – II: (10 hours)

Variational Principle and Lagrange's Equations: Variational Principle – Hamilton's Principle – Derivation of Hamilton's Principle from Lagrange's Equations – Derivation of Lagrange's Equations from Hamilton's Principle – Extension of Hamilton's Principle – Hamilton's Principle for Non-conservative, Non-holonomic system – Generalised Force in Dynamic System – Hamilton's Principle for Conservative, Non-holonomic system – Lagrange's Equations for Non-conservative, Holonomic system - Cyclic or Ignorable Coordinates

Unit –III: (15 hours)

Conservation Theorem, Conservation of Linear Momentum in Lagrangian Formulation – Conservation of angular Momentum – conservation of Energy in Lagrangian formulation.

Unit – IV: (15 hours)

Hamilton's Equations of Motion: Derivation of Hamilton's Equations of motion – Routh's procedure – equations of motion – Derivation of Hamilton's equations from Hamilton's Principle – Principle of Least Action – Distinction between Hamilton's Principle and Principle of Least Action.

Unit – V: (10 hours)

Canonical Transformation: Canonical coordinates and canonical transformations – The necessary and sufficient condition for a transformation to be canonical – examples of canonical transformations – properties of canonical transformation – Lagrange's bracket is canonical invariant – poisson's bracket is canonical invariant - poisson's bracket is invariant under canonical transformation – Hamilton's Equations of motion in poisson's bracket – Jacobi's identity for poisson's brackets.

Reference Text Books :

1. Classical Mechanics by C.R.Mondal Published by Prentice Hall of India, New Delhi.

2. A Text Book of Fluid Dynamics by F. Charlton Published by CBS Publications, New Delhi.

3. Classical Mechanics by Herbert Goldstein, published by Narosa Publications, New Delhi.

4.Fluid Mechanics by T. Allen and I.L. DitsworthPublished by (McGraw Hill, 1972)

5.Fundamentals of Mechanics of fluids by I.G. Currie Published by(CRC, 2002)

6.Fluid Mechanics : An Introduction to the theory, by Chia-shun Yeh Published by(McGraw Hill, 1974)

7.Introduction to Fluid Mechanics by R.W Fox, A.T Mc Donald and P.J. PritchardPublished by(John Wiley and Sons Pvt. Ltd., 2003)

B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS
SEMESTER – VI, CLUSTER-B, PAPER – VIII-B-2

Cluster Elective–VIII-B-2 : FLUID MECHANICS

60 Hrs

Unit – I : (10 hours)

Kinematics of Fluids in Motion

Real fluids and Ideal fluids – Velocity of a Fluid at a point – Streamlines and pthlines – steady and Unsteady flows – the velocity potential – The Vorticity vector – Local and Particle Rates of Change – The equation of Continuity – Acceleration of a fluid – Conditions at a rigid boundary – General Analysis of fluid motion.

Unit – II : (10 hours)

Equations of motion of a fluid- Pressure at a point in fluid at rest – Pressure at a point in a moving fluid – Conditions at a boundary of two inviscid immiscible fluids – Euler's equations of motion – Bernoulli's equation – Worked examples.

Unit – III : (10 hours)

Discussion of the case of steady motion under conservative body forces - Some flows involving axial symmetry – Some special two-dimensional flows – Impulsive motion – Some further aspects of vortex motion.

Unit – IV : (15 hours)

Some Two – dimensional Flows, Meaning of two-dimensional flow – Use of Cylindrical polar coordinates – The stream function – The complex potential for two-dimensional, Irrotational, Incompressible flow – Uniform Stream – The Milne-Thomson Circle theorem – the theorem of Blasius.

Unit – V : (15 hours)

Viscous flow,Stress components in a real fluid – Relations between Cartesian components of stress – Translational motion of fluid element – The rate of strain quadric and principal stresses – Some further properties of the rate of strain quadric – Stress analysis in fluid motion – Relations between stress and rate of strain – the coefficient of viscosity and laminar flow - The Navier-Stokes equations of motion of a viscous fluid.

Reference Text Books :

1. A Text Book of Fluid Dynamics by F. Charlton Published by CBS Publications, New Delhi.
2. Classical Mechanics by Herbert Goldstein, published by Narosa Publications, New Delhi.
3. Fluid Mechanics by T. Allen and I.L. Ditsworth published by (McGraw Hill, 1972)
4. Fundamentals of Mechanics of fluids by I.G. Curriepublished by (CRC, 2002)
5. Fluid Mechanics, An Introduction to the theory by Chia-shun Yeh published by (McGraw Hill, 1974)
6. Fluids Mechanics by F.M White published by (McGraw Hill, 2003)
7. Introduction to Fluid Mechanics by R.W Fox, A.T Mc Donald and P.J Pritchard published by(John

Wiley and Sons Pvt. Ltd., 2007

B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS
SEMESTER – VI, CLUSTER-C, PAPER –VIII-C-1
Cluster Elective–VIII-C-1: GRAPH THEORY

60 Hrs

UNIT – I (12 hrs) Graphs and Sub Graphs :

Graphs , Simple graph, graph isomorphism, the incidence and adjacency matrices, sub graphs, vertex degree, Hand shaking theorem, paths and connection, cycles

UNIT – II (12 hrs)

Applications, the shortest path problem, Sperner's lemma.

Trees :

Trees, cut edges and Bonds, cut vertices, Cayley's formula

UNIT – III (12 hrs) :

Applications of Trees - the connector problem.

Connectivity

Connectivity, Blocks and Applications, construction of reliable communication Networks,

UNIT – IV (12 hrs):

Euler tours and Hamilton cycles

Euler tours, Euler Trail, Hamilton path, Hamilton cycles , dodecahedron graph, Petersen graph, hamiltonian graph, closure of a graph

UNIT – V (12 hrs)

Applications of Eulerian graphs, the Chinese postman problem, Fleury's algorithm - the travelling salesman problem.

Reference Books :

1.Graph theory with Applications by J.A. Bondy and U.S.R. Murthy published by Mac. Millan Press

2.Introduction to Graph theoryby S. Arumugham and S. Ramachandran,published by scitechPublications, Chennai-17

3. A Text Book of Discrete Mathamatics by Dr. Swapan Kumar Sankar, published byS Chand & Co. Publishers, New Delhi.

4. Graph theory and combinations by H.S. Govinda Rao published byGalgotia Publications.

B.A./B.Sc. THIRD YEAR MATHEMATICS SYLLABUS
SEMESTER – VI, CLUSTER-C, PAPER –VIII-C-2
Cluster Elective -VIII-C-2: APPLIED GRAPH THEORY

60 Hrs

UNIT – I (12 hrs) :

Matchings

Matchings – Alternating Path, Augmenting Path - Matchings and coverings in Bipartite graphs, Marriage Theorem, Minimum Coverings.

UNIT –II (12 hrs) :

Perfect matchings, Tutte's Theorem, Applications, The personal Assignment problem -The optimal Assignment problem, Kuhn-Munkres Theorem.

UNIT –III (12 hrs) :

Edge Colorings

Edge Chromatic Number, Edge Coloring in Bipartite Graphs - Vizing's theorem.

UNIT –IV (12 hrs) :

Applications of Matchings, The timetabling problem.

Independent sets and Cliques

Independent sets, Covering number , Edge Independence Number, Edge Covering Number - Ramsey's theorem.

UNIT –V (12 hrs) :

Determination of Ramsey's Numbers – Erdos Theorem, Turan's theorem and Applications, Sehut's theorem. A Geometry problem.

Reference Books :-

1.Graph theory with Applications byJ.A. Bondy and U.S.R. Murthy, published by Mac. Millan Press.
2.Introduction to graph theory by S. Arumugham and S. Ramachandranpublished by SciTech publications, Chennai-17.
3. A text book of Discrete Mathematics by Dr. Swapan Kumar Sarkar,published by S. Chand Publishers.
4. Graph theory and combinations by H.S. Govinda Rao,published by Galgotia Publications.

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GOVERNMENT DEGREE COLLEGE

NARASANNAPETA-SRIKAKULAM DIST.-532421.
Accredited by NAAC 'B' Grade
(Affiliated to DR.B.R.AmBedkar University)

SYLLABUS FOR APSCHE-2020

ANDHRA PRADESH STATE COUNCIL OF HIGHER EDUCATION

(A Statutory body of the Government of Andhra Pradesh)

3rd, 4th and 5th floors, Neeladri Towers, 1-6 Ram Nagar, 6th Battalion Road,
Atmakur (V), Mangalagiri (M), Guntur-522 503, Andhra Pradesh

Web: www.apsche.org Email: secretaryapsche@gmail.com

REVISED SYLLABUS OF BOTANY UNDER CBCS FRAMEWORK WITH EFFECT FROM 2020-21

PROGRAMME: FOUR-YEAR UG HONOURS PROGRAMME

BOTANY

(With Learning Outcomes, Unit-wise Syllabus, References, Co-curricular Activities & Model Q.P.)

For Fifteen Courses of 1, 2, 3 & 4 Semesters)

(To be Implemented from 2020-21 Academic Year)

S. No.	Semester	Title of the Course (Paper)	Hours /week	Max. Marks (SEE)	Marks in CIA	Credits
1.	Sem.-I/ Course-1	Fundamentals of Microbes and Non-vascular Plants	04	75	25	03
	Course-1 Practical	Fundamentals of Microbes and Non-vascular Plants	03	Max. Marks-50 Internal assessment at Semester end		02
2.	Sem.-II/ Course-2	Basics of Vascular plants and Phytogeography	04	75	25	03
	Course-2 Practical	Basics of Vascular plants and Phytogeography	03	Max. Marks-50 External assessment at Semester end		02
3.	Sem.-III/ Course-3	Anatomy and Embryology of Angiosperms, Plant Ecology and Biodiversity	04	75	25	03
	Course-3 Practical	Anatomy and Embryology of Angiosperms, Plant Ecology and Biodiversity	03	Max. Marks-50 Internal assessment at Semester end		02
4.	Sem.-IV Course-4	Plant Physiology and Metabolism	03	75	25	03
	Course-4Practical	Plant Physiology and Metabolism	03	Max. Marks-50 External assessment at Semester end		02
5.	Sem.- IV Course- 5	Cell Biology, Genetics and Plant Breeding	04	75	25	03
	Course-5Practical	Cell Biology, Genetics and Plant Breeding	03	Max. Marks-50 External assessment at Semester end		02
6.	Sem.– V Course – 6 & 7	Domain related Skill Enhancement Courses (02) - Three (3) pairs of courses (each pair has 2 related courses) will be offered, student has to choose a pair of courses	03	75	25	03
			03	Max. Marks-50 Internal assessment at Semester end		02
			03	75	25	03
			03	Max. Marks-50 Internal assessment at Semester end		02

CBCS / Semester System (w.e.f. 2020-'21 Admitted Batch) I Semester /Botany Core Course - 1

Fundamentals of Microbes and Non-vascular Plants
(Viruses, Bacteria, Fungi, Lichens, Algae and Bryophytes)
(Total hours of teaching – 60 @ 04 Hrs./Week)

Theory:

Learning Outcomes:

On successful completion of this course, the students will be able to

- Explain origin of life on the earth.
- Illustrate diversity among the viruses and prokaryotic organisms and can categorize them.
- Classify fungi, lichens, algaeand bryophytes based on theirstructure, reproduction and life cycles.
- Analyze and ascertain the plant disease symptoms due to viruses, bacteria and fungi.
- Recall and explain theevolutionary trends among amphibians of plant kingdom for their shift to land habitat.
- Evaluate the ecological and economic value of microbes, thallophytes and bryophytes.

Unit – 1:Origin of life and Viruses 12Hrs.

1. Origin of life, concept of primary Abiogenesis;Miller and Urey experiment.Five kingdom classification of R.H. Whittaker
2. Discovery of microorganisms,Pasteur experiments, germ theory of diseases.
3. Shape and symmetry of viruses; structure of TMV and Gemini virus; multiplicationof TMV; A brief account of Prions and Viroids.
4. A general account on symptoms of plant diseases caused by Viruses.Transmission of plant viruses and their control.
5. Significance of viruses in vaccine production,bio-pesticides and as cloning vectors.

Unit – 2:Special groups of Bacteria and Eubacteria 12Hrs.

1. Brief account of Archaebacteria, ActinomycetesandCyanobacteria.
2. Cell structure and nutritionof Eubacteria.

3. Reproduction- Asexual (Binary fission and endospores) and bacterial recombination (Conjugation, Transformation,Transduction).
4. Economic importance of Bacteria with reference to their role in Agriculture and industry (fermentation and medicine).
5. A general account on symptoms of plant diseases caused by Bacteria; Citrus canker.

Unit – 3: Fungi & Lichens 12 Hrs.

1. General characteristics of fungi and Ainsworth classification (upto classes).
2. Structure, reproductionand life history of(a)*Rhizopus*(Zygomycota)and (b)Puccinia (Basidiomycota).
3. Economic uses of fungi in food industry, pharmacy and agriculture.
4. A general account on symptoms of plant diseases caused by Fungi; Blast of Rice.
5. Lichens- structure and reproduction; ecological and economic importance.

Unit – 4: Algae 12 Hrs.

1. General characteristics of Algae (pigments, flagella and reserve food material);Fritsch classification (upto classes).
2. Thallus organization and life cycles in Algae.
3. Occurrence, structure, reproduction and life cycle of (a) *Spirogyra* (Chlorophyceae) and (b) *Polysiphonia* (Rhodophyceae).
4. Economic importance of Algae.

Unit – 5:Bryophytes 12 Hrs.

1. General characteristics of Bryophytes; classification upto classes.
2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life cycle of (a) *Marchantia* (Hepaticopsida) and (b) *Funaria*(Bryopsida).
3. General account on evolution of saprophytes in Bryophyte.

Text books:

- Botany – I (Vrukshasastram-I) : Telugu Akademi, Hyderabad
- Pandey, B.P. (2013) *College Botany, Volume-I*, S. Chand Publishing, New Delhi
- Hait,G., K.Bhattacharya&A.K.Ghosh (2011) *A Text Book of Botany, Volume-I*, New Central Book Agency Pvt. Ltd , Kolkata
- Bhattacharjee, R.N., (2017) *Introduction to Microbiology and Microbial Diversity*, Kalyani Publishers, New Delhi.

Books for Reference:

- Dubey, R.C. &D.K.Maheswari (2013) *A Text Book of Microbiology*,S.Chand& Company Ltd., New Delhi
- Pelczar Jr., M.J., E.C.N. Chan &N.R.Krieg (2001)*Microbiology*, Tata McGraw- Hill Co, New Delhi
- Prescott, L. Harley, J. and Klein, D. (2005)*Microbiology, 6th edition*, Tata McGraw –Hill Co. New Delhi.
- Alexopoulos, C.J., C.W.Mims&M.Blackwell (2007) *Introductory Mycology*,Wiley& Sons, Inc., New York
- Mehrotra, R.S. & K. R. Aneja (1990)*An Introduction to Mycology*. New Age International Publishers, New Delhi
- Kevin Kavanagh (2005) *Fungi ; Biology and Applications* John Wiley & Sons, Ltd.,West Sussex, England
- John Webster & R. W. S. Weber (2007) *Introduction to Fungi*,Cambridge University Press, New York
- Fritsch, F.E. (1945)*The Structure & Reproduction of Algae (Vol. I & Vol. II)*Cambridge UniversityPress Cambridge, U.K..
- Bold, H.C. & M. J. Wynne (1984)*Introduction to the Algae*, Prentice-Hall Inc., New Jersey
- Robert Edward Lee (2008)*Phycology*. Cambridge University Press, New York
- Van Den Hoek, C., D.G.Mann&H.M.Jahns (1996)*Algae : An Introduction to Phycology*. Cambridge University Press, New York
- Shaw, A.J.&B.Goffinet (2000)*Bryophyte Biology* .Cambridge University Press, New York

Practical syllabus of Botany Core Course – 1/ Semester – I
Fundamentals of Microbes and Non-vascular Plants
(Viruses, Bacteria, Fungi, Lichens, Algae and Bryophytes)
(Total hours of laboratory exercises 30 Hrs. @ 02 Hrs./Week)

Course Outcomes: On successful completion of this practical course, student shall be able to;

1. Demonstrate the techniques of use of lab equipment, preparing slides and identify the material and draw diagrams exactly as it appears.
2. Observe and identify microbes and lower groups of plants on their own.
3. Demonstrate the techniques of inoculation, preparation of media etc.
4. Identify the material in the permanent slides etc.

Practical Syllabus:

1. Knowledge of Microbiology laboratory practices and safety rules.
2. Knowledge of different equipment for Microbiology laboratory (Spirit lamp, Inoculation loop, Hot-air oven, Autoclave/Pressure cooker, Laminar air flow chamber and Incubator) and their working principles. (In case of the non-availability of the laboratory equipment the students can be taken to the local college/clinical lab. with required infrastructural facilities or they can enter a linkage with the college/lab for future developments and it will fetch creditsduring the accreditation by NAAC).
3. Demonstration of Gram's staining technique for Bacteria.
4. Study of Viruses (Corona, Gemini and TMV) using electron micrographs/ models.
5. Study of Archaebacteriaand Actinomycetes using permanent slides/ electron micrographs/diagrams.
6. Study of *Anabaena* and *Oscillatoria*using permanent/temporary slides.
7. Study of different bacteria (Cocci, Bacillus, Vibrio and Spirillum) using permanent or temporary slides/ electron micrographs/ diagrams.
8. Study/ microscopic observation of vegetative, sectional/anatomical and reproductive structures of the following using temporary or permanent slides/ specimens/ mounts :
   a. Fungi : *Rhizopus,Penicilliumand Puccinia*
   b. Lichens: Crustose, foliose and fruticose
   c. Algae :*Volvox, Spirogyra, Ectocarpusand Polysiphonia*
   d. Bryophyta : *Marchantia*and *Funaria*
9. Study of specimens of Tobacco mosaic disease, Citrus canker and Blast of Rice.

Model Question Paper for Practical Examination

Semester – I/ Botany Core Course – I

Fundamentals of Microbes and Non-vascular Plants

(Viruses, Bacteria, Fungi, Lichens, Algae and Bryophytes)

Max. Time: 3 Hrs. Max. Marks: 50

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1. Take the T.S. of material 'A' (Fungi), make a temporary mount and make comments about identification. 10 M
2. Identify any 2 algae from the mixture (material 'B') given with specific comments about identification. 10 M
3. Take the T.S. of material 'C' (Bryophyta), make a temporary mount and make comments about identification. 10 M
4. Identify the following with specific reasons. 4x 3 = 12 M
   D. A laboratory equipment of Microbiology
   E. Virus
   F. Archaebacteria /Ascomycete /Cyanobacteria/ Eu-Bacteria
   G. Lichen
5. Record + Viva-voce 5+3 = 8 M

Suggested co-curricular activities for Botany Core Course-1 in Semester-I:

A. **Measurable:**

a. **Student seminars:**

1. Baltimore classification of Viruses.
2. Lytic and lysogenic cycle of T- even Bacteriophages.
3. Viral diseases of humans and animals.
4. Retroviruses
5. Bacterial diseases of humans and animals.
6. Significance of Bacteria in Biotechnology and Genetic engineering.
7. Fungi responsible for major famines in the world.
8. Poisonous mushrooms (Toad stools).
9. Algae as Single Cell Proteins (SCPs)
10. Parasitic algae

11. Origin of Bryophytes through : Algae vsPteridophytes
12. Fossil Bryophytes
13. Evolution of gametophytes in Bryophyta.
14. Ecological and economic importance of Bryophytes.

h. **Student Study Projects :**

1. Isolation and identification of microbes from soil, water and air.
2. Collection and identification of algae from fresh /estuarine /marine water.
3. Collection and identification of fruiting bodies of Basidiomycetes and Ascomycetes.
4. Collection and identification of Lichens from their native localities.
5. Collection of diseased plants/parts and identification of symptoms.
6. Collection and identification of Bryophytes from their native localities.

c. **Assignments**: Written assignment at home / during 'O' hour at college; preparation of charts with drawings, making models etc., on topics included in syllabus.

B. **General :**

1. Visit to Agriculture and/or Horticulture University/College/Research station to learn about microbial diseases of plants.
2. Visit to industries working on microbial, fungal and algal products.
3. Group Discussion (GD)/ Quiz/ Just A Minute (JAM) on different modules in syllabus of the course.

II Semester /Botany Core Course

– 2 Basics of Vascular plants and Phytogeography

(Pteridophytes, Gymnosperms, Taxonomy of Angiosperms and Phytogeography)

(Total hours of teaching – 60 @ 02 Hrs /Week)

Theory:

Learning Outcomes:

On successful completion of this course, the students will be able to:

- Classify and compare Pteridophytes and Gymnosperms based on their morphology, anatomy, reproduction and life cycles.
- Justifyevolutionary trends in tracheophytes to adapt for land habitat.
- Explain the process of fossilization and compare the characteristics of extinct and extant plants.
- Critically understand various taxonomical aids for identification of Angiosperms.
- Analyze the morphology of the most common Angiospermplants of their localitiesand recognize their families.
- Evaluate the ecological, ethnic and economic value of different tracheophytes and summarize their goods and services for human welfare.
- Locate different phytogeographical regions of the world and India and can analyze their floristic wealth.

Unit – 1:Pteridophytes 12 Hrs.

1. General characteristics of Pteridophyta; classification of Smith (1955) uptodivisions.
2. Occurrence, morphology,anatomy, reproduction (developmental details are notneeded) and life historyof (a) *Lycopodium* (Lycopsida) and (b) Marsilea (Filicopsida).
3. Stelar evolution in Pteridophytes;
4. Heterospory and seed habit.

Unit – 2:Gymnosperms 14 Hrs.

1. General characteristics of Gymnosperms; Sporneclassification uptoclasses.
2. Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life history of (a) *Cycas*(Cycadopsida) and (b) *Gnetum* (Gnetopsida).
3. Outlines of geological time scale.
4. A brief account on *Cycadeoidea*.

Unit – 3:Basic aspects of Taxonomy 13Hrs.

1. Aim and scope of taxonomy; Species concept: Taxonomic hierarchy, species, genus and family.
2. Plant nomenclature: Binomial system, ICBN- rules for nomenclature.
3. Herbarium and its techniques,BSI herbarium and Kew herbarium; concept of digital herbaria.
4. Bentham and Hooker system of classification;
5. Systematic description and economic importance of the following families: (a) Annonaceae (b) Curcurbitaceae

Unit – 4: Systematic Taxonomy 13 Hrs.

1. Systematic description and economic importance of the following families:
   (a) Asteraceae (b) Asclepiadaceae (c)Amaranthaceae(d) Euphorbiaceae
   (e) Arecaceaeand (f) Poaceae
2. Outlines of Angiosperm Phylogeny Group (APG IV).

Unit – 5:Phytogeography 08 Hrs.

1. Principles of Phytogeography, Distribution (wides, endemic, discontinuous species)
2. Endemism – types and causes.
3. Phytogeographic regions of World.
4. Phytogeographic regions of India.
5. Vegetation types in Andhra Pradesh.

Text books:

- Botany – I (Vrukshasastram-I) : Telugu Akademi, Hyderabad
- Botany – II (Vrukshasastram-II) : Telugu Akademi, Hyderabad
- Acharya, B.C., (2019) *Archchegoniates*, Kalyani Publishers, New Delhi
- Bhattacharya, K., G. Hait&Ghosh, A. K., (2011) *A Text Book of Botany, Volume- II*, New Central Book Agency Pvt. Ltd., Kolkata
- Hait,G., K.Bhattacharya&A.K.Ghosh (2011) *A Text Book of Botany, Volume-I*, New Central Book Agency Pvt. Ltd., Kolkata
- Pandey, B.P. (2013)*College Botany, Volume-I*, S. Chand Publishing, New Delhi
- Pandey, B.P. (2013)*College Botany, Volume-II*, S. Chand Publishing, New Delhi

Books for Reference:

- Smith, G.M. (1971)*CryptogamicBotanyVol. II.*, Tata McGraw Hill, New Delhi
- Sharma,O.P.(2012)Pteridophyta. Tata McGraw-Hill, New Delhi
- Kramer, K.U.&P. S. Green (1990) *The Families and Genera of Vascular Plants, Volume –I: Pteridophytes and Gymnosperms*(Ed.K.Kubitzki) Springe-Verlag, New York
- Bhatnagar, S.P. &AlokMoitra (1996)*Gymnosperms*. New Age International, New Delhi
- Coulter, J.M. &C.J.Chamberlain(1910) *Morphology of Gymnosperms*,The University of Chicago Press, Chicago, Illinois
- Govil, C.M. (2007)*Gymnosperms : Extinct and Extant*. KRISHNA Prakashan Media (P) Ltd.Meerut& Delhi
- Sporne, K.R.(1971)*The Morphology of Gymnosperms*.Hutchinsons Co. Ltd., London
- Arnold, C.A., (1947) *An introduction to PaleobotanyMcGraw* –Hill Book Company,INC, New York
- Stewart,W.N., and G.W.Rothwell (2005) *Paleobotany and the evolution of plants* Cambridge University Press, New York
- Lawrence, George H.M. (1951) *Taxonomy of Vascular Plants*. The McMillan Co., New York
- Heywood, V. H. and D. M. Moore (1984)*Current Concepts in Plant Taxonomy*. Academic Press, London

- Jeffrey, C. (1982)*An Introduction to Plant Taxonomy*. Cambridge University Press, Cambridge. London.
- Sambamurty, A.V.S.S. (2005)*Taxonomy of Angiosperms* I. K. International Pvt. Ltd., New Delhi
- Singh, G. (2012). *Plant Systematics: Theory and Practice*.Oxford & IBH Pvt. Ltd., NewDelhi.
- Simpson, M.G. (2006). *Plant Systematics*. Elsevier Academic Press, San Diego, CA,U.S.A.
- Cain, S.A . (1944)*Foundations of Plant Geography*Harper & Brothers, N.Y.
- Good, R. (1997)*The Geography of flowering Plants (2nd Edn.)*Longmans, Green & Co., Inc., London & Allied Science Publishers, New Delhi
- Mani, M.S (1974)*Ecology & Biogeography of India*Dr. W. Junk Publishers, The Haque

Practical syllabus of Botany Core Course – 2 / Semester –

IIBasics of Vascular plants and Phytogeography

(Pteridophytes, Gymnosperms, Taxonomy of Angiosperms and Phytogeography)(Total hours of laboratory exercises 30 Hrs. @ 02 Hrs. /Week)

Course Outcomes:

On successful completion of this course students shall be able to

1. Demonstrate the techniques of section cutting, preparing slides, identifying of the material and drawing exact figures.
2. Compare and contrast the morphological, anatomical and reproductive features of vascular plants.
3. Identify the local angiosperms of the families prescribed to their genus and species level and prepare herbarium.
4. Exhibit skills of preparing slides, identifying the given twigs in the lab and drawing figures of plant twigs, flowers and floral diagrams as they are.
5. Prepare and preserve specimens of local wild plants using herbarium techniques.

Practical Syllabus:

1. Study/ microscopic observation of vegetative, sectional/anatomical and reproductive structures of the following using temporary or permanent slides/ specimens/ mounts :
   a. Pteridophyta : *Lycopodium* and *Marsilia*
   b. Gymnosperms : *Cycas*and *Gnetum*
2. Study of fossil specimens of *Cycadeoidea* and *Pentoxylon*(photographs /diagrams can be shown if specimens are not available).
3. Demonstration of herbarium techniques.
4. Systematic / taxonomic study of locally available plants belonging to the familiesprescribed in theory syllabus. (Submission of 30 number of Herbarium sheets ofwild plants with the standard system is mandatory).
5. Mapping of phytogeographical regions of the globe and India.

Model Question Paper for Practical Examination

Semester – II/ Botany Core Course – 2

Basics of Vascular plants and Phytogeography

(Pteridophytes, Gymnosperms, Taxonomy of Angiosperms and Phytogeography)

Max. Time: 3 Hrs Max. Marks: 50

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1. Take T.S. of the material 'A' (Pteridophyta), make a temporary slide and justify the identification with apt points. 10 M
2. Take T.S. of the material 'B' (Gymnosperms), make a temporary slide and justify the identification with apt points. 10 M
3. Describe the vegetative and floral characters of the material 'C' (Taxonomy of Angiosperms) and derive its systematic position. 10 M
4. Identify the specimen 'D' (Fossil Gymnosperm) and give specific reasons. 5 M
5. Locate the specified phytogeographical regions (2×2M) in the world / India (E) map supplied to you. 4 M
6. Record + Herbarium & Field note book + Viva-voce 5+4+3 = 12 M

Suggested co-curricular activities for Botany Core Course-2 in Semester-II:

A. Measurable:

a. Student seminars:

1. Fossil Pteridophytes.
2. Aquatic ferns and tree ferns
3. Ecological and economic importance of Pteridophytes
4. Evolution of male and female gametophytes in Gymnosperms.
5. Endemic and endangered Gymnosperms.
6. Ecological and economic importance of Gymnosperms.
7. Floras and their importance: Flora of British India and Flora of Madras Presidency.
8. Botanical gardens and their importance:National Botanic garden and Royal Botanic garden.
9. Artificial, Natural and Phylogenetic classification systems.
10. Molecular markers used in APG system of classification.
11. Vessel less angiosperms.

12. Insectivorous plants.

13. Parasitic angiospems.

14. Continental drift theory and species isolation.

b. **Student Study Projects :**

1. Collection and identification of Pteridophytes from their native locality/ making

an album by collecting photographs of Pteridophytes.

2 Collection and identification of Gymnosperms from their native locality/making an album by collecting photographs of Gymnosperms.

4. Collection of information on famous herbana in the world and preparation of a report.

5. Collection of information on famous botanic gardens in the world and preparation of a report.

6. Collection of data on vegetables (leafy and fruity) plants in the market and and preparation of a report on their taxonomy.

7. Collection and identification of fresh and dry fruits plants in the market andand preparation of a report on their taxonomy.

8. Collection of data on plants of ethnic and ethnobotanical importance fromtheir native locality.

9. Preparation of a local flora by enlisting the plants of their native place.

c. **Assignments**: Written assignment at home / during '0' hour at college; preparation of charts with drawings, making models etc., on topics included in syllabus.

II. **General :**

1. Visit to Botanic garden in a Research institute/University to see the live plants.

2. Virtual tour in websites for digital herbaria and botanic gardens.

3. Acquaint with standard floras like – Flora of Madras Presidency, Flora of their respective district in Andhra Pradesh.

4. Looking into vegetation of different phytogeographical regions using web resources.

5. Group Discussion (GD)/ Quiz/ Just A Minute (JAM) on different modules in syllabus of the course.

III Semester /Botany Core Course - 3

Anatomy and Embryology of Angiosperms, Plant Ecology and Biodiversity

(Total hours of teaching – 60 @ 04 Hrs /Week)

Theory:

Learning outcomes:

On successful completion of this course, the students will be able to;

- Understand on the organization of tissues and tissue systems in plants.
- Illustrate and interpret various aspects of embryology.
- Discuss the basic concepts of plant ecology, and evaluate the effects ofenvironmental and biotic factors on plant communities.
- Appraise various qualitative and quantitative parameters to study the population and community ecology.
- Correlate the importance of biodiversity and consequences due to its loss.
- Enlist the endemic/endangered flora and fauna from two biodiversity hot spots in india and assess strategies for their conservation.

Unit – 1: Anatomy of Angiosperms 12 Hrs.

1. Organization of apical meristems: Tunica-carpus theory and Histogen theory.
2. Tissue systems–Epidermal, ground and vascular.
3. Anomalous secondary growth in *Boerhaavia* and *Dracoena*.
4. Study of timbers of economic importance – Teak, Red sanders and Rosewood.

Unit – 2: Embryology of Angiosperms 12 Hrs.

1. Structure of anther, anther wall, types of tapetum. Microsporogenesis and development of male gametophyte.
2. Structure of ovule, megasporogenesis; monosporic (*Polygonum*), bisporic (*Allium*) and tetrasporic (*Peperomia*) types of embryo sacs.
3. Outlines of pollination, pollen – pistil interaction and fertilization.
4. Endosperm – Types and biological importance - Free nuclear, cellular, helobialand ruminate.
5. Development of Dicot (Capsella bursa-pastoris) embryo.

Unit – 3: Basics of Ecology 12 Hrs.

1 Ecology: definition, branches and significance of ecology.

2 Ecosystem: Concept and components, energy flow, food chain, food web, ecologicalpyramids.

4 Plants and environment: Climatic (light and temperature), edaphic and biotic factors.

5 Ecological succession:Hydrosere and Xerosere.

Unit – 4:Population, Community and Production Ecology 12 Hrs.

1 Population ecology: Natality, mortality, growth curves, ecotypes, ecads

2 Community ecology: Frequency, density, cover, life forms, biological spectrum

3 Concepts of productivity: GPP, NPP and Community Respiration

4 Secondary production, P/R ratio and Ecosystems.

Unit – 5:Basics of Biodiversity 12 Hrs.

1 Biodiversity: Basic concepts, Convention on Biodiversity - Earth Summit.

2 Value of Biodiversity; types and levels of biodiversity and Threats to biodiversity

3 Biodiversity Hot spots in India: Biodiversity in North Eastern Himalayas andWestern Ghats.

4 Principles of conservation: IUCN threat-categories, RED data book

5 Role of NBPGR and NBA in the conservation of Biodiversity.

Text books:

- Botany – III (Vrukshasastram-I) : Telugu Akademi, Hyderabad
- Botany – IV (Vrukshasastram-II) : Telugu Akademi, Hyderabad
- Pandey, B.P. (2013) *College Botany, Volume-II*, S. Chand Publishing, New Delhi
- Pandey, B.P. (2013) *College Botany, Volume-III*, S. Chand Publishing, New Delhi
- Bhattacharya, K., G. Hait&Ghosh, A. K., (2011) *A Text Book of Botany, Volume- II*, New Central Book Agency Pvt. Ltd., Kolkata

Books for Reference:

- Esau, K. (1971)*Anatomy of Seed Plants*. John Wiley and Son, USA.
- Fahn, A. (1990)*Plant Anatomy*, Pergamon Press, Oxford.
- Cutler, D.F., T. Botha & D. Wm. Stevenson (2008)*Plant Anatomy: An Applied Approach*, Wiley, USA.
- Paula Rudall (1987)*Anatomy of Flowering Plants: An Introduction to Structure and Development*. Cambridge University Press, London
- Bhojwani, S. S. and S. P. Bhatnagar (2000)*The Embryology of Angiosperms (4th Ed.)*,Vikas Publishing House, Delhi.
- Pandey, A. K. (2000) *Introduction to Embryology of Angiosperms*. CBS Publishers & Distributors Pvt. Ltd. , New Delhi
- Maheswari, P. (1971)*An Introduction to Embryology of Angiosperms*. McGraw Hill Book Co., London.
- Johri, B.M. (2011)*Embryology of Angiosperms*. Springer-Verlag, Berlin
- Pandey, B.P. (2013)*College Botany, Volume-III*, S. Chand Publishing, New Delhi
- Bhattacharya, K., A. K. Ghosh, & G. Hait (2011) *A Text Book of Botany, Volume- IV*, New Central Book Agency Pvt. Ltd., Kolkata
- Kormondy, Edward J. (1996) *Concepts of Ecology*, Prentice-Hall of India Private Limited, New Delhi
- Begon, M., J.L. Harper & C.R. Townsend (2003) *Ecology*, Blackwell Science Ltd., U.S.A.
- Eugene P. Odum (1996)*Fundamentals of Ecology*, Natraj Publishers, Dehradun
- Sharma, P.D. (2012) *Ecology and Environment*. Rastogi Publications, Meerut, India.
- N.S.Subrahmanyam& A.V.S.S. Sambamurty (2008)*Ecology*Narosa Publishing House,

New Delhi

- A. K. Agrawal& P.P. Deo (2010) *Plant Ecology*,Agrobios (India), Jodhpur
- Kumar, H.D. (1992) *Modern Concepts of Ecology (7th Edn.,*Vikas Publishing Co.,
  New Delhi.
- Newman, E.I. (2000): *Applied Ecology*Blackwell Scientific Publisher, U.K.
- Chapman, J.L&M.J. Reiss (1992): *Ecology - Principles & Applications.*Cambridge
  University Press, U.K.
- Kumar H.D. (2000)*Biodiversity & Sustainable Conservation* Oxford & IBH
  Publishing Co Ltd. New Delhi.
- U. Kumar (2007) *Biodiversity : Principles & Conservation*,Agrobios (India),
Jodhpur

Practical syllabus of Botany Core Course – 3 /Semester – III Anatomy and Embryology of Angiosperms, Plant Ecology and Biodiversity

(Total hours of laboratory exercises 30 Hrs. @ 02 Hrs./Week)

Course Outcomes

On successful completion of this practical course students shall be able to

1. Get familiarized with techniques of section making, staining and microscopic study of vegetative, anatomical and reproductive structure of plants.
2. Observe externally and under microscope, identify and draw exact diagrams of the material in the lab.
3. Demonstrate application of methods in plant ecology and conservation of biodiversity and qualitative and quantitative aspects related to populations and communities of plants.

ractical Syllabus

1. Tissue organization in root and shoot apices using permanent slides.
2. Anomalous secondary growth in stems of *Boerhavia* and *Dracoena*.
3. Study of anther and ovule using permanent slides/photographs.
4. Study of pollen germination and pollen viability.
5. Dissection and observation of Embryo sac haustoria in *Santalum*or*Argemone*.
6. Structure of endosperm (nuclear and cellular) using permanent slides / Photographs.
7. Dissection and observation of Endosperm haustoria in *Crotalaria* or *Coccinia*.
8. Developmental stages of dicot and monocot embryos using permanent slides / photographs.
9. Study of instruments used to measure microclimatic variables; soil thermometer, maximum and minimum thermometer, anemometer, rain gauze, and lux meter. (visit to the nearest/ocal meteorology station where the data is being collected regularly and record the field visit summary for the submission in the practical).
10. Study of morphological and anatomical adaptations of hydrophytes and xerophytes (02 each).
11. Quantitative analysis of herbaceous vegetation in the college campus for frequency, density and abundance.
12. Identification of vegetation/various plants in college campus and comparison with Raunkiaer's frequency distribution law.
13. Find out the alpha-diversity of plants in the area
14. Mapping of biodiversity hotspots of the world and India.

Model paper for Practical Examination

Semester – III/ Botany Core Course – 3

Anatomy and Embryology of Angiosperms, Plant Ecology and Biodiversity

Max. Time: 3 Hrs. Max. Marks: 50

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1. Take T.S. of the material 'A' (Anatomy), prepare a temporary slide and justify the identification with specific reasons. 10 M
2. Write the procedure for the experiment 'B' (Embryology) and demonstrate the same. 10 M
3. Take T.S. of the material 'C', prepare a temporary slide and justify the identification with specific reasons. 10 M
4. Identify the following with specific reasons. 4 x 3 = 12 M
   D. Anatomy/Embryology
   E. Ecology instrument
   F. Mapping of Biodiversity hot spot
   G. Endemic/endangered plant/animal
5. Record + Viva-voce 5 + 3 = 8 M

Suggested co-curricular activities for Botany CoreCourse-3 in Semester-III:

A. **Measurable :**

a. **Student seminars :**

1. Anatomy in relation to taxonomy of Angiosperms.
2. Nodal anatomy
3. Floral anatomy
4. Embryology in relation to taxonomy of Angiosperms.
5. Apomictics and polyembryony.
6. Biogeochemical cycles- Carbon, Nitrogen and Phosphorous.
7. Deforestation and Afforestation.
8. Green house effect and ocean acidification.
9. The Montreal protocol and the Kyoto protocol.
10. Productivity of aquatic ecosystems.
11. Mangrove ecosystems in India.
12. Kolleru lake – Ramsar site.
13. Biodiversity hotspots of the world.
14. Origin of Crop plants - Vavilov centers
15. Agrobiodiversity
16. International organizations working on conservation of Biodversity
17. Nagoya protocol – ABS system.
18. Endemic and endangered plants in Andhra Pradesh.

b. **Student Study Projects :**

1. Stomata structure in plants from college campus/ their native place.
2. Report on xylem elements in plants using maceration technique.
3. Collection of information on famous herbaria in the world and preparation of a report.
4. Microscopic observations on pollen morphology from plants in college Campus/ their native locality.
5. Study report on germination and viability of pollen in different plants.
6. Observation of anthesis time in different plants and their pollinators.
7. A report on autecology and synecology of some plants in college campus or their native place.
8. Collection of photos of endemic/endangered plant and animal species to Makean album.

9. Biodiversity of the college or their own residential/ native area.
10. Collection of seeds/vegetative organs of rare plant species from their localities and to raise/grow in college garden

c. **Assignments**: Written assignment at home / during '0' hour at college; preparation of charts with drawings, making models etc., on topics included in syllabus.

B. General :

1. Visit to an arboretum / silviculture station/Forest research institute to see the live timber yielding plants or to visit a local timber depot, to observe various woods.
2. Field visit to a nearby ecosystem to observe the abiotic-biotic relationships.
3. Visit to National park/Sanctuary/Biosphere reserve etc., to observe in-situ conservation of plants and animals.
4. Visit to a Botanical garden or Zoo to learn about ex-situ conservation of rare plants or animals.
5. Group Discussion (GD)/ Quiz/ Just A Minute (JAM) on different modules in syllabus of the course.

IV Semester/ Botany Core Course – 4

Plant Physiology and Metabolism

(Total hours of teaching – 60 @ 04 Hrs./Week)

Theory:

Learning outcomes:

On successful completion of this course, the students will be able to;

- Comprehend the importance of water in plant life and mechanisms for transport ofwater and solutes in plants.
- Evaluate the role of minerals in plant nutrition and their deficiency symptoms.
- Interpret the role of enzymes in plant metabolism.
- Critically understand the light reactions and carbon assimilation processes responsible for synthesis of food in plants.
- Analyze the biochemical reactions in relation to Nitrogen and lipid metabolisms.
- Evaluate the physiological factors that regulate growth and development in plants.
- Examine the role of light on flowering and explain physiology of plants under stress conditions.

Unit – 1: Plant-Water relations 10 Hrs.

1. Importance of water to plant life, physical properties of water, diffusion, imbibition, osmosis. water potential, osmotic potential, pressure potential.
2. Absorption and lateral transport of water; Ascent of sap
3. Transpiration: stomata structure and mechanism of stomatal movements (K^+ ion flux).
4. Mechanism of phloem transport; source-sink relationships.

Unit – 2: Mineral nutrition, Enzymes and Respiration 14 Hrs.

1. Essential macro and micro mineral nutrients and their role in plants; symptoms of mineral deficiency
2. Absorption of mineral ions; passive and active processes.
3. Characteristics, nomenclature and classification of Enzymes. Mechanism of enzyme action, enzyme kinetics.

4. Respiration: Aerobic and Anaerobic; Glycolysis, Krebs cycle; electron transport system, mechanism of oxidative phosphorylation, Pentose Phosphate Pathway (HMP shunt).

Unit – 3: Photosynthesis and Photorespiration 12 Hrs.

1. Photosynthesis: Photosynthetic pigments, absorption and action spectra; Red drop and Emerson enhancement effect
2. Concept of two photosystems; mechanism of photosynthetic electron transport and evolution of oxygen; photophosphorylation
3. Carbon assimilation pathways (C3,C4 and CAM);
4. Photorespiration - C2 pathway

Unit – 4: Nitrogen and lipid metabolism 12 Hrs.

1. Nitrogen metabolism: Biological nitrogen fixation – asymbiotic and symbiotic nitrogen fixing organisms. Nitrogenase enzyme system.
2. Lipid metabolism: Classification of Plant lipids, saturated and unsaturated fatty acids.
3. Anabolism of triglycerides, β-oxidation of fatty acids, Glyoxylate cycle.

Unit – 5: Plant growth - development and stress physiology 12 Hrs.

1. Growth and Development: Definition, phases and kinetics of growth.
2. Physiological effects of Plant Growth Regulators (PGRs) - auxins, gibberellins, cytokinins, ABA, ethylene and brassinosteroids.
3. Physiology of flowering:Photoperiodism, role of phytochrome in flowering.
4. Seed germination and senescence; physiological changes.

Text books:

- Botany – IV (Vrukshasastram-II) : Telugu Akademi, Hyderabad
- Pandey, B.P. (2013) *College Botany, Volume-III*, S. Chand Publishing, New Delhi
- Ghosh, A. K., K. Bhattacharya &G. Hait (2011) *A Text Book of Botany, Volume- III*, New Central Book Agency Pvt. Ltd., Kolkata

Books for Reference:

- Aravind Kumar & S.S. Purohit (1998) *Plant Physiology – Fundamentals and Applications*, AgroBotanica, Bikaner
- Datta, S.C. (2007) *Plant Physiology*, New Age International (P) Ltd., Publishers, New Delhi
- Hans Mohr & P. Schopfer (2006) *Plant Physiology*, Springer (India) Pvt. Ltd., New Delhi
- Hans-Walter heldt (2005) *Plant Biochemistry*, Academic Press, U.S.A.
- Hopkins, W.G. & N.P.A. Huner (2014) *Introduction to Plant Physiology*, Wiley India Pvt. Ltd., New Delhi
- Noggle Ray & J. Fritz (2013) *Introductory Plant Physiology*, Prentice Hall (India), New Delhi
- Pandey, S.M. &B.K.Sinha (2006) *Plant Physiology*, Vikas Publishing House, New Delhi
- Salisbury, Frank B. & Cleon W. Ross (2007) *Plant Physiology*, Thomsen & Wadsworth, Australia&U.S.A
- Sinha, R.K. (2014) *Modern Plant Physiology*, Narosa Publishing House, New Delhi
- Taiz, L.&E. Zeiger (2003) *Plant Physiology*, Panima Publishers, New Delhi
- Verma, V.(2007) *Text Book of Plant Physiology*, Ane Books India, New Delhi

Practical Syllabus of Botany Core Course - 4 / Semester –

IVPlant Physiology and Metabolism

(Total hours of laboratory exercises 30 Hrs. @ 02 Hrs /Week)

Course outcomes: On successful completion of this practical course, students shall be able to

1. Conduct lab and field experiments pertaining to Plant Physiology, that is, biophysical and biochemical processes using related glassware, equipment, chemicals and plant material.
2. Estimate the quantities and qualitative expressions using experimental results and calculations
3. Demonstrate the factors responsible for growth and development in plants.

Practical Syllabus

1. Determination of osmotic potential of plant cell sap by plasmolytic method using *Rhoeo/ Tradescantia* leaves.
2. Calculation of stomatal index and stomatal frequency of a mesophyte and a xerophyte.
3. Determination of rate of transpiration using Cobalt chloride method / Ganong's potometer (at least for a dicot and a monocot).
4. Effect of Temperature on membrane permeability by colorimetric method.
5. Study of mineral deficiency symptoms using plant material/photographs.
6. Demonstration of amylase enzyme activity and study the effect of substrate and Enzymeconcentration.
7. Separation of chloroplast pigments using paper chromatography technique.
8. Demonstration of Polyphenol oxidase enzyme activity (Potato tuber or Apple fruit)
9. Anatomy of C3, C4 and CAM leaves
10. Estimation of protein by biuret method/Lowry method
11. Minor experiments – Osmosis, Arc-auxanometer, ascent of sap through xylem, cytoplasmic streaming.

Model Question Paper for Practical Examination

Semester – IV/ Botany Core Course – 4

Plant Physiology and Metabolism

Max. Time 3 Hrs. Max. Marks 50

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1. Conduct the experiment 'A' (Major experiment), write aim, principle, material and apparatus/equipment, procedure, tabulate results and make conclusion. 20 M
2. Demonstrate the experiment 'B' (Minor experiment), write the principle, procedure and give inference. 10 M
3. Identify the following with apt reasons. 3 x 4 = 12 M
   C. Plant water relations / Mineral nutrition
   D. Plant metabolism
   E. Plant growth and development
4. Record + Viva-voce 5 + 3 = 8 M

Suggested co-curricular activities for Botany Core Course-4 in Semester-IV:

A. **Measurable:**

a. **Student seminars:**

1. Antitranspirants and their significance in crop physiology and horticulture.
2. Natural chelating agents in plants.
3. Criteria of essentiality of elements and beneficial elements.
4. Hydroponics, aquaponics and aeroponics.
5. Mycorrhizal association and mineral nutrition in plants.
6. Non-proteinaceous enzymes.
7. Respiratory inhibitors.
8. Structure of ATPase and Chemiosmotic hypothesis.
9. Transpiration and photosynthesis – a compromise.
10. Amphibolic pathways and bypass pathways in plants.
11. Non-biological nitrogen fixation.
12. Role of Hydrogenase in nitrogen fixation.
13. Plant lectins – their role in plants and use in medicine and medical research.

b. **Student Study Projects :**

1. Stomatal densities among different groups of plants.
2. Various treatments (salt, cold, high temperature, heavy metals) and their effects on seed germination.
3. Effects of plant hormones (IAA, Gibberellin and Kinetin) on Seed Germination.
4. Diurnal variation of stomatal behavior in CAM and C3 plants found in local area.
5. Effects of nitrogen fertilizer on plant growth.
6. Enumeration of C3, C4 and CAM plants in the local area.
7. Effect of different light wavelengths (red light, green light, blue light) on apparent photosynthesis in terms of growth.
8. Light effects on leaf growth and leaf orientation.
9. Artificial Fruit Ripening Process by various treatments (carbide and ethylene).
10. Study of relative water content and water retention by leaves under different environments.
11. Study of soil nutrients in local agricultural fields.
12. Study of mineral deficiency symptoms of various crops of local area.
13. Study of local weeds in crop fields.
14. Studies on seed storage proteins, oils and starch in local millets and pulse crops.
15. Making a report on LDPs, SDPs and DNPs in their locality.

c. **Assignments**: Written assignment at home / during '0' hour at college; preparation of charts with drawings, making models etc., on topics included in syllabus.

II. **General :**

1. Group Discussion (GD)/ Quiz/ Just A Minute (JAM) on different modules in syllabus of the course.
2. Visit to a Plant Physiology laboratory in a University or Physiology division in a Agriculture/Horticulture University/Research station.

IV Semester / Botany Core Course –5 Cell Biology, Genetics and Plant Breeding (Total hours of teaching – 60 @ 04 Hrs./Week)

Theory:

Learning outcomes:

On successful completion of this course, the students will be able to:

- Distinguish prokaryotic and eukaryotic cells and design the model of a cell.
- Explain the organization of a eukaryotic chromosome and the structure of genetic material.
- Demonstrate techniques to observe the cell and its components under a microscope.
- Discuss the basics of Mendelian genetics, its variations and interpret inheritance of traits in living beings.
- Elucidate the role of extra-chromosomal genetic material for inheritance of characters.
- Evaluate the structure, function and regulation of genetic material.
- Understand the application of principles and modern techniques in plant breeding.
- Explain the procedures of selection and hybridization for improvement of crops.

Unit – 1: The Cell — 12 Hrs.

1. Cell theory; prokaryotic vs eukaryotic cell; animal vs plant cell; a brief account on ultra-structure of a plant cell.
2. Ultra-structure of cell wall.
3. Ultra-structure of plasma membrane and various theories on its organization.
4. Polymorphic cell organelles (Plastids); ultra structure of chloroplast. Plastid DNA.

Unit – 2: Chromosomes — 12 Hrs.

1. Prokaryotic vs eukaryotic chromosome. Morphology of a eukayotic chromosome.
2. Euchromatin and Heterochromatin; Karyotype and ideogram.
3. Brief account of chromosomal aberrations - structural and numerical changes
4. Organization of DNA in a chromosome (solenoid and nucleosome models).

Unit – 3: Mendelian and Non-Mendelian genetics 14Hrs.

1. Mendel's laws of inheritance. Incomplete dominance and co-dominance; Multiple allelism.
2. Complementary, supplementary and duplicate gene interactions (plant based examples are to be dealt).
3. A brief account of linkage and crossing over; Chromosomal mapping - 2 point and 3 point test cross.
4. Concept of maternal inheritance (Corren's experiment on *Mirabilis jalapa*); Mitochondrial DNA.

Unit – 4:Structure and functions of DNA 12 Hrs.

1. Watson and Crick model of DNA. Brief account on DNA Replication (Semi-conservative method).
2. Brief account on Transcription, types and functions of RNA. Gene concept and genetic code and Translation.
3. Regulation of gene expression in prokaryotes - Lac Operon.

Unit – 5:Plant Breeding 12 Hrs.

1. Plant Breeding and its scope; Genetic basis for plant breeding. Plant Introduction and acclimatization.
2. Definition, procedure; applications and uses; advantages and limitations of :(a) Mass selection, (b) Pure line selection and (c) Clonal selection.
3. Hybridization – schemes, and technique; Heterosis(hybrid vigour).
4. A brief account on Molecular breeding – DNA markers in plant breeding. RAPD, RFLP.

Text books :

- Botany – III (Vrukshasastram-I) : Telugu Akademi, Hyderabad
- Pandey, B.P. (2013) *College Botany, Volume-III*, S. Chand Publishing, New Delhi
- Ghosh, A.K., K.Bhattacharya&G. Hait (2011) *A Text Book of Botany, Volume-III*, New Central Book Agency Pvt. Ltd , Kolkata
- Chaudhary, R. C. (1996) *Introduction to Plant Breeding*, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi

Books for Reference:

- S. C. Rastogi (2008)*Cell Biology*,New Age International (P) Ltd. Publishers, New Delhi
- P. K. Gupta (2002)*Cell and Molecular biology*,Rastogi Publications, New Delhi
- B. D. Singh (2008) *Genetics*,Kalyani Publishers, Ludhiana
- A.V.S.S. Sambamurty (2007) *Molecular Genetics*,Narosa Publishing House,New Delhi
- Cooper, G.M. & R.E. Hausman (2009)*The Cell – A Molecular Approach*, A.S.M. Press, Washington
- Becker, W.M., L.J. Kleinsmith& J. Hardin (2007)*The World of Cell*, Pearson Education, Inc., New York
- De Robertis, E.D.P. & E.M.F. De Robertis Jr. (2002)*Cell and Molecular Biology*, Lippincott Williams & Wilkins Publ., Philadelphia
- Robert H. Tamarin (2002)*Principles of Genetics*,Tata McGraw –Hill Publishing Company Limited, New Delhi.
- Gardner, E.J., M. J. Simmons & D.P. Snustad (2004)*Principles of Genetics*, John Wiley & Sons Inc., New York
- Micklos, D.A., G.A. Freyer& D.A. Cotty (2005) *DNA Science: A First Course*, I.K. International Pvt. Ltd., New Delhi
- Chaudhari, H.K.(1983)*Elementary Principles of Plant Breeding*, TMHpublishers Co., New Delhi
- Sharma, J.R. (1994)*Principles and Practice of Plant Breeding*, Tata McGraw- Hill Publishers, New Delhi
- Singh,B.D. (2001)*Plant Breeding : Principles and Methods* ,Kalyani Publishers, Ludhiana
- Pundhan Singh (2015) *Plant Breeding for Undergraduate Students*, Kalyani Publishers, Ludhiana
- Gupta, S.K. (2010)*Plant Breeding : Theory and Techniques*,Agrobios (India), Jodhpur
- Hayes, H.K., F.R. Immer& D.C. Smith (2009) *Methods of Plant Breeding*,Biotech Books, Delhi

Practical Syllabus of Botany Core Course –
5/IVSemester Cell Biology, Genetics and Plant Breeding

(Total hours of laboratory exercises 30 Hrs @ 02 Hrs. /Week)

Course Outcomes: After successful completion of this practical course the student shall be able to:

1. Show the understanding of techniques of demonstrating Mitosis and Meiosis in the laboratory and identify different stages of cell division.
2. Identify and explain with diagram the cellular parts of a cell from a model or picture and prepare models
3. Solve the problems related to crosses and gene interactions.
4. Demonstrate plant breeding techniques such as emasculation and bagging

Practical Syllabus:

1. Study of ultra structureof plant cell and its organelles using Electron microscopic Photographs/models.
2. Demonstration of Mitosis in *Allium cepa*/*Aloe vera* roots using squashtechnique; observation of various stages of mitosis in permanent slides.
4. Demonstration of Meiosis in P.M.C.s of *Allium cepa*flower buds using squash technique; observation of various stages of meiosis in permanent slides.
4. Study of structure of DNA and RNA molecules using models.
5. Solving problems monohybrid, dihybrid, back and test crosses.
6. Solving problems on gene interactions (atleast one problem for each of the gene interactions in the syllabus).
7. Chromosome mapping using 3- point test cross data.
8. Demonstration of emasculation, bagging, artificial pollination techniques for hybridization.

Model paper for Practical Examination

Semester-IV / Botany Core Course – 5

Cell Biology, Genetics and Plant Breeding

Max. Time: 3 Hrs. Max. Marks: 50

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1. Make a cytological preparation of given material 'A' (mitosis or meiosis in Onion) by squash technique, report any two stages, draw labeled diagrams and write the reasons. 15 M

2. Solve the given Genetic problem (Dihybrid cross/ Interaction of genes/ 3-point test cross) 'B' and write the conclusions. 15 M

3. Identify the following and justify with apt reasons. 3 x 4 = 12 M

   C. Cell Biology (Cell organelle)

   D. Genetics (DNA/RNA)

   E. Plant Breeding

4. Record + Viva-voce 5 + 3 = 8 M

Suggested co-curricular activities for Botany Core Course- 5 in Semester-IV:

A. **Measurable:**

a. **Student seminars:**

1. Light microscopy: bright field and dark field microscopy.
2. Scanning Electron Microscopy (SEM).
3. Transmission Electron Microscopy (TEM).
4. Mitosis and Meiosis
5. Cell cycle and its regulation.
6. Cell organelles bounded by single membrane.
7. Prokaryotic chromosomes
8. Special types of chromosomes :Polytene, Lampbrush and B-chromosomes.
9. Different forms of DNA
10. Gene mutations.
11. DNA damage and repair mechanisms.
12. Reverse transcription.
13. Protein structure.

14. Modes of reproduction in plants.

15. Modes of pollination in plants

b. Student Study Projects :

1. Study of mitoticcell cycle in roots of*Alliumcepa*

2. Study of mitoticcell cycle in roots of*Aloe vera*

3. Observation of chromosomal aberrations in *Allium cepa* root cells exposed toindustrial effluent(s).

4. Observation of chromosomal aberrations in *Allium cepa* root cells exposed toheavy metal(s).

5. Observation of polyembryony in *Citrus* spp.and *Mangiferaindica*.

c. **Assignments**: Written assignment at home / during '0' hour at college; preparation of charts with drawings, making models etc., on topics included in syllabus.

B. General :

1. Field visit to Agriculture/Horticulture University/ Research station to observe Plant breeding methods.

2. Group Discussion (GD)/ Quiz/ Just A Minute (JAM) on different modules in syllabus of the course.

RECOMMENDED ASSESSMENT OF STUDENTS:

Recommended continuous assessment methods for all courses:

Some of the following suggested assessment methodologies could be adopted. Formal assessment for awarding marks for Internal Assessment in theory.

(a) Formal:

1. The oral and written examinations [Scheduled and surprise tests],
2. Simple, medium and Critical Assignments and Problem-solving exercises,
3. Practical assignments and laboratory reports,
4. Assessment of practical skills,
5. Individual and group project reports,
6. Seminar presentations,
7. Viva voce interviews.

(b) Informal:

1. Computerized adaptive testing, literature surveys and evaluations,
2. Peers and self-assessment, outputs form individual and collaborative work
3. Closed-book and open-book tests,

Common pattern for Question Paper for Theory Examination(s) at Semester end

Max. Time: 3 Hrs. Max. Marks: 75 M

Section – A

Answer all the following questions. 5 x 2 = 10 M

- ✓ One question should be given from each Unit in the syllabus.

Section – B

Answer any three of the following questions. Draw a labeled diagram wherever necessary 3 x 5 = 15 M

- ✓ One question should be given from each Unit in the syllabus.

Section – C

Answer any five of the following questions. Draw a labeled diagram wherever necessary 5 x 10 = 50 M

- ✓ Two questions (a & b) are to be given from each Unit in the syllabus (internal choice in each unit). Student has to answer 5 questions by choosing one from a set of questions given from a Unit.

Note: Questions should be framed in such a way to test the understanding, analytical and creative skills of the students. All the questions should be given within the frame work of the syllabus prescribed.

Annexure

Objectives and General Outcomes of Programme and Domain Subject

Programme (B.Sc.) Objectives: The objectives of bachelor's degree programme with Botany are:

1. To provide a comprehensive knowledge on various aspects related to microbes and plants.
2. To deliver knowledge on latest developments in the field of Plant sciences with a practical approach.
3. To produce a student who thinks independently, critically and discuss various aspects of plant life.
4. To enable the graduate to prepare and pass through national and international examinations related to Botany.
5. To empower the student to become an employee or an entrepreneur in the field of Botany /Biology and to serve the nation.

Programme Outcomes:

1. Understand the basic concepts of Botany in relation to its allied core courses.
2. Perceive the significance of microbes and plants for human welfare, and structural and functional aspects of plants.
3. Demonstrate simple experiments related to plant sciences, analyze data, and interpret them with the theoretical knowledge.
4. Work in teams with enhanced inter-personal skills.
5. Develop the critical thinking with scientific temper.
6. Effectively communicate scientific ideas both orally and in writing.

Domain Subject(Botany) Objectives :

1. To impart knowledge on origin, evolution, structure, reproduction and interrelationships of microbes and early plant groups.
2. To provide knowledge on biology and taxonomy of true land plants within a phylogenetic framework.
3. To teach aspects related to anatomy, embryology and ecology of plants, and importance of Biodiversity.
4. To explain the structural and functional aspects of plants with respect to the cell organelles, chromosomes and genes, and methods of plant breeding.
5. To develop a critical understanding on SPAC, metabolism and growth and development in plants.
6. To enable the students proficient in experimental techniques and methods of analysis appropriate for various sub-courses in Botany.

Domain Subject (Botany) Outcomes:

1. Students will be able to identify, compare and distinguish various groups of microbes and primitive plants based on their characteristics.
2. Students will be able to explain the evolution of trachaeophytes and also distribution of plants on globe.
3. Students will be able to discuss on internal structure, embryology and ecological adaptations of plants, and want of conserving Biodiversity.
4. Students will be able to interpret life processes in plants in relation to physiology and metabolism.
5. Students will be able to describe ultra structure of plant cells, inheritance and cropimprovement methods.
6. Students will independently design and conduct simple experiments based on the knowledge acquired in theory and practicals of the different sub-courses in Botany.

ANDHRA PRADESH STATE COUNCIL OF HIGHER EDUCATION

(A Statutory body of the Government of Andhra Pradesh)

REVISED UG SYLLABUS UNDER CBCS
(Implemented from Academic Year 2020-21)
PROGRAMME: FOUR YEAR B.Sc (Hons)
Domain Subject: **BOTANY**

Skill Enhancement Courses (SECs) for Semester V, from 2022-23 *(Syllabus with LearningOutcomes, References, Co-curricular Activities & Model Q.P. Pattern)*

Structure of SECs for Semester – V

(To choose One pair from the Four alternate pairs of SECs)

Univ. Code	Course NO. 6 & 7	Name of Course	Th. Hrs. / Week	IE Mar-ks	EE Mar-ks	Credits	Prac. Hrs./ Wk	Mar-ks	Credits
	6A	Plant Propagation	3	25	75	3	3	50	2
	7A	Seed Technology	3	25	75	3	3	50	2
		OR							
	6B	Vegetable Crops – Cultivation Practices	3	25	75	3	3	50	2
	7B	Vegetable Crops – Post Harvest Practices	3	25	75	3	3	50	2
		OR							
	6C	Plant Tissue Culture	3	25	75	3	3	50	2
	7C	Mushroom Cultivation	3	25	75	3	3	50	2
		OR							
	6D	Gardening and Landscaping	3	25	75	3	3	50	2
	7D	Agroforestry	3	25	75	3	3	50	2

Note-1: For Semester–V, for the domain subject Botany, any one of the four pairs of SECs shall bechosen as courses 6 and 7, i.e., 6A & 7A or 6B & 7B or 6C & 7C or 6D & 7D. The pair shall notbe broken (ABCD allotment is random, not on any priority basis).

Note-2: *One of the main objectives of Skill Enhancement Courses (SEC) is to inculcate skills related to the domain subject in students. The syllabus of SEC will be partially skill oriented. Hence, teachers shall also impart practical training to students on the skills embedded in syllabus citing related real field situations.*

A.P. State Council of Higher Education
Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code:

Four-year B.Sc. (Hons)
Domain Subject: **BOTANY**
IV Year B. Sc. (Hons) – Semester – V

Max. Marks: 100

Course-6A: Plant Propagation

(Skill Enhancement Course (Elective), Credits: 05)

I. Learning Outcomes:

Students at the successful completion of the course will be able to:

1. Explain various plant propagation structures and their utilization.
2. Understand advantages and disadvantages of vegetative, asexual and sexual plantpropagation methods.
3. Assess the benefits of asexual propagation of certain economically valuable plants usingapomictics and adventive polyembryony.
4. Demonstrate skills related to vegetative plant propagation techniques such as cuttings,layering, grafting and budding.
5. Apply a specific macro-propagation technique for a given plant species.

II. Syllabus: (Hours: Teaching: 50, Lab: 30, Field training: 05, others incl. unit tests: 05)
(Syllabi of theory, practical and lab (skills) training together shall be completed in 80 hours)

Unit – 1: Basic concepts of propagation (10h)

1. Propagation: Definition, need and potentialities for plant multiplication; asexual andsexual methods of propagation - advantages and disadvantages.
2. Propagation facilities: Mist chamber, humidifiers, greenhouses, glasshouses, cold frames,hot beds, poly-houses, phytotrons nursery - tools and implements.
3. Identification and propagation by division and separation: Bulbs, pseudobulbs, corms,tubers and rhizomes; runners, stolons, suckers and offsets.

Unit – 2: Apomictics in plant propagation (10h)

1 Apomixis: Definition, facultative and obligate; types – recurrent, non-recurrent,adventitious and vegetative; advantages and disadvantages.
2 Polyembryony: Definition, classification, horticultural significance; chimera and bud sport.
3 Propagation of mango, *Citrus* and *Allium* using apomictic embryos.

Unit – 3: Propagation by cuttings (10h)

1 Cuttings: Definition, different methods of cuttings; root and leaf cuttings.

1 Stem cuttings: Definition of stem tip and section cuttings; plant propagation by herbaceous, soft wood, semi hard wood, hard wood and coniferous stem cuttings.
2 Physiological and bio chemical basis of rooting; factors influencing rooting of cuttings; Use of plant growth regulators in rooting of cuttings.

Unit – 4: Propagation by layering (10h)

1 Layering: Definition, principle and factors influencing layering.
2 Plant propagation by layering: Ground layering – tip layering, simple layering, trench layering, mound (stool) layering and compound (serpentine layering).
3 Air layering technique – application in woody trees.

Unit – 5: Propagation by grafting and budding (10h)

1 Grafting: Definition, principle, types, graft incompatibility, collection of scion wood stick, scion-stock relationship, and their influences, bud wood certification; micrografting.
2 Propagation by veneer, whip, cleft, side and bark grafting techniques.
3 Budding: Definition; techniques of 'T', inverted 'T', patch and chip budding.

III. References:

1. Sharma RR and Manish Srivastav.2004. Plant Propagation and Nursery ManagementInternational Book Distr buting Co. Lucknow.
2. Hartman, HT and Kester, D.E.1976. Plant Propagation: Principles and Practices, Prentice Hall of India Pvt. Ltd. Bombay.
3. Sadhu, M.K. 1996. Plant Propagation. New Age International Publishers, New Delhi.
4. Web resources suggested by the teacher concerned and college librarian includingreading material.

Course -6A: Plant Propagation - Practical syllabus

IV. Learning Outcomes: On successful completion of this practical course, student will be able to:

1. Make use of different plant propagation structures for plant multiplication.
2. Explore the specialized organs or asexual propagules in some plants for theirproliferation.
3. Demonstrate skills on micropropagation of plants through vegetative propagationtechniques.
4. Evaluate and use a suitable propagation technique for a given plant species.

V. Practical (Laboratory) syllabus: (30hrs): The following experiments/practices shall be conducted by students in the lab.

1. Preparation of nursery beds – flat, raised and sunken beds.
2. Propagation through apomictic.
3. Propagation by separation and division technique.
4. Propagation by cuttings.
5. Propagation by layering
6. Propagation by grafting.
7. Propagation by budding.
8. Preparation of potting mixture, potting and repotting.

VI. Lab References:

1. Prasad, V. M. and Balaji Vikram, 2018. Practical Manual on Fundamentals of Horticulture and Plant Propagation, Write & Print Publications, New Delhi
2. Upadhyay S. K. (Ed.) 2013. Practical Manual Basic Horticulture-I, Akashdeep Printers, New Delhi
3. Web sources suggested by the teacher concerned.

VII. Co-Curricular Activities:

a) **Mandatory:** *(Lab/field training of students by teacher: (Lab: 10 + field: 05 hours):*

1. **For Teacher**: Training of students by the teacher in the laboratory/field for a total of not less than 15 hours on the field techniques/skills of different plant propagation structures, containers, preparation of soil, plant propagation through separation and division, apomictics, cuttings, layering, grafting and budding.
2. **For Student**: Students shall (individually) visit horticulture nurseries in a University/, research institute /private nursery and observe propagation structures, propagation techniques etc., write their observations and submit a hand-written Fieldwork/Project work/Project work Report not exceeding 10 pages in the given format to the teacher.
3. Max marks for Fieldwork/Project work Report: 05.
4. Suggested Format for Fieldwork/Project work Report: Title page, student details,

indexpage, details of place visited, observations, findings and acknowledgements.

5. Unit tests (IE).

b) Suggested Co-Curricular Activities:

1. Training of students by experts in plant vegetative propagation methods.
2. Assignments (including technical assignments like identifying propagation structures andtheir operational techniques for a specific plant species.
3. Seminars, Group discussions, Quiz, Debates etc. (suggested topics):
4. Preparation of videos on plant propagation techniques in relation to differenteconomically useful plants.
5. Collection of material/figures/photos related to plant propagation methods, writing andorganizing them in a systematic way in a file.
6. Visits to Horticulture/Agriculture/Forest nurseries, research organizations, universitiesetc.
7. Invited lectures and presentations on related topics by experts in the specified area.

Model Question Paper pattern for Practical Examination

Semester – V/ Botany Skill Enhancement Course

Course -6A: Plant Propagation

Max. Time: 3 Hrs. Max. Marks: 50

1. Demonstration plant propagation using separation and division /apomictics 'A'	10
2. Demonstration plant propagation using cuttings/ layering technique 'B'	10
3. Demonstration of plant propagation using grafting/budding technique 'C'	10
4. Scientific observation and data analysis	4 x 3 = 12
D. Plant propagation structure model/photograph	
E. Plant Growth Regulator	
F. Nursery bed model /photograph	
G. Asexual propagule/container/pot mixture for propagation	
5. Record + Viva-voce	5+3 = 8

A.P. State Council of Higher Education
Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code:

Four-year B.Sc. (Hons)
Domain Subject: **BOTANY**
IV Year B. Sc. (Hons) – Semester – V

Max. Marks: 100

Course-7A: Seed Technology

(Skill Enhancement Course (Elective), Credits: 05)

I. Learning outcomes:

Students at the successful completion of the course will be able to:

1. Explain the causes for seed dormancy and methods to break dormancy.
2. Understand critical concepts of seed processing and seed storage procedures.
3. Acquire skills related to various seed testing methods.
4. Identify seed borne pathogens and prescribe methods to control them.
5. Understand the legislations on seed production and procedure of seed certification.

II. Syllabus: (Hours: Teaching: 50, Lab: 30, Field training: 05, others incl. unit tests: 05)
(Syllabi of theory, practical and lab (skills) training together shall be completed in 80 hours)

Unit - 1: Seed dormancy (10h)

1. Seed and grain: Definitions, importance of seed; structure of Dicot and Monocot seed.
2. Role and goals of seed technology; characteristics of quality seed material.
3. Dormancy: Definition, causes for seed dormancy; methods to break seed dormancy.

Unit – 2: Seed processing and storage (10h)

1. Principles of seed processing: seed pre-cleaning, precuring, drying, seed extraction; cleaning, grading, pre-storage treatments; bagging and labelling, safety precautionsduring processing.
2. Seed storage; orthodox and recalcitrant seeds, natural longevity of seeds.
3. Factors affecting longevity in storage; storage conditions, methods and containers.

Unit – 3: Seed testing (10h)

1. Definition of seed vigour, viability and longevity; seed sampling and equipment;physical purity analysis.
2. Seed moisture – importance – methods of moisture determination.
3. Seed germination tests using paper, sand or soil – standard germination test; TZ testto determine seed viability; seed health testing.

Unit – 4: Seed borne diseases (10h)

1. A brief account of different seed borne diseases and their transmission.
2. Different seed health testing methods for detecting microorganisms.
3. Management of seed borne diseases; seed treatment methods: spraying and dusting.

Unit – 5: Seed certification (10h)

1. Objectives - Indian seed Act; seed rules and seed order; new seed policy (1988).
2. Seed Inspector: Duties and responsibilities; classes of seeds, phases of certificationstandards (i.e., Land requirement, isolation distance] etc.
3. Issue of certificates, tags and sealing; pre and post control check: Genetic purityverification, certification, records and reporting.

III. References:

1. Umarani R, Jerlin R, Natarajan N, Mashaman P, Ponnuswamy AS 2006. Experimental Seed Science and Technology, Agrobios, Jodhpur
2. Agrawal, 2005. Seed Technology. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi
3. Desai B D 2004. Seeds Hand Book: Processing and Storage, CRC Press
4. Agarwal V K and J B Sinclair 1996, Principles of Seed Pathology, CRC Press
5. Tunwar NS and Singh SN. 1988. Indian Minimum Seed Certification Standards. CSCB, Ministry of Agriculture, New Delhi.
6. McDonald, M.B. and L.O. Copland. 1999. Seed Science and Technology Laboratory Manual. Scientific Publishers, Jodhpur
7. Web resources suggested by the teacher concerned and the college librarian includingreading material.

Course -7A: Seed Technology Practical syllabus

IV. Learning Outcomes: On successful completion of this practical course, student will be able to:

1. Demonstrate skills on various methods to break the seed dormancy.
2. Determine seed moisture, seed germination percentage, seed viability and vigour.
3. Identify the seed borne pathogens and prescribe methods to prevent or control them.
4. Evaluate various methods to produce healthy seeds.

V. Practical (Laboratory) syllabus: (30hrs)

1. Determination of physical properties of seeds of 3 select local crops (1 each fromcereals, millets, pulses and oil seeds).
2. Breaking seed dormancy in 3 select local crops.
3. Measurement of seed moisture content by O S W A or moisture meter or oven dryingmethod.
4. Seed germination tests and evaluation.
5. Seed vigour - conductivity test.
6. Accelerated ageing tests.
7. Tetrazolium test.
8. Priming and invigoration treatments for improving germination and vigour.

9. Techniques of seed health testing - visual examination of seeds, washing test, incubation methods, embryo count method, seed soak method for the detection ofcertain seed borne pathogens.
10. Using various types of tools for dusting and spraying pesticides/insecticides.

VI. Lab References:

1. Sanjeev Kumar, 2019. Practical Manual Seed Technology of Vegetable Crops, M/s Asian Printery, Ahmedabad
2. Divakara Sastry, E.V., Dhirendra Singh and S.S.Rajput, 2013. Seed Technology: Practical Manual, Swami Keshwanand Rajasthan Agricultural University, Jobner
3. Web sources suggested by the teacher concerned.

VII. Co-Curricular Activities:

Mandatory: *(Lab/field training of students by teacher: (Lab: 10 + field: 05 hours)*

1. **For Teacher:** Training of students by the teacher in the laboratory/field for a total of not less than15 hours on the field techniques/skills of identifying and drawing seed structure, methods of breaking seed dormancy, seed cleaning, seed storage, identification of seed borne diseases, seed certification procedure.
2. **For Student:** Students shall (individually) visit horticulture/agriculture/ forest nursery/commercial seed production firms/ seed testing laboratories in government orprivate sector, observe seed production techniques, processing and storage, seed testing and certification procedures etc., write their observations and submit a hand- written Fieldwork/Project work Report not exceeding 10 pages in the given format tothe teacher.
3. Max marks for Fieldwork/Project work Report: 05.
4. Suggested Format for Fieldwork/Project work Report: Title page, student details, index page, details of place visited, observations, findings and acknowledgements.
5. Unit tests (IE).

a) Suggested Co-Curricular Activities:

1. Training of students by experts in seed technology.
2. Assignments (including technical assignments like seed processing and storage techniques, seed testing, seed certification, seed borne diseases-prevention andcontrol).
3. Seminars, Group discussions, Quiz, Debates etc. (suggested topics):
4. Preparation of videos on various aspects related to seed technology.
5. Collection of material/figures/photos related to seed technology, writing andorganizing them in a systematic way in a file.

6. Visits to seed production units in Industries/Horticulture/Agriculture/Forestuniversities/colleges; research organizations, seed testing laboratories etc.
7. Invited lectures and presentations on related topics by experts in the specified area.

Model Question Paper pattern for Practical Examination

Semester – V/ Botany Skill Enhancement Course

Course – 7A: Seed Technology

Max. Time: 3 Hrs. Max. Marks: 50

1. Demonstration of a method to break seed dormancy 'A'	10
2. Determination of seed moisture content/ seed germination test 'B'	10
3. Demonstration of test for seed viability/ seed vigour 'C'	10
4. Scientific observation and data analysis	4 x 3 = 12
D. Monocot / Dicot seed	
E. Seed sampling equipment	
F. Seed borne pathogen specimen/photograph	
G. Seed certification agency/procedure	
4. Record + Viva-voce	5+3 = 8

A.P. State Council of Higher Education
Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code:

Four-year B.Sc. (Hons)
Domain Subject: **BOTANY**
IV Year B. Sc. (Hons) – Semester – V

Max Marks: 100

Course 6B: Vegetable Crops – Cultivation Practices

(Skill Enhancement Course (Elective), Credits: 05)

I. Learning Outcomes:

Students at the successful completion of the course will be able to:

1. Identify different vegetable plants and realize their value in human nutrition.
2. Analyse the types of soils to cultivate vegetable crops.
3. Demonstrate skills on agronomic practices for cultivation of vegetable crops.
4. Acquire knowledge on water, weed and disease managements in vegetable farming.
5. Comprehend aspects related to harvesting and storage of produce.

II. Syllabus: (Hours: Teaching: 50, Lab: 30, Field training: 05, others incl. unit tests: 05)
[Syllabi of theory, practical and lab (skills) training together shall be completed in 80 hours]

Unit – 1: Introduction to Olericulture (10h)

1. Vegetables and Olericulture: Definitions, nutritive value of vegetables and economicsignificance of vegetable farming.
2. Classification of vegetable crops (Botanical, based on climatic zones and economic parts used).
3. Types of vegetable gardens (kitchen gardening, terrace gardening, market gardening and truck gardening); implements used in vegetable gardening; vegetable forcing – a brief concept.

Unit – 2: Cultivation of leafy vegetables (10h)

1. Leafy vegetables: Definition and a brief account of locally cultivated crops.
2. Study of the following leafy vegetable crops: (a) *Amaranthus* (b) Palak (c) *Hibiscus cannabinus* (d) Fenugreek: systematic position, nutritive value, origin, area, production, improved varieties.
3. General cultivation practices such as sowing, planting distance, fertilizer requirements, irrigation, weed management, harvesting.
4. Crop specific yield, storage, disease and pest control and seed production.

Unit – 3: Cultivation of fruity vegetables [10h]

1. Fruity vegetables: Definition and a brief account of locally cultivated crops.
2. Study of the fruity vegetable crops: (a) Okra (b) Tomato (c) Chillies (d) Brinjal: systematic position, nutritive value, origin, area, production, improved varieties.
3. General cultivation practices such as sowing, planting distance, fertilizer requirements, irrigation, weed management, harvesting.
4. Crop specific yield- storage, disease and pest control and seed production

Unit – 4: Cultivation of peas and beans [10h]

1. A brief account of locally cultivated peas and beans.

2. Study of the following crops: (a) *Dolichos* (b) Cluster bean (c) French bean: Systematic position, nutritive value, origin, area, production, improved Varieties.
3. General cultivation practices such as sowing, planting distance, fertilizer requirements, irrigation, weed management, harvesting.
4. Crop specific yield, storage, disease and pest control and seed production.

Unit – 5: Cultivation of root and tuber crops [10h]

1. A brief account of locally cultivated root and tuber crops.
2. Study of the following crops: (a) Carrot (b) Radish (c) Sweet potato (d) Potato: Systematic position, family, nutritive value, origin, area, production, improved varieties.
3. General cultivation practices such as sowing, planting distance, fertilizer requirements, irrigation, weed management, harvesting.
4. Crop specific yield, storage, disease and pest control and seed production.

III. References:

1. Bose T K et al. (2003) Vegetable crops, Naya Udhyog Publishers, Kolkata.
2. Singh D K (2007) Modern vegetable varieties and production, IBN Publisher Technologies, International Book Distributing Co, Lucknow.
3. Premnath, Sundari Velayudhan and D P Sing (1987) Vegetables for the tropical region, ICAR, New Delhi
4. Shanmugavelu, K. G. 1989. Production Technology of Vegetable Crops. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.
5. Rana MK. 2008. Scientific Cultivation of Vegetables. Kalyani Publ., New Delhi
6. Rubatzky VE and Yamaguchi M. (Eds.). 1997. World Vegetables: Principles, Production and Nutritive Values. Chapman & Hall, London.
7. Web resources suggested by the teacher concerned and the college librarian includingreading material.

Course 7B: Vegetable Crops – Cultivation Practices – Practical syllabus

IV. Learning Outcomes: On successful completion of this practical course, student will be able to:

1. List out, identify and handle different garden implements.
2. Identify the important vegetable crops grown in their locality.
3. Demonstrate various skills in cultivation of vegetable crops.
4. Identify pests, diseases and their remedies that are specific to a vegetable crop.

V. Practical (Laboratory) Syllabus: (30 hrs)

1. Identification of seeds of important local vegetable plants and preparation ofherbarium.
2. Identification of local vegetable crops and handling of garden tools.
3. Analysis of garden soil for ratios of physical characteristics by sieve separation.
4. Determination of chemical characters of garden soil (pH, EC, Organic Carbon, SAR).
5. Planning and layout of a vegetable crop farm.
6. Preparation of nursery bed (raised, sunken and flat beds) and sowing of seeds.
7. Transplanting and care of vegetable seedlings.
8. Intercultural operations in vegetable plots.
9. Estimation of Total Soluble Solids (TSS) by Refractometer in a fruit and a leafy vegetable.
10. Estimation of Vitamin - C in a fruit and a leafy vegetable by DCIP method.
11. Identification of pests and disease-causing organisms on any two vegetable plants.
12. Seed extraction in tomato and brinjal.

VI. Lab References:

1. Akhilesh Sharma (Ed.), 2013. Practical Manual Olericulture-I, Sheel Packers, New Delhi
2. Biswajit Saha and Shri Dharampal Singh, 2013. Practical Manual Olericulture-I, Sheel Packers, New Delhi
3. Saini RS, K.D. Sharma, O.P. Dhankhar and R.A. Kaushik (Eds.). 2001. Laboratory Manual of Analytical Techniques in Horticulture. Agrobios, Jodhpur
4. Ranganna S. 1986. Handbook of Analysis and Quality Control for Fruit and Vegetable Products. Tata-McGraw Hill, New Delhi
5. Web sources suggested by the teacher concerned.

VII. Co-Curricular Activities:

a) **Mandatory:** (*Lab/ field training of students by teacher: (Lab: 10 + field: 05 hours*)

1 **For Teacher**: Training of students by the teacher in the laboratory/field for a total of not less than 15 hours on the field techniques/skills of vegetable plants identification, vegetable gardening, agronomic practices, water, weed and disease management; harvesting and storage of produce.

2 **For Student**: Students shall (individually) visit a horticulture university/ research station or vegetable crop farm in their locality, observe different vegetable crops/ varieties of a vegetable crop, intercultural operations, pests and diseases, harvesting and storage etc., write their observations and submit to the teacher a hand-written Fieldwork/Project work Report not exceeding 10 pages in the given format.

3 Max marks for Fieldwork/Project work Report: 05.

4 Suggested Format for Fieldwork/Project work Report: Title page, student details, index page, details of place visited, observations, findings and acknowledgements.

5 Unit tests (IE).

b) Suggested Co-Curricular Activities:

1. Training of students by related industrial experts or farmers.
2. Assignments (including technical assignments like tools in vegetable gardening andtheir handling, agronomic practices, modern irrigation methods, organic farming practices etc.)
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Preparation of videos on cultivation practices for vegetable crops.
5. Collection of material/figures/photos related to different vegetable crop species,writing and organizing them in a systematic way in a file.

6. Visits to horticulture universities, research organizations, private vegetable farmingunits etc.
7. Invited lectures and presentations on related topics by field/industrial experts

Model Question Paper Pattern for Practical Examination

Semester – V/ Botany Skill Enhancement Course

Vegetable Crops – Cultivation Practices

Max. Time: 3 Hrs. Max. Marks: 50

1. Demonstration of nursery bed making/transplanting of seedlings 'A' 8
2. Determination of physical or chemical characters of a given soil sample / Preparation ofslide and identification of pest/disease-causing organism in plant part given 'B' 10
3. Estimation of Total Soluble Solids/Vitamin-C in a given plant sample 'C' 12
4. Scientific observation and data analysis 4 x 3 = 12
   D. Identification of a garden tool
   E. Identification of seed/specimen of a vegetable crop species
   F. Identification of a weed/irrigation method
   G. Identification of a pest/disease causing organism
5. Record + Viva-voce 5+3 = 8

A.P. State Council of Higher Education
Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code:

Four-year B.Sc. (Hons)
Domain Subject: **BOTANY**
IV Year B. Sc. (Hons) – Semester – V

Max Marks: 100

Course 7B: Vegetable Crops – Post Harvest Practices

(Skill Enhancement Course (Elective), Credits: 05)

I. Learning Outcomes:

Students at the successful completion of the course will be able to:

1. Understand various practices for vegetable produce from harvesting to marketing.
2. Demonstrate skills on storage, processing and preservation of vegetables.
3. Summarize causes for spoilage of vegetables before and during storage and methodsto prevent and control them.
4. Make use of preservation methods to reduce the loss of vegetable produce.
5. Explain about value added products, packaging and marketing of vegetables.

II. Syllabus: (Hours: Teaching: 50, Lab: 30, Field training: 05, others incl. unit tests: 05)
(Syllabi of theory, practical and lab (skills) training together shall be completed in 80 hours)

Unit – 1: Introduction to Post Harvest Practices (10h)

1. Post-harvest technology: Definition; importance, scope and future status of post-harvest management of vegetables.
2. Study of maturity standards of vegetables; harvest techniques of vegetables, methods stages, signs of harvesting; harvesting and its relationship with quality, sorting and grading.
3. Careful handling of harvested vegetables; pre-harvest and post-harvest factors responsible for ripening.

Unit – 2: Methods of storage (10h)

1. Climacteric and non-climacteric types of vegetables.
2. Methods of storage to prolong shelf life of harvested vegetables; on-farm storage, evaporatively cooled stores, ventilated storage, pit storage etc.
3. Refrigerated storage, refrigeration cycle, controlled and modified atmosphere, hypobaricstorage.

Unit – 3: Processing of vegetables (10h)

1. Causes for spoilage of vegetables and control measures during storage; post-harvestdisease and pest management.
2. Techniques to prevent deterioration; vegetable processing equipment; minimal

processingof vegetables.

3. Safe chemicals and microbial limits; application of growth regulators for quality assurance; grading.

Unit -4: Preservation and value-addition [10h]

1. Importance and scope of vegetable preservation in India; principles underlying generalmethods of preservation.
2. Methods of preservation; food additives and food colours.
3. Fried products, process of frying; dried vegetables; sauces and chutneys, pickles andsalted vegetables; by-product and waste utilization.

Unit – 5: Marketing [10h]

1. Packing line operations, packaging of vegetables and their products; transportation; codex norms for export of perishables.
2. Demand supply analysis of important vegetables; market potential of various vegetablesproducts.
3. Important marketing agencies and institutions; importance of cooperative marketing.

III. References:

1. Salunkhe DK and Kadam SS. (Ed.). 1998. Hand Book of Vegetable Science and Technology: Production, Composition, Storage and Processing. Marcel Dekker, New York.
2. Arthey D and Dennis C. 1996. Vegetable Processing. Blackie/Springer-Verlag, New York
3. Verma LR and Joshi VK. 2000. Post-harvest Technology of Fruits and Vegetables: Handling, Processing, Fermentation and Waste Management. Indus Publishing Company, New Delhi
4. Srivastava RP and Kumar S. 2003. Fruit and Vegetable Preservation: Principles and Practices. International Book Distribution Company, Lucknow.
5. Giridharlal GS, Siddappa and Tandon GL. 1986. Preservation of Fruits and Vegetables. ICAR, New Delhi.
6. Web resources suggested by the teacher concerned and the college librarian includingreading material.

Course 7B: Vegetable Crops – Post harvest Practices – Practical syllabus

IV. Learning Outcomes: On successful completion of this practical course, student will be able to:

1. Identify stages of maturity in vegetable crops.
2. Handle material for storage of vegetables.
3. Identify physical and biological causes for spoilage of vegetables.
4. Make some value-added products of vegetables.

V. Practical (Laboratory) Syllabus: (30 hrs)

1. Maturity selection and harvest, harvesting practices.
2. List and cost of equipment, utensils, and additives required for small scale processing industry.
3. Study of different types of spoilages in fresh as well as processed vegetables.
4. Identification and classification of spoilage organisms.
5. Estimation of total carbohydrates (Anthrone method) in a stored vegetable and un-stored vegetable.
6. Estimation of protein (Lowry method) in a stored vegetable and un-stored vegetable.
7. Sensory evaluation of fresh and processed vegetables.
8. Assessment of quality and grading, pre-packaging and protective treatments.
9. Identification of packaging materials, containers for packaging.
10. Preparation of pickle from a vegetable.
11. Preparation of tomato sauce, ketchup and chutney.

VI. Lab References:

1. Swati Barche, Reena Nair and P. K. Jain, 2016. A Practical Manual on Post Harvest Value Addition and Processing of Horticulture Crops. Agrobios (India), Jodhpur
2. Antonio L. Acedo Jr., Md. Atiqur Rahman, Borarin Buntong and Durga Mani Gautam, 2016. Vegetable Postharvest Training Manual, AVRDC - The World Vegetable Center, Taiwan
3. Akhilesh Sharma (Ed.), 2013. Practical Manual Olericulture-I, Sheel Packers, New Delhi
4. Biswajit Saha and Shri Dharampal Singh, 2013. Practical Manual Olericulture-I, Sheel Packers, New Delhi
5. Web sources suggested by the teacher concerned.

VII. Co-Curricular Activities:

a) Mandatory: *(Lab/ field training of students by teacher: (Lab: 10 + field: 05 hours)*

1. **For Teacher:** Training of students by teacher in the laboratory/field for a total of not less than 15 hours on the field techniques/skills of harvesting indices of vegetables, storage methods, tools and techniques for processing, causes for spoilage and methods to control, preservation methods, marketing chain and in making value added products.
2. **For Student:** Students shall (individually) visit any one of the places like horticulture university/ research station; vegetable storage units in public and private sector; vegetable processing industries in their locality and observe harvesting practices, storage methods, processing and preservation; grading, value added products and marketing. Write their observations and submit to the teacher a hand-written Fieldwork/Project work Report not exceeding 10 pages in the given format.
3. Max marks for Fieldwork/Project work Report: 05.
4. Suggested Format for Fieldwork/Project work Report: Title page, student details, index page, details of place visited, observations, findings and acknowledgements.
5. Unit tests (IE).

b). Suggested Co-Curricular Activities:

1. Training of students by related industrial experts or farmers.
2. Assignments (including technical assignments like tools and techniques for storage, processing and preservation, causes for spoilage and methods to avoid losses, valueadded products of some vegetables, packaging and marketing etc.]
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics].
4. Preparation of videos on cultivation practices for vegetable crops.
5. Collection of material/figures/photos related to harvesting, storage, processing and preservation of vegetable crop produce, writing and organizing them in a systematicway in a file.
6. Visits to horticulture universities, research organizations; storage, processing industries in public or private sector; industries making value added products ofvegetables etc.
7. Invited lectures and presentations on related topics by field/industrial experts.

Model Question Paper Pattern for Practical Examination

Semester – V/ Botany Skill Enhancement Course

Vegetable Crops – Post Harvest Practices

Max. Time: 3 Hrs. Max. Marks: 50

1	Identification of organism(s) responsible for spoilage of vegetable 'A'	8
2	Assessment of quality and grading/ technique of packaging and protective treatment.	10
3	Estimation of carbohydrates/protein content in a vegetable sample 'C'	12
4	Scientific observation and data analysis D. Identification of harvesting stage E. Identification of equipment for processing F. Identification of PGR/chemical used for PHT of vegetables. G. Identification of a packaging material/value added product.	4 x 3 = 12
5	Record + Viva-voce	5+3 = 8

A.P. State Council of Higher Education
Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code:

Four-year B.Sc. (Hons)
Domain Subject: **BOTANY**
IV Year B. Sc. (Hons) – Semester – V

Max Marks: 100

Course 6C: Plant Tissue Culture

(Skill Enhancement Course (Elective), Credits: 05)

I. Learning Outcomes:

Students at the successful completion of the course will be able to:

1. Comprehend the basic knowledge and applications of plant tissue culture.
2. Identify various facilities required to set up a plant tissue culture laboratory.
3. Acquire a critical knowledge on sterilization techniques related to plant tissue culture.
4. Demonstrate skills of callus culture through hands on experience.
5. Understand the biotransformation technique for production of secondary metabolites.

II. Syllabus: (Hours: Teaching: 50, Lab: 30, Field training: 05, others incl. unit tests: 05)
(Syllabi of theory, practical and lab (skills) training together shall be completed in 80 hours)

Unit - 1: Basic concepts of plant tissue culture (10h)

1. Plant tissue culture: Definition, history, scope and significance.
2. Totipotency, differentiation, dedifferentiation, and redifferentiation; types of cultures.
3. Infrastructure and equipment required to establish a tissue culture laboratory.

Unit - 2: Sterilization techniques and culture media (10h)

1. Aseptic conditions – Fumigation, wet and dry sterilization, UV sterilization, ultrafiltration.
2. Nutrient media: Composition of commonly used nutrient culture media with respect to their contents like inorganic chemicals, organic constituents, vitamins, amino acidsetc.
3. Composition and preparation of Murashige and Skoog culture medium.

Unit - 3: Callus culture technique (10h)

1. Explant: Definition, different explants for tissue culture: shoot tip, axillary buds, leafdiscs, cotyledons, inflorescence and floral organs, their isolation and surface

sterilization; inoculation methods.
2. Callus culture: Definition, various steps in callus culture.
3. Initiation and maintenance of callus - Growth measurements and subculture; somaclonal variations.

Unit – 4: Micropropagation [10h]

1. Direct and indirect morphogenesis, organogenesis, role of PGRs; somaticembryogenesis and synthetic seeds.
2. Greenhouse hardening unit operation and management; acclimatization and hardeningof plantlets - need, process, packaging, exports.
3. Pathogen (Virus) indexing- significance, methods, advantages, applications.

Unit – 5: Applications of plant tissue culture [10h]

1. Germplasm conservation: cryopreservation methods, slow growth, applications andlimitations; cryoprotectants.
2. Plant transformation techniques and bioreactors; production of secondary metabolites-optimization of yield, commercial aspects, applications, limitations.
3. Transgenic plants- gene transfer methods; BT cotton.

III.References:

1. Kalyan Kumar De (2001) An Introduction to Plant Tissue Culture, New Central Book Agency (P) Ltd., Calcutta
2. Razdan, M.K. (2005) Introduction to Plant Tissue Culture, Oxford & IBH Publishers, Delhi
3. Bhojwani, S.S. (1990) Plant Tissue Culture: Theory and Practical (a revised edition). Elsevier Science Publishers, New York, USA.
4. Vasil, I.K. and Thorpe, T.A. (1994) Plant Cell and Tissue Culture. Kluwer Academic Publishers, the Netherlands.
5. Web resources suggested by the teacher concerned and the college librarian includingreading material.

Course 6C: Plant Tissue Culture – Practical syllabus

IV. Learning Outcomes: On successful completion of this practical course, student will be able to:

1. List out, identify and handle various equipment in plant tissue culture lab.
2. Learn the procedures of preparation of media.
3. Demonstrate skills on inoculation, establishing callus culture andMicro propagation.
4. Acquire skills in observing and measuring callus growth.
5. Perform some techniques related to plant transformation for secondaryMetabolite production.

V. Practical (Laboratory) Syllabus: (30 hrs)

1. Principles and applications of- Autoclave, Laminar Airflow, Hot Air Oven.
2. Sterilization techniques for glass ware, tools etc.,
3. MS medium - Preparation of different stock solutions; media preparation
4. Explant preparation, inoculation and initiation of callus from carrot.
5. Callus formation, growth measurements.
6. Induction of somatic embryos, preparation of synthetic seeds.
7. Multiplication of callus and organogenesis.
8. Hardening and acclimatization in green house.

VI. Lab References:

1. Reinert, J. and M.M. Yeoman, 1982. Plant Cell and Tissue Culture - A Laboratory
2. Manual, Springer-Verlag Berlin Heidelberg
3. Robert N. Trigiano and Dennis J. Gray, 1999. Plant Tissue Culture Concepts and Laboratory Exercises. CRC Press, Florida
4. Ashok Kumar, 2018. Practical Manual for Biotechnology, College of Horticulture & Forestry, Jhalawar, AU, Kota
5. Chawla, H.S., 2003. Plant Biotechnology: A Practical Approach, Nova Science Publishers, New York
6. Web sources suggested by the teacher concerned.

VII. Co-Curricular Activities:

a) **Mandatory:** *(Lab/field training of students by teacher: Lab: 10 + field: 05 hours)*

1. **For Teacher**: Training of students by teacher in the laboratory/field for a total of not less than 15 hours on the field techniques/skills of sterilization procedures, preparation of media, establishment of callus culture, growth measurements; morphogenesis and organogenesis; acclimatization and hardening of plantlets.
2. **For Student**: Students shall (individually) visit anyone of plant tissue culture laboratories in universities/research organizations/private facilities, write their observations on tools, techniques, methods and products of plant tissue culture; and submit a hand-written Fieldwork/Project work Report not exceeding 10 pages to the teacher in the given format.
3. Max marks for Fieldwork/Project work Report: 05
4. Suggested Format for Fieldwork/Project work Report: Title page, student details, index page, details of place visited, observations, findings and acknowledgements.
5. Unit tests (IE).

b) **Suggested Co-Curricular Activities:**

1. Training of students by related industrial experts.
2. Assignments (including technical assignments like identifying tools in plant tissue culture and their handling, operational techniques with safety and security, IPR)
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Preparation of videos on tools and techniques in plant tissue culture.
5. Collection of material/figures/photos related to products of plant tissue culture,writing and organizing them in a systematic way in a file.
6. Visits to plant tissue culture/biotechnology laboratories in universities, researchorganizations, private firms, etc.
7. Invited lectures and presentations on related topics by field/industrial experts

Model Question Paper Pattern for Practical Examination

Semester – V/ Botany Skill Enhancement Course

Plant Tissue Culture

Max. Time: 3 Hrs. Max. Marks: 50

1	Demonstration of a sterilization technique 'A'	8
2	Preparation of MS medium 'B'	10
3	Demonstration of callus culture technique/growth measurements 'C'	12
4	Scientific observation and data analysis D. Tissue culture equipment /photograph E. Morphogenesis or organogenesis - photograph F. Bioreactor/Secondary metabolite G. Transgenic plant/photograph	4 x 3 = 12
5	Record + Viva-voce	5+3 = 8

A.P. State Council of Higher Education
Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code:

Four-year B.Sc. (Hons)
Domain Subject: **BOTANY**
IV Year B. Sc. (Hons) – Semester – V

Max Marks: 100

Course 7C: Mushroom Cultivation

(Skill Enhancement Course (Elective), Credits: 05)

I. Learning Outcomes:

Students at the successful completion of the course will be able to:

1. Understand the structure and life of a mushroom and discriminate edible and poisonousmushrooms.
2. Identify the basic infrastructure to establish a mushroom culture unit.
3. Demonstrate skills preparation of compost and spawn.
4. Acquire a critical knowledge on cultivation of some edible mushrooms.
5. Explain the methods of storage, preparation of value-added products and marketing.

II. Syllabus: (Hours: Teaching: 50, Lab: 30, Field training: 05, others incl. unit tests: 05)
(Syllabi of theory, practical and lab (skills) training together shall be completed in 80 hours)

Unit – 1: Introduction and value of mushrooms (10h)

1. Mushrooms: Definition, structure of a mushroom and a brief account of life cycle; historical account and scope of mushroom cultivation; difference between edible andpoisonous mushrooms.
2. Morphological features of any four edible mushrooms, Button mushroom (*Agaricus Bosporus*), Milky mushroom (*Calocybe indica*), Oyster mushroom (*Pleurotus sajor-caju*) and Paddy straw mushroom (*Volvariella volvacea*).
3. Nutraceutical value of mushrooms; medicinal mushrooms in South India - *Ganodermalucidum, Pheilinus rimosus, Pleurotus florida and Pleurotus pulmonaris* – their therapeutic value; Poisonous mushrooms - harmful effects.

Unit – 2: Basic requirements of cultivation system (10h)

1. Small village unit and larger commercial unit; layout of a mushroom farm - location of building plot, design of farm, bulk chamber, composting, equipment and facilities, pasteurization room and growing rooms.
2. Compost and composting: Definition, machinery required for compost making, materialsfor compost preparation.
3. Methods of composting- long method of composting and short method of composting.

Unit – 3: Spawning and casing (10h)

1. Spawn and spawning: Definition, facilities required for spawn preparation; preparation ofspawn substrate.
2. Preparation of pure culture, media used in raising pure culture; culture maintenance,storage of spawn.
3. Casing: Definition, Importance of casing mixture, Quality parameters of casing soil, different types of casing mixtures, commonly used materials.

Unit – 4: Mushroom cultivation [10h]

Raw material, compost, spawning, casing, cropping and problems in cultivation (diseases, pests and nematodes, weed molds and their management strategies), picking and packing for any Four of the following mushrooms:

(a) Button mushroom (b) Oyster mushroom (c) Milky mushroom and (d) Paddy straw mushroom

Unit – 5: Post harvest technology [10h]

1. Shelf life of mushrooms; preservation of mushrooms - freezing, dry freezing, drying and canning.
2. Quality assurance and entrepreneurship - economics of different types of mushrooms;value added products of mushrooms.
3. Management of spent substrates and waste disposal of various mushrooms.

III. References:

1. Tewari Pankaj Kapoor, S. C. (1988). Mushroom Cultivation. Mittal Publication, New Delhi.
2. Pandey R.K, S. K Ghosh, (1996). A Hand Book on Mushroom Cultivation. Emkey Publications
3. Nita Bhal. (2000). Handbook on Mushrooms (Vol. I and II). Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi
4. Pathak, V. N. and Yadav, N. (1998). Mushroom Production and Processing Technology. Agrobios, Jodhpur.
5. Tripathi, D.P. (2005) Mushroom Cultivation, Oxford & IBH Publishing Co. Pvt. Ltd, New Delhi.
6. Pathak V.N., Nagendra Yadav and Maneesha Gaur (2000). Mushroom Production and Processing Technology Vedams Ebooks Pvt. Ltd., New Delhi
7. Web resources suggested by the teacher concerned and the college librarian includingreading material.

4

Course 7C: Mushroom Cultivation – Practical syllabus

IV. Learning Outcomes: On successful completion of this practical course, student will be able to:

1. Identify and discriminate different mushrooms based on morphology.
2. Understand facilities required for mushroom cultivation.
3. Demonstrate skills on preparation of spawn, compost and casing material.
4. Exhibit skills on various cultivation practices for an edible mushroom.

V. Practical (Laboratory) Syllabus: (30 hrs)

1. Identification of different types of mushrooms.
2. Preparation of pure culture of an edible mushroom.
3. Preparation of mother spawn.
4. Production of planting spawn and storage.
5. Preparation of compost and casing mixture.
6. Demonstration of spawning and casing.
7. Hands on experience on cropping and harvesting.
8. Demonstration of storage methods.
9. Preparation of value-added products.

VI. Lab References:

1. Sushma Sharma Sapna Thakur Ajar Nath Yadav, 2018. Mushroom Cultivation: A Laboratory Manual, Eternal University, Sirmour, H.P.
2. Kadhila-Muandingi, N.P., F. S. Mubiana and K. L. Haiueendo, 2012. Mushroom Cultivation: A Beginners Guide, The University of Namibia
3. Gajendra Jagatap and Utpal Dey, 2012. Mushroom Cultivation:Practical Manual, LAMBERT Academic Publishing, Saarbrücken, Germany
4. Deepak Som, 2021. A Practical Manual on Mushroom Cultivation, P.K.Publishers & Distributors, Delhi
5. Web sources suggested by the teacher concerned.

VII. Co-Curricular Activities:

a) **Mandatory:** *(Lab/field training of students by teacher: Lab: 10 + field: 05 hours)*

1. **For Teacher**: Training of students by teacher in the laboratory/field for not less than 15 hours on the field techniques/skills of identification of edible and poisonous mushrooms, basic facilities of a mushroom culture unit, preparation of compost and spawn, cultivation practices of edible mushrooms, storage and marketing of produce
2. **For Student**: Students shall (individually) visit mushroom culture units in universities/research organizations/private sector write their observations on infrastructure, cultivation practices and products of a mushroom culture unit etc., and submit to the teacher a hand-written Fieldwork/Project work Report not exceeding 10 pages in the given format.
3. Max marks for Fieldwork/Project work Report: 05.
6. Suggested Format for Fieldwork/Project work Report: Title page, student details, index page, details of place visited, observations, findings and acknowledgements
4. Unit tests (IE)

b) **Suggested Co-Curricular Activities:**

1. Training of students by related industrial experts.
2. Assignments (including technical assignments like identifying various mushrooms, tools and techniques for culture, identification and control of diseases etc.,
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Preparation of videos on tools and techniques in mushroom culture.
5. Collection of material/figures/photos related to edible and poisonous mushrooms,cultivation of mushrooms in cottage industries, writing and organizing them in a systematic way in a file.
6. Visits to mushroom culture units in universities, research organizations, private firms,etc.
7. Invited lectures and presentations on related topics by field/industrial experts.

Model Question Paper Pattern for Practical Examination

Semester – V/ Botany Skill Enhancement Course

Mushroom Cultivation

Max. Time: 3 Hrs. Max. Marks: 50

1. Demonstration of preparing pure culture/mother spawn 'A' 8
2. Preparation method for planting spawn and storage/compost and casing material 'B' 10
3. Demonstration of spawning and casing/storage and making a value-added product 'C' 12
4. Scientific observation and data analysis 4 x 3 = 12
   D. Edible/poisonous mushroom specimen/photograph
   E. Infrastructure/tool used in mushroom cultivation
   F. Material for compost/casing
   G. Storage practice/ a value-added product
5. Record + Viva-voce 5+3 = 8

A.P. State Council of Higher Education
Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code:

Four-year B.Sc. (Hons)
Domain Subject: **BOTANY**
IV Year B. Sc. (Hons) – Semester – V

Max Marks: 100

Course 6D: Gardening and Landscaping

(Skill Enhancement Course (Elective), Credits: 05)

I. Learning Outcomes:

Students at the successful completion of the course will be able to:

1. Acquire a critical knowledge about the aesthetic value, types and styles of gardens.
2. Perform filed operations in a garden by understanding the role of a gardener.
3. Identify various ornamental plants and explain the growth habits.
4. Propagate garden plants through various propagation techniques.
5. Demonstrate skills of designing and developing a garden.

II. Syllabus: (Hours: Teaching: 50, Lab: 30, Field training: 05, others incl. unit tests: 05]
(Syllabi of theory, practical and lab (skills) training together shall be completed in 80 hours)

Unit -1: Basics of Gardening [10h]

1. Garden and gardening: Definitions, objectives and scope; types of gardens (domesticgarden, Flower garden, woodland garden, rock garden, water garden and herb and vegetable garden).
2. Speciality gardens (vertical garden, roof garden and scented garden); principles ofgardening; garden components and adornments;
3. Styles of garden: formal, informal, free style and wild; some famous gardens of India.

Unit -2: Garden operations [10h]

1. Bio-aesthetic planning, eco-tourism, theme parks, indoor gardening, therapeutic gardening.
2. Gardening operations: soil laying, manuring, watering, management of pests and diseasesand harvesting.
3. Lawn making, methods of designing rockery and water garden.

Unit-3: Ornamental plants [10h]

1. Ornamental plants: flowering annuals and perennials; climbers and creepers; shade andornamental trees.

2. Bulbous and foliage ornamental plants; cacti and succulents; palms, ferns.
3. Bonsai: definition, types and styles, art of making bonsai.

Unit-4: Propagation techniques (10h)

1. Propagation of ornamental plants by rhizomes, corms tubers, bulbs and bulbils.
2. Vegetative propagation techniques – a brief account of cuttings, layering and grafting.
3. Types of seed beds; sowing of seeds and raising seedlings, transplanting of seedlings;growing plants in pots, potting and repotting.

Unit-5: Landscaping (10h)

1. Landscaping: definition, landscaping of parks and public gardens.
2. Urban planning and planting avenues; Landscaping highways and educationalinstitutions; beautifying villages and colonies.
3. Computer Aided Designing (CAD) for outdoor and indoor-scaping.

III. References:

1. Bose T.K. and Mukherjee, D., 1972, Gardening in India, Oxford & IBH Publishing Co., New Delhi.
2. Sandhu, M.K. 1989 Plant Propagation, Wiley Eastern Ltd., Bengaluru.
3. Nambisan, K. M. P. 1992. Design Elements of Land Scape Gardening Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
4. Bose, T. K. Maiti, R. G. Dhua, R.S and Das, P. 2004. Floriculture and Landscaping. Nayaprakash, Calcutta.
5. Arora, J.S. 2006. Introductory Ornamental Horticulture. Kalyani Publishers, Ludhiana.
6. Web resources suggested by the teacher concerned and the college librarian includingreading material.

Course 6D: Gardening and Landscaping – Practical syllabus

IV. Learning Outcomes: On successful completion of this practical course, student will be able to:

1. Perform various skills related to gardening.
2. Identify the living and non-living components required for garden development.
3. Identify the pests and diseases of garden plants and control the same.
4. Demonstrate skills of making bonsai and developing lawn.
5. Make landscape design using CAD.

V. Practical (Laboratory) Syllabus: (30 hrs)

1. Preparation of beds for growing nursery of herbs, shrubs and trees.
2. Tools, implements and containers used for propagation and nursery techniques.
3. Identification of different ornamental plants.
4. Demonstration of types and styles of gardens using photos or videos.
5. Gardening operations: soil laying, manuring, watering.
6. Identification of pathogenic and non-pathogenic diseases of garden plants andgrasses.
7. Propagation by cutting, layering, budding and grafting.
8. Planning and designing of gardens, functional uses of plants in the landscape.
9. Preparation of land for lawn and planting.
10. Exposure to CAD (Computer Aided Designing)
11. Demonstration of bonsai making.
12. Making of topiaries.

VI. Lab References:

1. Paul Wagland, 2011. Garden Landscaping Manual: A Step-by-Step Guide to Landscaping & Building Projects in Your Garden, Haynes Publishing UK
2. Misra Kaushal Kumar, 2016. Practical Manual of Horticulture, Biotech Books, Open Library.org
3. Hemla Naik, B., S.Y. Chandrashekhar and M. Jawaharlal, 2013. Principles of Landscape Gardening, TNAU, Agrimoon.Com.
4. Web sources suggested by the teacher concerned.

VII.

VIII. Co-Curricular Activities:

a) Mandatory: (*Lab/ field training of students by teacher: (Lab: 10 + field: 05 hours*)

1. **For Teacher:** Training of students by the teacher in the laboratory/field for a total of not less than 15 hours on the field techniques/skills of garden operations, lawn making, art of bonsai, plant propagation methods, Using CAD.
2. **For Student:** Students shall (individually) visit the parks in public and private places, study the living and non-living elements of gardening – landscaping; write their observations (on various plants, growth habit, propagation, design of garden etc.,) andsubmit a hand-written Fieldwork/Project work Report not exceeding 10 pages in the given format to the teacher.
3. Max marks for Fieldwork/Project work Report: 05
4. Suggested Format for Fieldwork/Project work Report: Title page, student details, index page, details of place(s) visited, observations, findings, and acknowledgements.
5. Unit tests (IE).

b) Suggested Co-Curricular Activities:

1. Training of students by related industrial experts.
2. Assignments (including technical assignments like identifying ornamental plants,types and styles of gardens, propagation of garden plants, landscaping)
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Preparation of videos on plant propagation, garden operations, ornamental gardening.
5. Collection of material/figures/photos related to gardening and landscaping, writingand organizing them in a systematic way in a file.
6. Visits to gardens and parks in public places and/or private firms; famous gardens in A.P. and India etc.
7. Invited lectures and presentations on related topics by field/industrial experts.

Model Question Paper Pattern for Practical Examination

Semester – V/ Botany Skill Enhancement Course

Gardening and Landscaping

Max. Time: 3 Hrs. Max. Marks: 50

1	Demonstration a vegetative propagation technique 'A'	8
2	Demonstration of bed making/ garden operations' 'B'	10
3	Demonstration of bonsai technique/ designing a landscape 'C'	12
4	Scientific observation and data analysis	4 x 3 = 12
	D. Type or style of garden	
	E. Ornamental plant	
	F. Garden adornments	
	G. Pest or disease of garden plants	
5	Record + Viva-voce	5+3 = 8

A.P. State Council of Higher Education
Semester-wise Revised Syllabus under CBCS, 2020-21

Course Code:

Four-year B.Sc. (Hons)
Domain Subject: **BOTANY**
IV Year B. Sc. (Hons) – Semester – V

Max Marks: 100

Course 7D: Agroforestry

(Skill Enhancement Course (Elective), Credits: 05)

I. Learning Outcomes:

Students at the successful completion of the course will be able to:

1. Understand the concepts and economic value of agroforestry.
2. Acquire a critical knowledge on systems and design of agroforestry.
3. Explain silviculture practices in relation to agroforestry.
4. Understand the role of agroforestry to reclaim the waste lands.
5. Perform skills in relation to tree measurement techniques.

II. Syllabus: (Hours: Teaching: 50, Lab: 30, Field training: 05, others incl. unit tests: 05]
[Syllabi of theory, practical and lab (skills) training together shall be completed in 80 hours]

Unit-1: Basic concepts of Agroforestry (10h]

1. Forest and Agroforestry. Definition, objectives, scope and advantages of agroforestry;classification of agroforestry; differences between social forestry and agroforestry.
2. Agroforestry practices as existing in India and Andhra Pradesh.
3. Criteria for selection and screening of tree species; design and diagnosis methodologyin relation to agroforestry.

Unit-2: Systems of Agroforestry (10h]

1. Global agroforestry system: shifting cultivation, taungya cultivation, shelter belt andwind breaks, and energy plantation and homestead gardens.
2. Multipurpose tree species and their characteristics; criteria for selection of agroforestry design, role tree architecture and management in agroforestry.
3. Alley cropping, high density short rotation plantation systems, silicultural woodlots,energy plantations.

Unit-3: Silviculture of Agroforestry trees (10h)

1. Silviculture: Definition, objectives and scope and its place in agroforestry.
2. Choice of species, site selection, and pure verses mixed crop, planting techniques andmethods, protection of seedlings/ plantations from environmental and biological adversaries, tending operations, concept of coppice etc.
3. Silviculture of agroforestry trees with special reference to: (a) *Azadirachta indica*, (b) *Tectona grandis* (c) *Emblica officinalis* and (d) *Tamarindus indica*.

Unit-4: Waste land reclamation (10h)

1. Wasteland definition, types: ecological characteristics, landslides, soil erosion, floods,drought, salinity, water logging and fire.
2. Biological causes of deforestation, grazing, shifting cultivation and faulty agricultural practices.
3. Reclamation of wastelands, scientific land use practices, afforestation, soil conservation practices, improvement of water catchment areas and development ofrecreational and amenity areas.

Unit-5: Measurements in Agroforestry (10h)

1. Tree measurement techniques: Instruments and methods for measurement of treediameter, height, bark thickness, crown volume crown surface area.
2. Tree stem form, yield tables, volume tables, concept of sustained yield, and kind oftree rotation, increment and yield; estimation of biomass.
3. Determination of tree age and introduction of working plan.

III. References:

1. Dwivedi, A.P. 1992. Agroforestry: Principles and Practices. Oxford & IBH
2. Nair, P.K.R. 1993. An Introduction to Agroforestry. Kluwer.
3. Nair P.K.R., M.R. Rai and L.E.Buck, 2004. New Vistas in Agroforestry. Kluwer
4. Rajeshwar Rao G., M. Prabhakar, G. Venkatesh, I. Srinivas and K. Sammi Reddy (2018) Agroforestry Opportunities for Enhancing Resilience to Climate Change in Rainfed Areas, ICAR-CRIDA, Hyderabad
5. Young, A. 1997. Agroforestry for Soil Management. CABI
6. Web resources suggested by the teacher concerned and the college librarian includingreading material.

Course 7D: Agroforestry – Practical syllabus

IV. Learning Outcomes: On successful completion of this practical course, student will be able to:

1. Identify suitable tree species for agroforestry and their products.
2. Demonstrate skills on raising tree species from seeds and by vegetative propagation.
3. Perform skills on measurements related to wood-based products.
4. Estimate biomass in an energy plantation.

V. Practical (Laboratory) Syllabus: (30 hrs)

1. Identification of agroforestry tree-species.
2. Identification of important major and minor agroforest products.
3. Collection and maintenance of agro-forest products and herbarium
4. Nursery lay out seed sowing and pre-sowing seed treatments.
5. Vegetative propagation techniques – hard wood cuttings and air layering.
6. Diameter measurements using callipers and tape; diameter measurements offorked, buttressed, fluted and leaning trees.
7. Height measurement of standing trees by shadow method, single pole method andhypsometer.
8. Volume measurement of logs using various formulae.
9. Biomass estimation in energy plantations.

VI. Lab References:

1. Meena, R. N. and R.K. Singh, 2014. A Practical Manual on Agroforesty, Srijan Samiti Publication, Varanasi
2. Dadhwal, K.S., P.Panwar, R.Kaushal, H.S.Sarao and R.Chauhan, 2014.Practical Manual on Agroforestry, Jaya Publishing House, Delhi

3 Sen, N. L., R. C. Dadheech, L. K. Dashora and T. S. Rawat, 2010. Manual of Agroforestry and Social forestry, Agrotech Publishing Academy, Udaipur
4 Web sources suggested by the teacher concerned.

VII. Co-Curricular Activities:

a) Mandatory: (*Lab/ field training of students by teacher: (Lab: 10 + field: 05 hours)*

1. **For Teacher**: Training of students by the teacher in the laboratory/field for not less than 15 hours on techniques like selection and screening of tree species, design and diagnosis methodology in agroforestry, silviculture practices for some selected tree species and measurements in agroforestry.
2. **For Student**: Students shal (individually) visit to nurseries of forest department, agroforestry division in Horticulture university/research station, agroforest/silviculture sites, write their observations on nursery practices, various species grown in an agroforest, growth habit, cultivation practices, measurements, products etc., and submit to the teacher a hand-written Fieldwork/Project work Reportnot exceeding 10 pages in the given format.
3. Max marks for Fieldwork/Project work Report: 05
4. Suggested Format for Fieldwork/Project work Report: Title page, student details, index page, details of place visited, observations, findings and acknowledgements.
5. Unit tests (IE).

a) Suggested Co-Curricular Activities:

1. Training of students by related industrial experts.
2. Assignments (including technical assignments like criteria for selection of agroforestry tree species; silviculture practices in agroforests; measurements inagroforestry; economic, social, land use and cultural services of agroforestry)
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Preparation of videos on various agroforestry methods, silviculture practices, treemeasurement techniques etc.,
5. Collection of material/figures/photos related to agroforestry, writing and organizingthem in a systematic way in a file.
6. Visits to social forest nurseries, energy plantations and forest research centres; nearbyagro-forest based industries in A.P.
7. Invited lectures and presentations on related topics by field/industrial experts

Model Question Paper Pattern for Practical Examination

Semester – V/ Botany Skill Enhancement Course

Agroforestry

Max. Time: 3 Hrs.	Max. Marks: 50
1. Demonstration pre-sowing seed treatments 'A'	8
2. Demonstration of hard wood cutting/air layering technique 'B'	10
3. Demonstration of technique of diameter/height measurement 'C'	12
4. Scientific observation and data analysis	4 x 3 = 12
D. Agroforest plant	
E. Agroforest product	
F. A tool used for measurement	
G. A herbarium specimen collected by him/her for identification	
5. Record + Viva-voce	5+3 = 8

Suggested pattern for Question Paper of Theory Examination(s) at Semester end

Max. Time: 3 Hrs. Max. Marks: 75 M

Section – A

Answer all the following questions. **5 x 2 = 10 M**

- ✓ One question should be given from each Unit in the syllabus.

Section – B

Answer any Four of the following questions. Draw a labelled diagram wherever necessary

3 x 5 = 15 M

- ✓ One question should be given from each Unit in the syllabus.

Section – C

Answer any five of the following questions. Draw a labelled diagram wherever necessary

5 x 10 = 50 M

- ✓ Two questions (a & b) are to be given from each Unit in the syllabus (internal choice in each unit). Student has to answer 5 questions by choosing one from a set of questions given from a Unit.

Note: Questions should be framed in such a way to test the understanding, analytical and creative skills of the students. All the questions should be given within the frame work of the syllabus prescribed.

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2017-2018

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DEPARTMENT OF MATHEMATICS

MID-I EXAMINATIONS, SEMESTER-II, PAPER-II, FEB-2018

[SOLID GEOMETRY: PLANES, STRAIGHT LINES & SPHERES-I]

TIME :1 HOUR **MARKS :25**

ANSWER THE FOLLOWING ANY FIVE QUESTIONS

1. A Variable plane is at a constant distance 3p from the origin and meets the coordinate axes in A,B,C. Show that the locus of the centroid of ΔABC is $x^{-2} + y^{-2} + z^{-2} = p^{-2}$.
2. Find the equation of the planes through the intersection of the planes $x + 3y + 6 = 0$ *and* $3x - y - 4z = 0$ such that the perpendicular distances of each from origin is unity.
3. A variable plane is at a constant distance p from the origin and meets the coordinate axes in A,B,C.Show that the locus of centroid of tetrahedrawn OABC is $x^{-2} + y^{-2} + z^{-2} = 16p^{-2}$.
4. Find the equation of the plan passing through the intersection of the planes $x + 2y + 3z = 4, 2x + y - z + 5 = 0$ *and* perpendicular to the plane $5x + 3y + 6z + 8 = 0$.
5. Show that points are (0,-1,-1)(4,5,1)(3,9,4)(-4,4,4) are coplanar.
6. Find the equation of a plane passing through the point (4,4,0) and perpendicular to the planes $x + 2y + 2z - 5 = 0, 3x + 3y + 2z - 8 = 0$.

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DEPARTMENT OF MATHEMATICS

MID-I EXAMINATIONS, SEMESTER-IV, PAPER-V, AUG-2018.

(LINEAR ALGEBRA: VECTOR SPACES-I & II)

TIME : 1 HOUR **MAX.MARKS:25**

SECTION –A 1 x 10 = 10M

Answer any one questions . Each question carries 5 marks.

1. Prove that the necessary and sufficient condition for a non empty subset W of V(F) to be a subspace is $a,b \in F$ and $\alpha, \beta \in W \Rightarrow a\alpha+b\beta \in W$.
2. Let $W_1 and\ W_2$ be two subspaces of a Finite dimensional vector space V(F) Then $dim(W_1 + W_2) = dim(W_1) + dim(W_2) - dim(W_1 \cap W_2)$.

SECTION-B

Answer any 3 questions. Each question carries marks. 3x5=15 M

1. The set W of ordered traids (x,y,0) where $x, y \in F$ is a subspace of $V_3(F)$.
2. The intersection of any two subspaces $W_1 and\ W_2$ of vector spaces of V(F) is also a Subspace.
3. Express the vector $\alpha = (1,-2,5)$ as a linear combination of the vectors $\alpha_1 = (1,1,1), \alpha_2 = (1,2,3) and\ \alpha_3 = (2,-1,1)$.
4. If S is a subset of a vector space V(F) then prove that 1)S is a subspace of V(F) $\Leftrightarrow$ L(S) = S
   2) L(L(S)) = L(S).
5. State and prove INVARIENCE THEOREM.
6. Shoe that the set $\{(1,2,1),(2,1,0),(1,-1,2)\}$ forms a basis of $V_3(F)$

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DEPARTMENT OF COMMERCE

MID I EXAMINATIONS

SEMESTER- I

MARCH-2017-18

BUSINESS ECONOMICS

Time :1hour MaxMarks :25

SECTION-A

I. ఏదైనా రెండు ప్రశ్నలకు సమాధానం ఇవ్వండి 2x10=20.

1. ధరను పాత సిద్ధాంతం గురించి వివరించుము.
2. వ్యాపార చక్రాలు వివిధములు గు కారణాలు గురించి రాయుము.
3. కీనేసియన్ ద్రవ్యోపాది సిద్ధాంతాన్ని వివరించండి మరియు మినహాయింపులను వివరించండి.

SECTION-B

II. ఏదైనా ఒక ప్రశ్నకు సమాధానం రాయుము 1x5=5

1. ధర వ్యాకోచము అనగానేమి
2. లర్నర్ కార్యకలాపాలను వివరించుము
3. ఉత్పత్తి వలయమును వివరించండి.

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DEPARTMENT OF COMMERCE

MID I EXAMINATIONS

SEMESTER- II

MARCH-2017-18

BUSINESS STATISTICS

Time :1hour MaxMarks :25

SECTION-A

I. ఏదైనా రెండు ప్రశ్నలకు సమాధానం ఇవ్వండి 2x10=20

1. గణాంక శాస్త్రం అనే గణాంక శాస్త్రం అనగానేమి? లక్షణాలు మరియు ప్రయోజనాల గురించి వివరించండి.
2. ప్రశ్నావళి మరియు షెడ్యూల్ గురించి వివరించండి
3. ప్రాథమిక దత్తాంశాలు ద్వితీయ దత్తాంశం కు మధ్య గల వ్యత్యాసం వివరించండి.

SECTION-B

II. ఏదైనా ఒక ప్రశ్నకు సమాధానం రాయుము 1x5=5

1. తరగతి అంతరము అనగానేమి ఉదాహరణలు ఇవ్వు
2. సూచి సంఖ్య అంటే ఏమిటి?
3. వ్యాపార చక్రము అనగానేమి?

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GOVERNMENT DEGREE COLLEGE,NARASANNAPETA

DEPARTMENT OF POLITICAL SCIENCE

MID-1 EXAMINATIONS, SEMESTER-I -2018-19

Time: 1 Hour Max.Marks:

SECTION-A

Answer any ONE questions. Each question carries 10 marks. 1x10=10

1) Describe theory of separation of powers

2) Describe Basis features of federal form of government

3) Describe the classification of rights

SECTION-B

Answer any three questions. Each question carries 5 marks. 3x5=15

1) Explain theories of sovereignty

2) Explain Constitution

3) What are political rights

4) Explain judicial review

5) Describe unicameralism

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Govt. Degree college, Narasannapeta

Department of physics

MID-I Examinations, Semester-II

(Theory and oscillations)

Year: 2018-19 Duration: 1.25

Section A

I Answer any one of the following questions: 1x10=10

1. What are the physical characteristics of SHM

2- Explain the theory piezoelectric effect and magnetostriction.

Section B

II Answer any three questions. 3x5=15

1. Explain Relaxation time and Q-value.
2. What is critical damping. Give an example.
3. State the laws of vibrating strings
4. Explain SONAR and its uses.

T. Rajendra prasad
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Department of physics

MID-I Examinations, Semester-III

(Waves and oscillations)

Year: 2018-19 Max Marks: 25

Section A

I Answer any one of the following questions: 1X10=10

1 What are the physical characteristics of SHM

2- Explain the theory piezoelectric effect and magnetostriction.

Section B

II Answer any three Questions. 3X5 = 15

1. Explain Relaxation time and Q-value.
2. What is Critical damping. Give an example.
3. State the laws of vibrating strings
4. Explain SONAR and its uses.

T. Rajasekhar

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2019-20 Govt Degree College, Narasannapeta

Department of Chemistry

Sem - I PAPER-I Title : Inorganic, Organic chemistry

Marks : 25M MID-I Time : 1hr 30 min

Section - A

I Answer any one of the following questions. 1X10 = 10M

1) Explain synthesis and structure of diborane.
2) Write preparation and applications of silicones.

Section - B

II Answer any three questions. 3X5 = 15M

1) Higher boranes
2) Pseudo halogens
3) $B_3N_3H_6$
4) Silanes

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2019-20 Govt Degree College, Narasannapeta

Department of chemistry

Sem: II PAPER-I Title : Inorganic & Organic chemistry

Marks : 25M MSD-II Time : 1 hr 30min

Section-A

I Answer any one of the following Questions. 1X10 = 10M

1) Define Inductive effect and explain applications of it.

2) Explain Orientation of Benzene.

Section-B

I Answer any three Questions (3X5 = 15M)

1) Bond Polarization

2) Baeyer's Strain theory

3) Conformations of cyclobutane

4) Resonance of Benzene.

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GOVERNMENT DEGREE COLLEGE, NARASANNAPETA

DEPARTMENT OF POLITICAL SCIENCE

MID-1 EXAMINATIONS, SEMESTER-II -2019-20

Time: 1 Hour Max.Marks: 25

SECTION-A

Answer any ONE questions. Each question carries 10 marks. 1x10=10M

1) Explain the main features of the Indian Constitution
2) Explain the fundamental rights
3) Explain the Supreme court powers and functions

SECTION-B

Answer any three questions. Each question carries 5 marks. 3x5=15

1) Preamble
2) Central state relations
3) Unitary Government
4) Fundamental Duties
5) 1935 Indian Government Act

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B.Sc degree ... EXAMINATIONS -2020-21

ZOOLOGY, SEMESTER-V

Paper-V : Animal Biotechnology

Time: 3 hours ... Max. marks: 75

Section-A

Answer any one of the following questions. Each question carries 20 marks. 1×20=20

1. Give a detailed account of reproductive technologies in animals.
2. Describe the following:
   i) Embryo transfer
   ii) Transgenic fish
3. What is fermentation and explain different types of fermentation mechanisms?
4. Give an account of monoculture and polyculture in fishes.

Section-B

Answer any five of the following ... 5×11=55

5. Microinjection technique
6. DNA finger printing
7. Chromosome painting

Prof. In-charge

Govt. Degree College

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Lecturer in Zoology

Govt. Degree College

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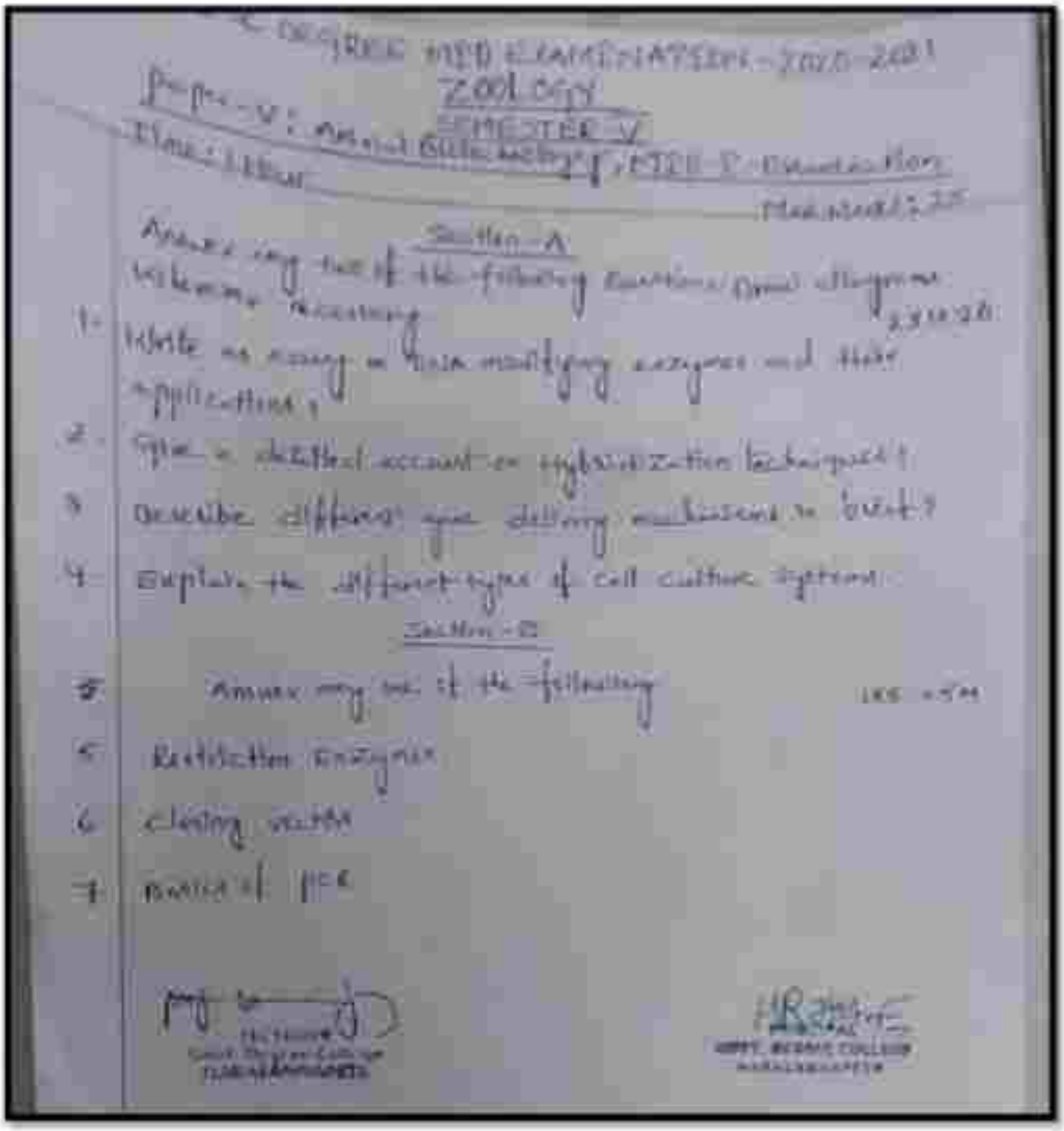

ZOOLOGY

SEMESTER V

Section - A

Section - B

Answer any two of the following

Answer any two of the following

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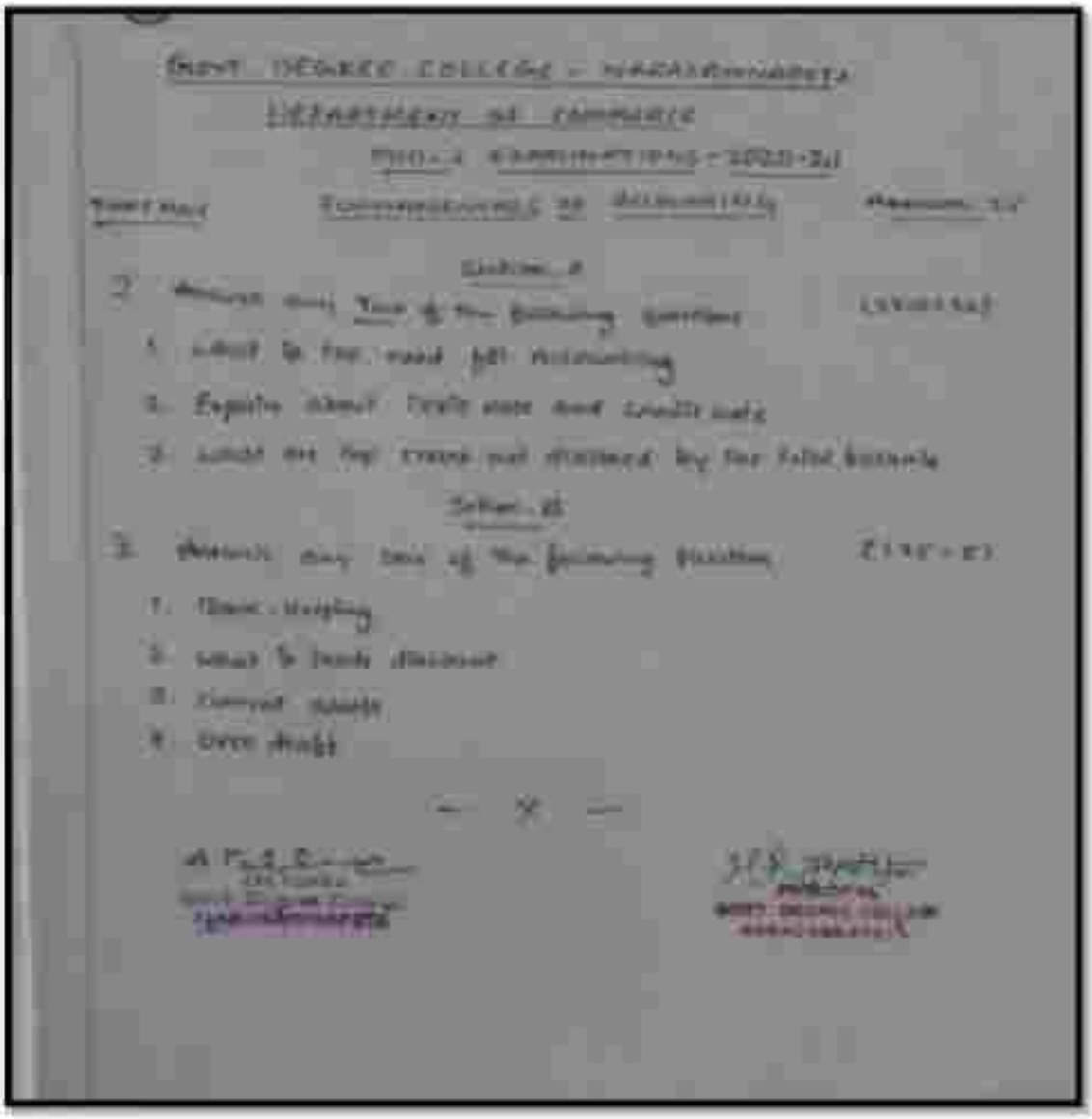

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DEPARTMENT OF MATHEMATICS

MID-I EXAMINATIONS, SEMESTER-I PAPER-I DEC 2022

(DIFFERENTIAL EQUATIONS)

Time: 1 Hour Max Marks: 20

SECTION-A

ANSWER ANY ONE QUESTION EACH QUESTION CARRIES 5 MARKS 1 x 5 = 5 M

1. Solve: [illegible]
2. Solve: [illegible]
3. Solve: [illegible]

SECTION-B

ANSWER ANY FIVE QUESTION. EACH QUESTION CARRIES 2 MARKS 5 x 2 = 10 M

1. Define Exact differential Equation
2. Solve: [illegible]
3. Solve: [illegible]
4. Solve: [illegible]
5. Solve: [illegible]
6. [illegible]
7. Solve: [illegible]

SECTION-C

ANSWER ALL QUESTIONS EACH QUESTION CARRIES ½ MARK 10 x 1/2 = 5 M

1. [illegible] ____________
2. [illegible] ____________
3. The general solution of [illegible] ____________
4. [illegible] ____________
5. General form of linear differential equation is ____________
6. General form of Bernoulli's differential equation is ____________
7. [illegible] ____________
8. [illegible] ____________
9. [illegible]
10. [illegible] ____________

[illegible]

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GOVERNMENT DEGREE COLLEGE, NARASANNAPETA

DEPARTMENT OF MATHEMATICS

MID-I EXAMINATIONS, SEMESTER-II, PAPER-II, APRIL-2022.

(SOLID GEOMETRY: PLANES, STRAIGHT LINES & SPHERES-I)

Time: 1 Hour **Max.Marks: 20**

SECTION-A

Answer any ONE questions. Each question carries 5 marks. **1 x 5 = 5 M**

1) A variable plane is at a constant distance p from the origin and meets the axes in A, B, C. Show that the centroid of the tetrahedron OABC is $x^{-2} + y^{-2} + z^{-2} = 16p^{-2}$.

2) Find the length and equations to the line of shortest distance between the lines $\frac{x-2}{3} = \frac{y-3}{4} = \frac{z-1}{2}$ and $\frac{x-4}{4} = \frac{y-5}{5} = \frac{z-2}{3}$.

3) Show that the circles $x^2 + y^2 + z^2 - y + 2z = 0$, $x - y + z - 2 = 0$ and $x^2 + y^2 + z^2 + x - 3z + 1 = 0$, $2x - y + 4z - 1 = 0$ lie on the same sphere and find its equation.

SECTION-B

Answer any FIVE questions. Each question carries 2 marks. **5 x 2 = 10 M**

1) Find the equation of the plane passing through the points (2, 2, 1), (9, 3, 6) and is perpendicular to the plane $2x + 6y + 6z = 9$.

2) Find the bisecting plane of acute angle between the planes $3x - 2y + 6z + 2 = 0$, and $2x - y + 3z + 2 = 0$.

3) Find the image of the point $(2, -1, 3)$ in the plane $3x - 2y + z = 9$.

4) Prove that the lines $\frac{x}{2} = \frac{y}{3} = \frac{z}{4}$ and $\frac{x-1}{3} = \frac{y-2}{4} = \frac{z-3}{5}$ are coplanar.

5) Find in symmetrical form the equation of the line $2x + 2y - z - 6 = 0 = 2x + 5y + z - 8$.

6) Find the equation to the sphere through origin and making intercepts a, b, c on the axes.

7) Find the centre and radius of the circle $x^2 + y^2 + z^2 - 2y - 4z - 11 = 0$; $x + 2y + 2z - 17 = 0$.

SECTION-C

Answer ALL questions. Each question carries 1/2 marks. **10 x 1/2 = 5 M**

1) A normal line is parallel to a plane (TRUE/FALSE)

2) Intersection of two planes represents a line (TRUE/FALSE)

3) Write the formula to find an angle between two planes .....

4) Write the condition for orthogonal spheres .....

5) Write the normal d/r's of the plane $3x - 5y + z + 9 = 0$.

6) Find k so that the lines $\frac{x+1}{-3} = \frac{y-2}{2k} = \frac{z-3}{2}$ and $\frac{x-1}{3k} = \frac{y-5}{1} = \frac{z+6}{7}$ are perpendicular.

7) Find K, if the radius of the sphere $x^2 + y^2 + z^2 + 6x - 8y - 8z - 0$ is 9.

8) Define skew lines.

9) Write the condition that a plane touches a Sphere .....

10) Define great circle.

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DEPARTMENT OF MATHEMATICS
MID-II EXAMINATIONS, SEMESTER-II, PAPER-II, MAY- 2022.

[SOLID GEOMETRY: SPHERES-II & CONES]

Time: 1 Hour | Max.Marks: 15

SECTION-A

Answer any ONE questions. Each question carries 5 marks. $1 \times 5 = 5$ M

1) Find the limiting points of the coaxial system of spheres determined by the spheres $x^2 + y^2 + z^2 + 4x + 2y + 2z + 1 = 0, x^2 + y^2 + z^2 + 2x - 4y - 2z + 1 = 0$.

2) Find the equation of the right circular cone whose vertex is $(1, 2, 1)$, axis line $\frac{x-3}{2} = \frac{y-2}{1} = \frac{z-1}{2}$ and semi vertical angle $30°$.

3) Prove that the angle between the lines of intersection of the plane $x + y + z = 0$ with the cone $ayz + bzx + cxy = 0$ is $\sec^{-1}\left(\frac{2f}{a} + \frac{2g}{b} + \frac{2h}{c}\right) = 0$.

SECTION-B

Answer any FIVE questions. Each question carries 2 marks. $5 \times 2 = 10$ M

1) S.T the the spheres $x^2 + y^2 + z^2 + 6y + 2z + 8 = 0$ & $x^2 + y^2 + z^2 + 6x + 8y + 4z + 20 = 0$ are orthogonal.

2) Show that the spheres $x^2 + y^2 + z^2 - 2x - 4y - 6z - 58 = 0$ and $x^2 + y^2 + z^2 - 10x + 2y + 18z + 82 = 0$ touch externally at the point $\left(\frac{46}{19}, \frac{4}{19}, \frac{-25}{19}\right)$.

3) Explain about touching of two spheres with diagrams.

4) Find the general equation to a cone containg three coordinate axes.

5) Show that the line $x = -y = -z$ is a generator of the cone $5yz + 8zx + 3xy = 0$.

6) Show that the reciprocal cone of $ax^2 + by^2 + cz^2 = 0$ is the cone $\frac{yz}{a} + \frac{zx}{b} + \frac{xy}{c} = 0$.

7) Find the condition that the plane $lx + my + nz = p$ may touch the cone $2x^2 - 3y^2 + z^2 = 0$ and also find the equation of its reciprocal cone.

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GOVERNMENT DEGREE COLLEGE,NARASANNAPETA

DEPARTMENT OF POLITICAL SCIENCE

MID-3 EXAMINATIONS, SEMESTER-I, NOV 2022

Time: 2 Hour Max.Marks: 30

SECTION-A

Answer any ONE questions. Each question carries 5 marks. 1x5=5M

1) Define Political Science

2) Rousseau's general will

3) Locke's theory of Natural rights

SECTION-B

Answer any FIVE questions. Each question carries 2 marks. 2x5=10

1) Modern Approach

2) Historical Approach

3) Natural right theory

4) Political Rights

5) Economic Equal

6) Power

SECTION-C

Answer ALL questions. Each question carries 1 marks. 1x5=5 Marks

1)Man is a Social animal_____

2)The Author of the Capital is_____

3)Leviathan was written by_____

4)The Father of Sovereign Nicolaus is_____

5) The author of "The Social Contracts"_____

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DEPARTMENT OF COMMERCE

MID-I EXAMINATIONS, 2021-22

Financial Accounting

Time: 1 Hour Max Marks: 25

SECTION-A

(I) Answer any One of the following Questions (1×5=5)

1. What are the objects of providing depreciation
2. What are the types of provision
3. What is meant by Bill of Exchange

SECTION-B

(II) Answer any Five of the following Questions (5×2=10)

1. [illegible]
2. Promissory note
3. Renewal of the bill
4. Straight line method
5. Joint venture
6. [illegible] and [illegible]

SECTION-C

(III) Answer any all questions each question carries [illegible] marks (5×1=5)

1. Consignment
2. Consignee
3. Consignor
4. Proforma Invoice
5. [illegible]

A.P. [illegible]
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[illegible]
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CONTINUOUS INTERNAL ASSESSMENT

2017-2018

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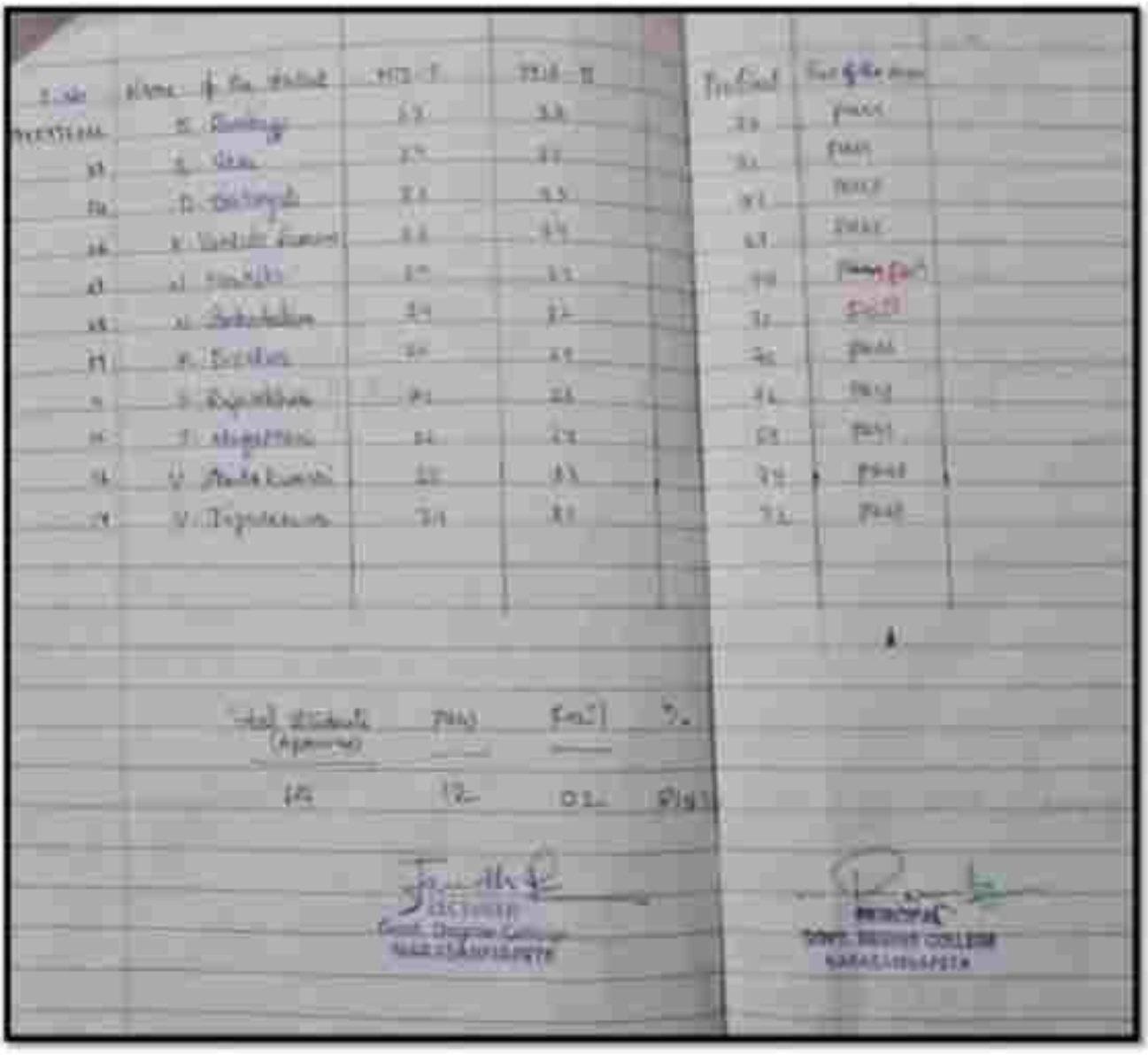

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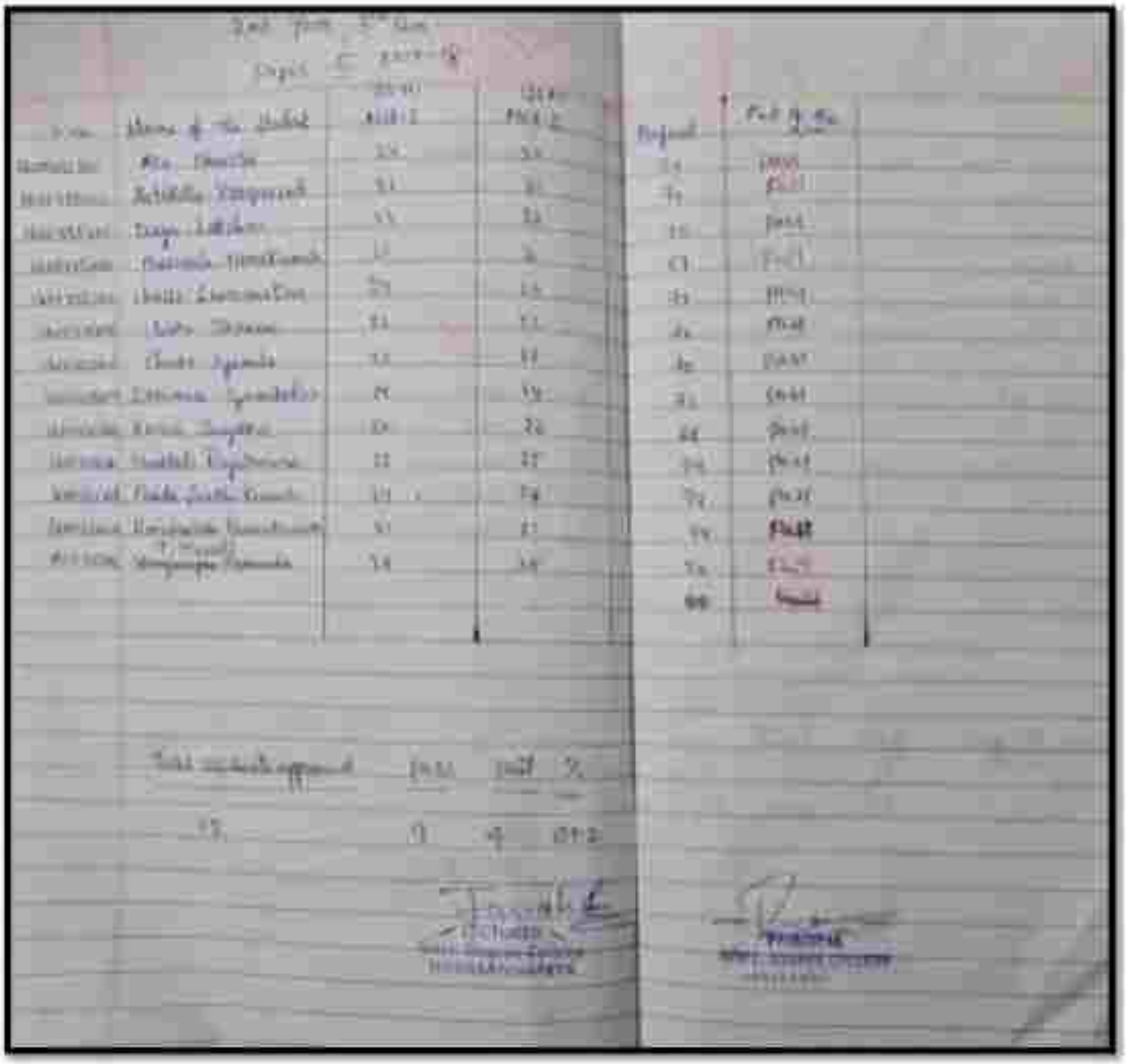

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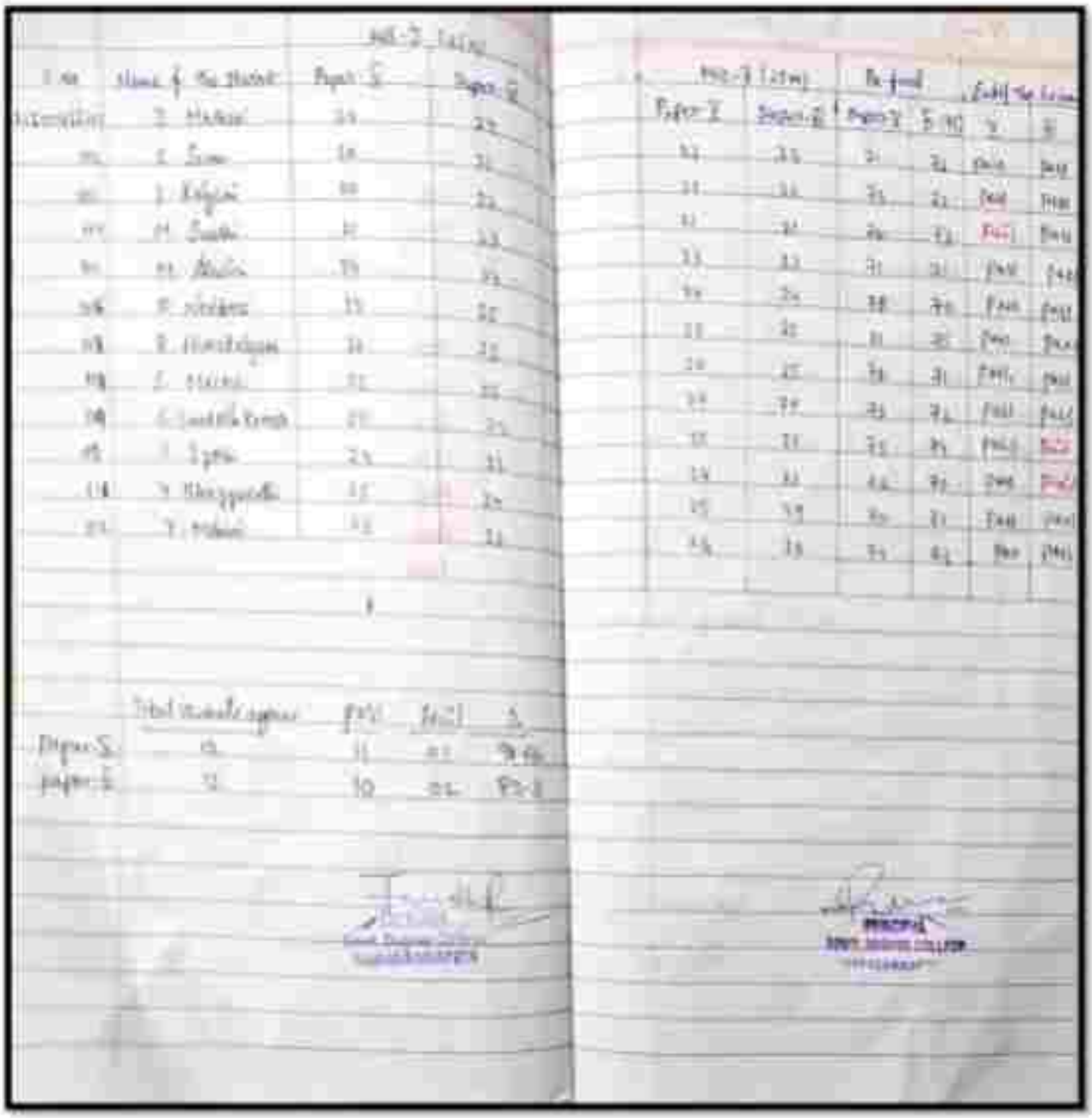

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Name of the student	Mid-I	Mid-II
B. Rambabji	22	24
B. Vasu	24	21
D. Geetanjali	23	23
K. VenkataRao	24	24
N. Mounika	23	24
N. Shankaralingam	24	24
P. Duvakar	21	23
S. Rajasekhar	21	24
T. Nagamani	23	25
V. Anitakumari	25	25
V. Jagadeesh	21	23

At the End of 2nd Sem

Total Appeared = 11
Passed = 05

$\frac{5}{11} \times 100 = 45.4$

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CONTINUOUS INTERNAL ASSESSMENT

2018-2019

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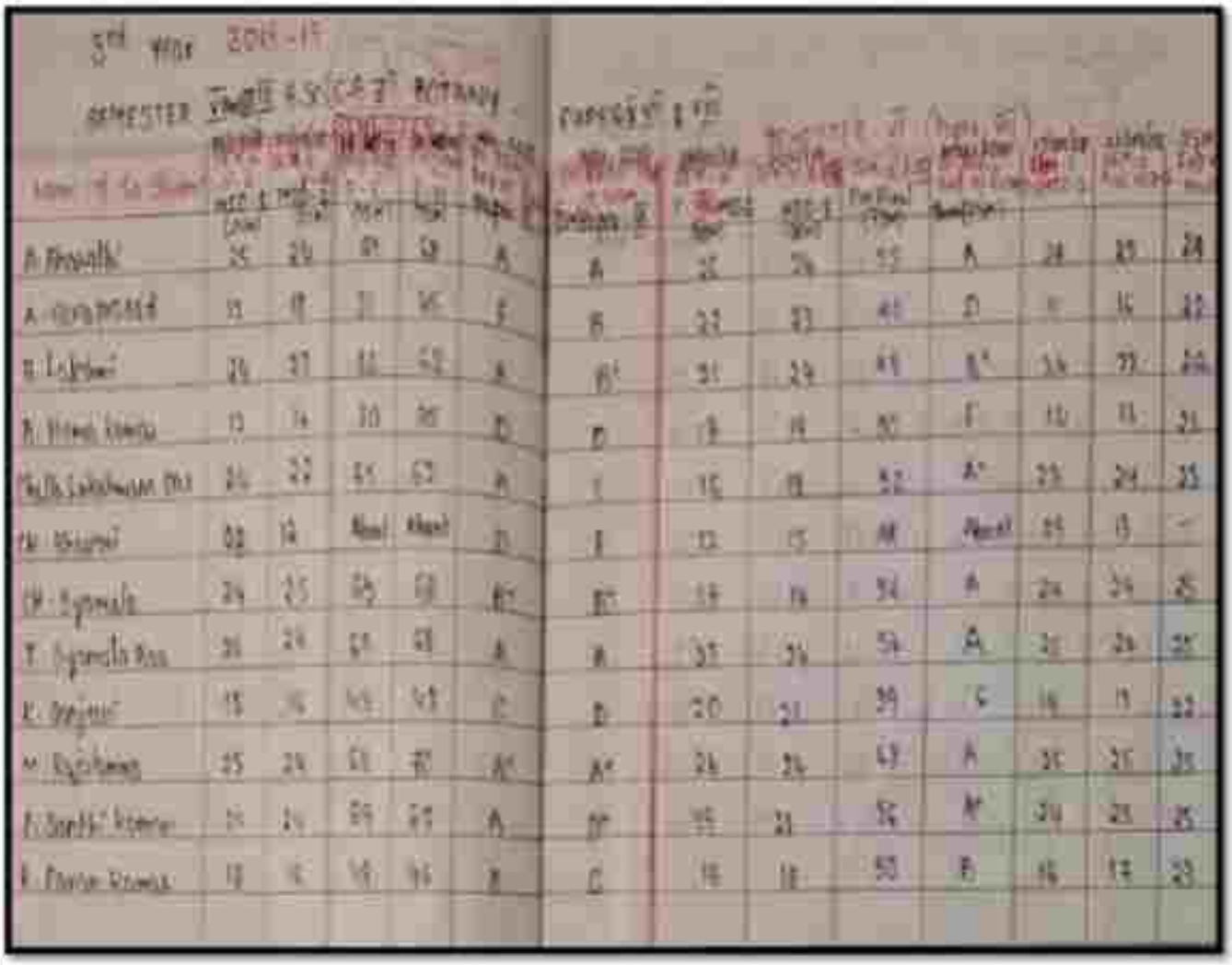

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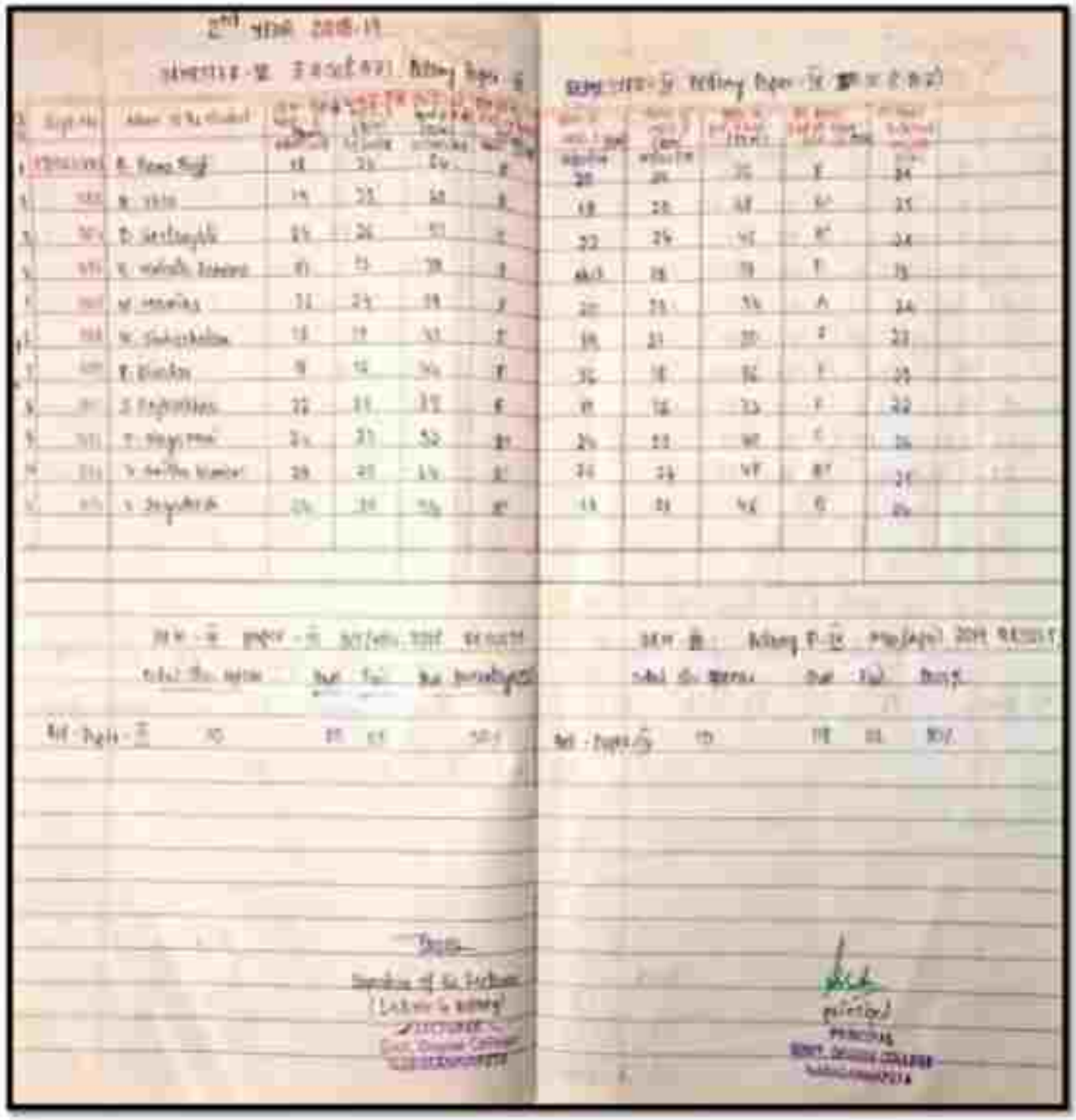

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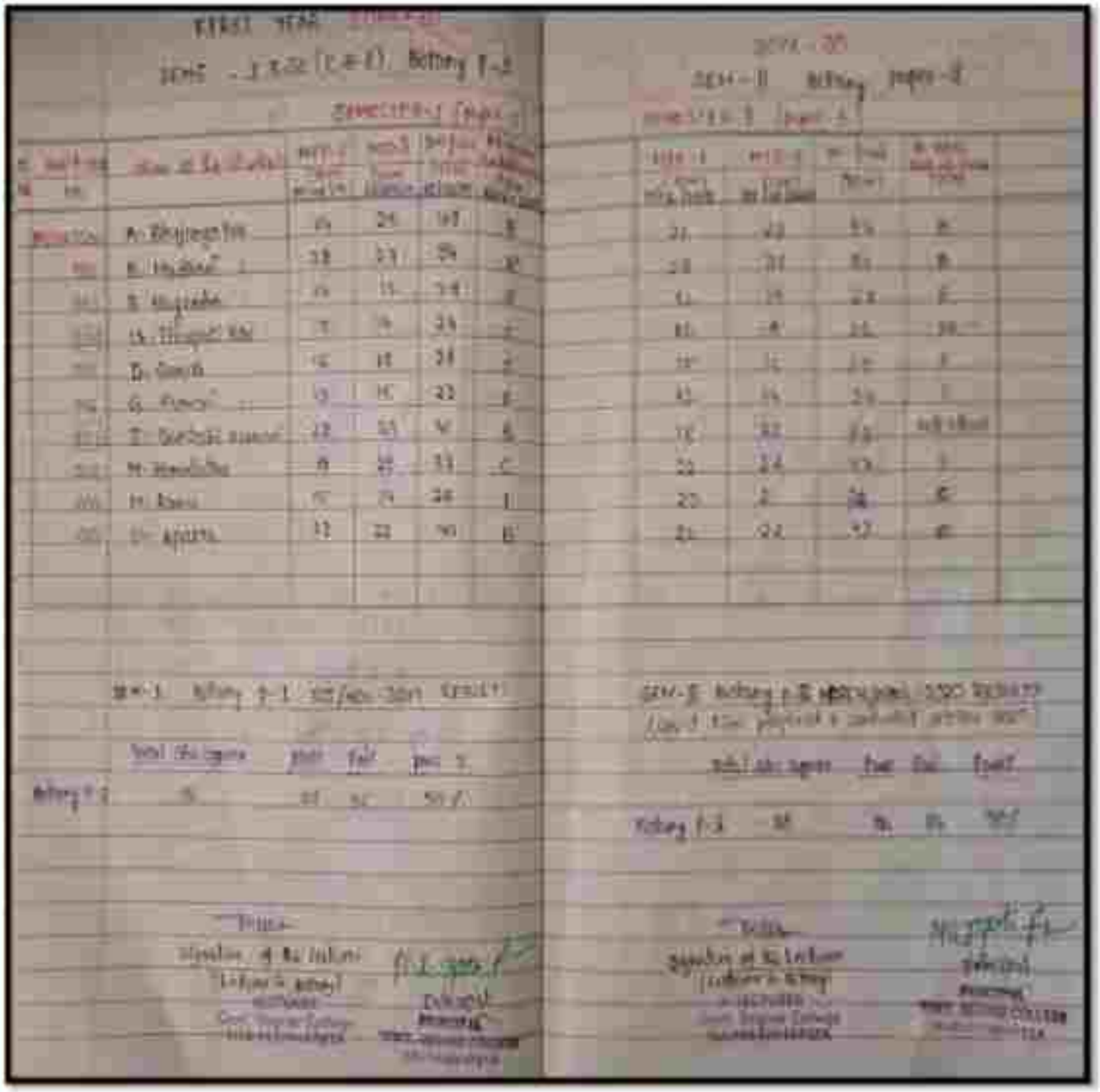

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2019-2020

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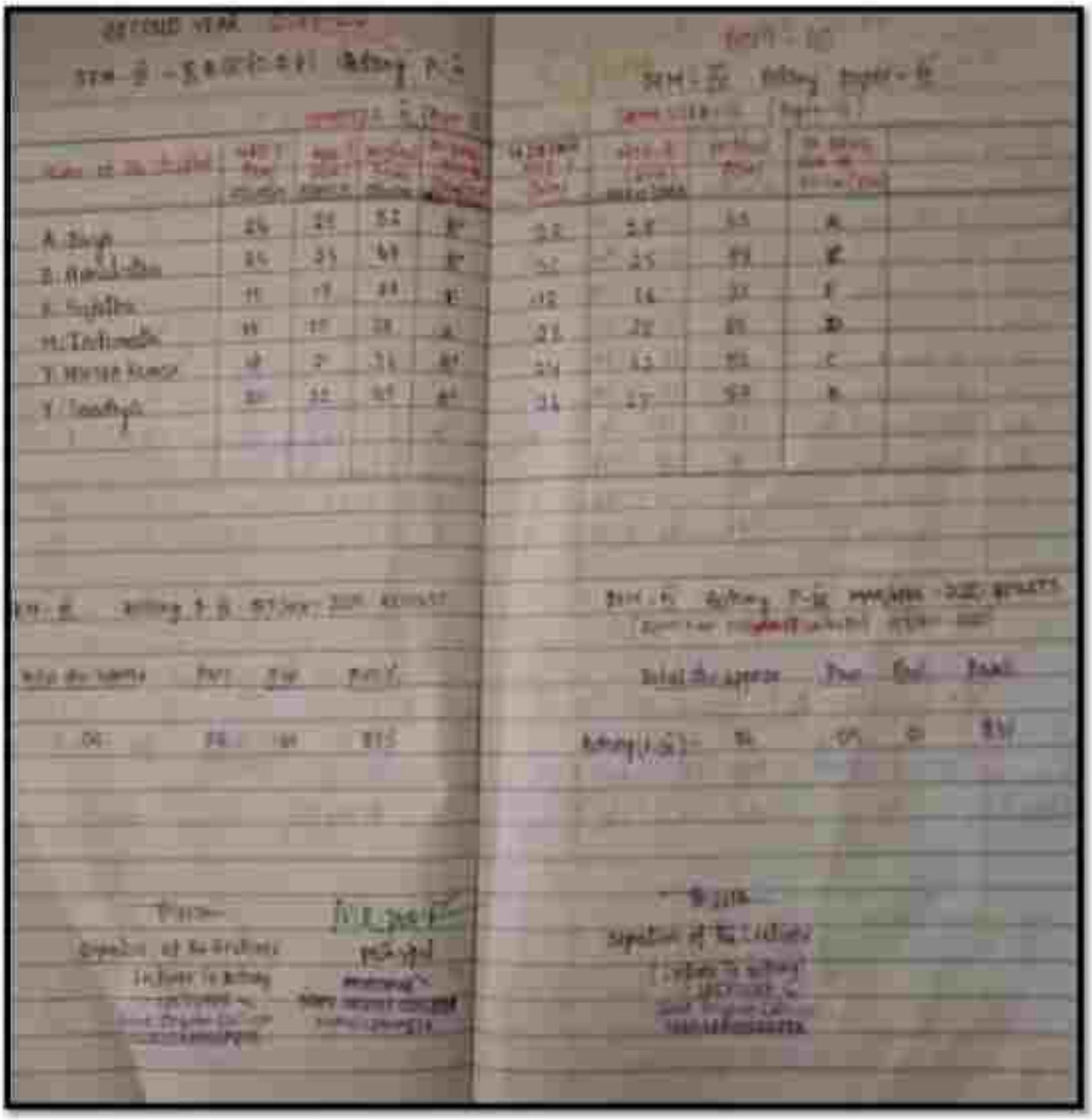

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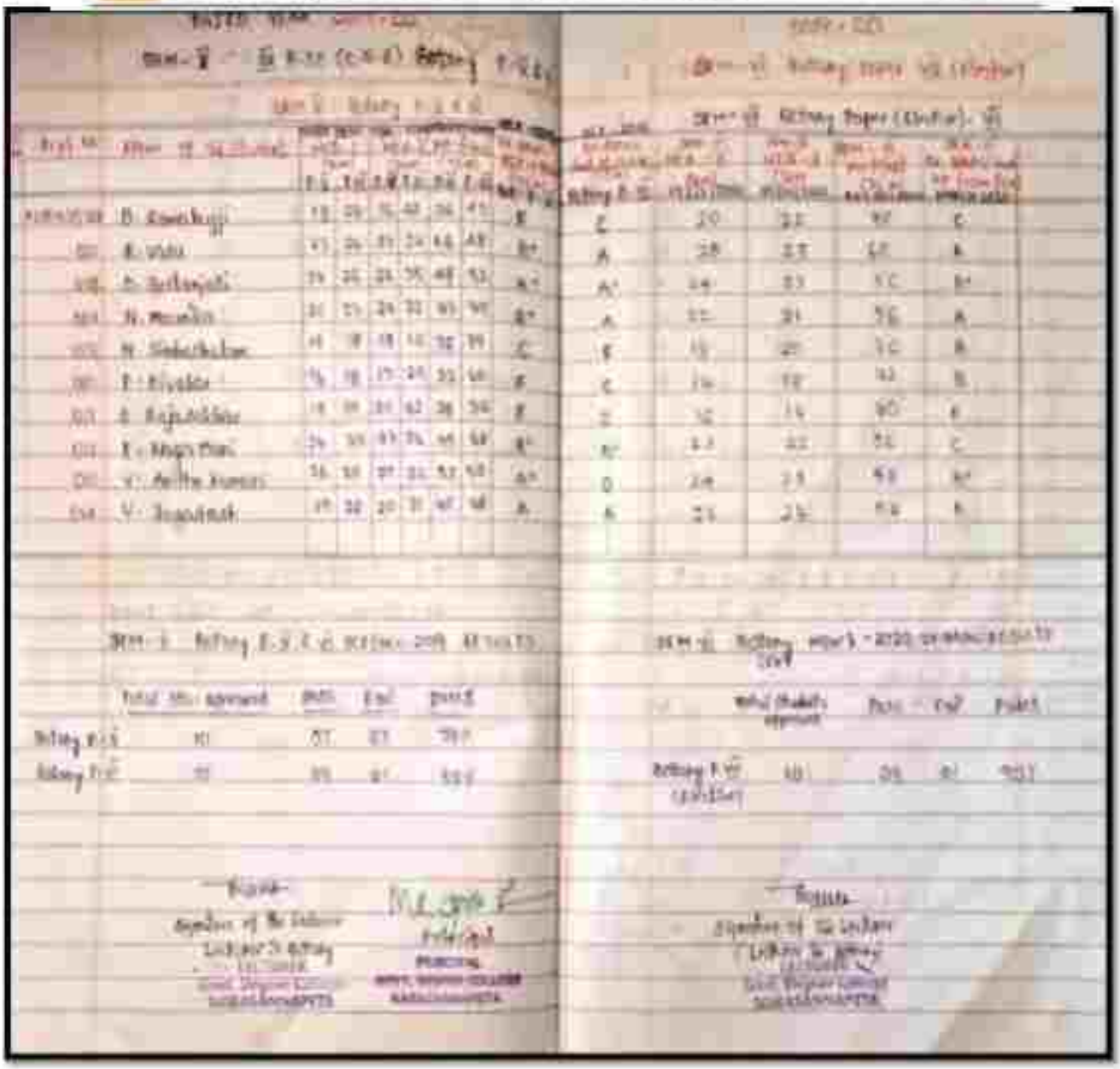

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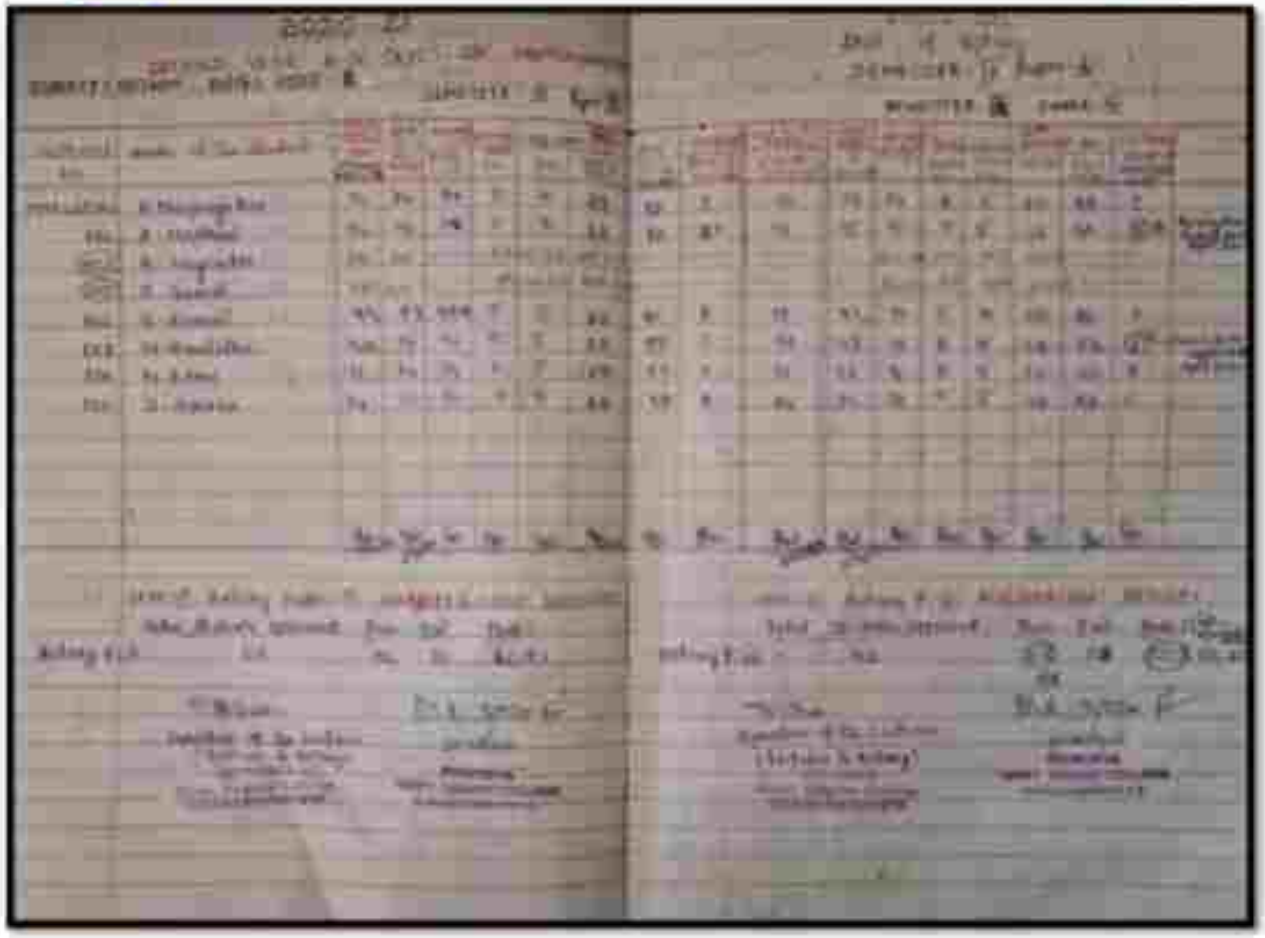
CONTINUOUS INTERNAL ASSESSMENT

2020-2021



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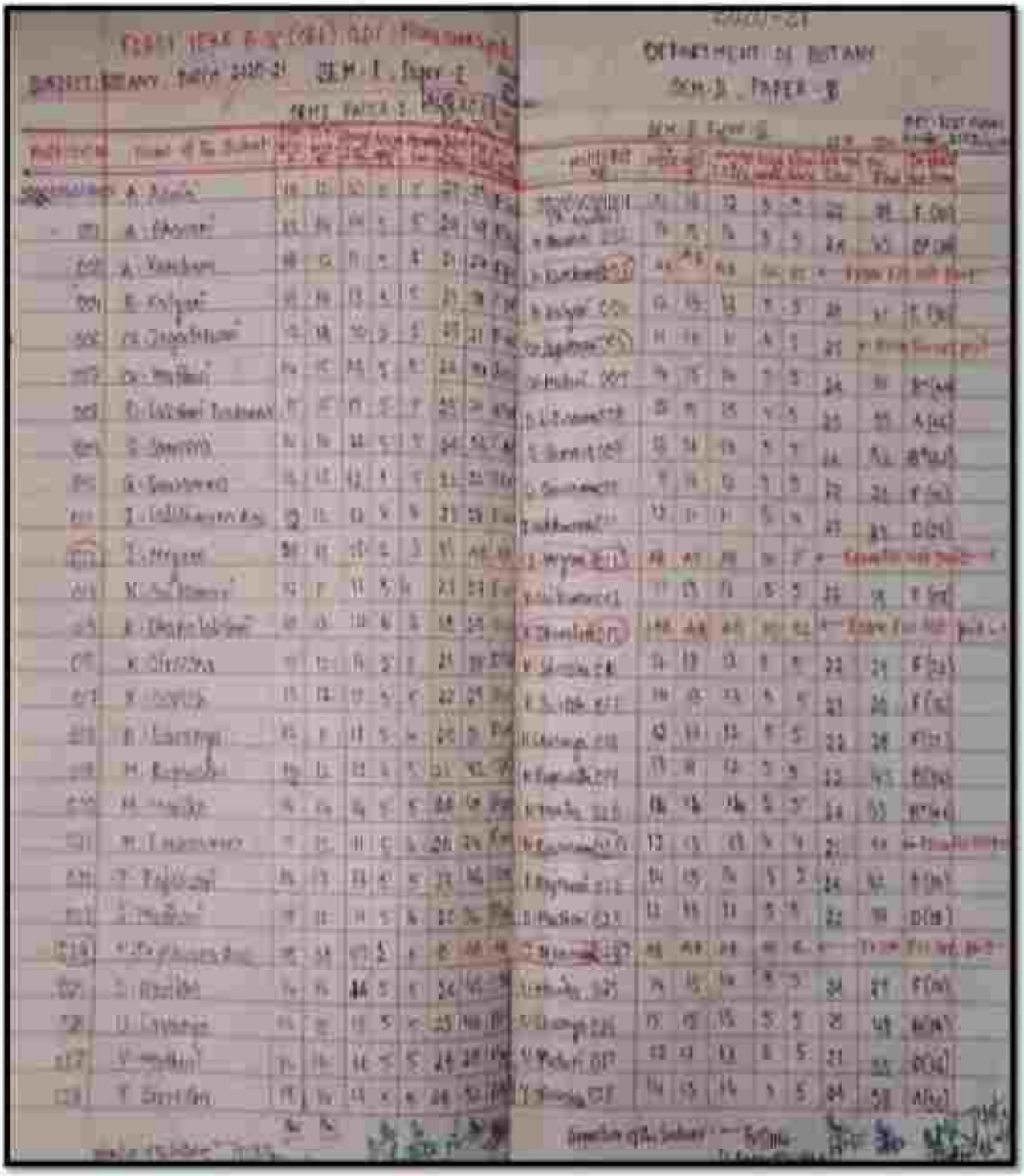

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SEM-I Botany (P-I) — March 2022 Results

	Total students appeared	Pass	Fail	Pass %
SEM-I Botany (P-I)	22	13	09	59%
SEM-I Plant Nursery	22	21	01	95%

SEM-II (Botany P-II) — July 2022 Results

	Total students appeared	Pass	Fail	Pass %
SEM-II (Botany P-II)	20	13	07	65%
SEM-II (Fruits & vegetable preservation)	20	20	00	100%

(S. Parameswara Rao)
Lecturer in Botany
LECTURER
Govt. Degree College
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Principal
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2021-2022

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STUDENT EVALUATION REPORT

GOVERNMENT DEGREE COLLEGE , NARASANNAPETA

Name of the Faculty: [illegible] Subject: PHYSICS Semester: III Title of the paper: HEAT & THERMODYNAMICS

Programme Name: Programme Code: Specialization Name & Code: Course Name: Course Code:

S.No	[illegible]	Name of the student	University Register Number	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1		[illegible]	[illegible]	19	11	29	5	4	5	40	25	50	80P		44P		
2		[illegible]	[illegible]	19	14	33	6	4	4	46	23	8	25P		62P		
3		[illegible] VASANTH KUMAR	[illegible]	14	9	40	2	3	4	52	16	26	83P		40P		
4		[illegible]	[illegible]	13	9	15	6	5	5	25	14	5	16P		38P		
5		[illegible]	[illegible]	17	17	35	4	5	4	44	13	58	83P		58P		
6		[illegible]	[illegible]														
7		[illegible] KUMAR	[illegible]	19	11	27	5	4	4	40	25	41	85		69P		
8		[illegible]	[illegible]	18	14	33	5	5	4	46	24	36	80P		60P		
9		[illegible]	[illegible]	20	15	38	6	5	5	50	25	52	77P		66P		
10		[illegible] GANESH	[illegible]	13	7	20	5	2	5	25	14	21	35P		40P		
11		[illegible]	[illegible]	19	11	38	5	4	5	44	25	37	85P		45P		
12		[illegible]	[illegible]	18	14	33	5	4	4	46	24	27	40P		59P		
13		[illegible]	[illegible]	19	19	32	4	5	5	45	25	31	56P		44P		
14		[illegible]	[illegible]	-	-	-	-	-	-	-	-	-	-	-	-		
15		[illegible]	[illegible]	15	8	19	4	4	4	30	15	28	43P		35P		
16		[illegible]	[illegible]	19	13	33	6	5	4	46	23	36	28P		30P		
17		[illegible]	[illegible]	19	13	24	3	5	4	45	28	29	73P		48P		

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S.No.	Student ID	Name of the Student	University Register Number	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
2		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
3		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
4		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
5		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
6		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
7		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
8		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
9		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
10		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
11		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
12		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
13		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
14		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
15		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
16		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
17		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
18		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
19		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
20		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
21		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
22		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
23		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
24		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

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DEPARTMENT OF MATHEMATICS

ACADEMIC YEAR

2020-21

GROUPING OF STUDENTS IN TO

(SLOW LEARNERS)

GOVERNMENT DEGREE COLLEGE

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LIST OF SLOW LEARNERS

III B.Sc (MPC&MPCS)

S.NO	NAME OF THE STUDENT	REGISTERED NUMBER	GRADE OBTAINED IN PREVIOUS ODD SEMSTER SEMESER (III)
1	A. Rambabu	1800441006	F
2	B. Manikanta	1800441008	F
3	B.Sumanth	1800441009	F
4	K. Srihari	1800441014	F
5	K.Dhileswara Rao	1800441015	F
6	K. Lakshminarayana	1800441016	F
7	P.Naveen	1800441018	F
8	P.Prasanth	1800441020	F
9	R.Vishnu kumar	1800441022	F
10	P.Kamaleswara Rao	1800442003	F
11	K.Nagaraju	1800442005	F

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DEPARTMENT OF MATHEMATICS

LIST OF REMEDIAL QUESTIONS /TOPICS TAUGHT TO SLOW LEARNERS

III B.Sc. (MPC & MPCS)

S.NO	NAME OF THE TOPIC/QUESTION	DATE OF CLASSES TAKEN	NUMBER OF STUDENTS ATTENDED
1	Prove that a finite semi group G satisifying cancellation laws is a group	15-02-2021	5
2	Prove that the set of nth roots of unity forms an abelian group	16-02-2021	8
3	Lagrange's Theorem	17-02-2021	7
4	H and K are two subgroups of a group G then prove that HK is a subgroup of G iff HK=KH.	18-02-2021	9
5	Any two left cosets of a subgroup of a group G is either disjoint or identical	19-02-2021	8
6	Prove that every group of prime order is Simple.	24-02-2021	6
7	If G is a group and H is a subgroup of a group G index is 2 in G then H is a normal subgroup of G.	25-02-2021	5
8	State and Prove Fundamental theorem of homomorphisms of groups.	26-02-2021	6
9	State and Prove Cayley's Theorem	27-02-2021	7
10	Every subgroup of a cyclic group is cyclic.	01-03-2021	7

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DEPARTMENT OF MATHEMATICS

OUTCOME OF THE REMEDIAL CLASSES TO SLOW LEARNERS

III B.Sc (MPC &MPCS)

S.NO	NAME OF THE STUDENT	REGISTERED NUMBER	NUMBER OF REMEDIAL CLASSES ATTENDED	GRADE OBTAINED BY STUDENT AFTER CLASSES
1	A. Rambabu	1800441006	6	P
2	B. Manikanta	1800441008	5	F
3	B.Sumanth	1800441009	6	P
4	K. Srihari	1800441014	7	P
5	K.Dhileswara Rao	1800441015	1	F
6	K. Lakshminarayana	1800441016	3	F
7	P.Naveen	1800441018	6	F
8	P.Prasanth	1800441020	10	P
9	R.Vishnu kumar	1800441022	1	F
10	P.Kamaleswara Rao	1800442003	6	P
11	K.Nagaraju	1800442005	7	F

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2	B. Manikanta	1800441008	5	F
3	B.Sumanth	1800441009	6	P
4	K. Srihari	1800441014	7	P
5	K.Dhileswara Rao	1800441015	1	F
6	K. Lakshminarayana	1800441016	3	F
7	P.Naveen	1800441018	6	F
8	P.Prasanth	1800441020	10	P
9	R.Vishnu kumar	1800441022	1	F
10	P.Kamaleswara Rao	1800442003	6	P
11	K.Nagaraju	1800442005	7	F

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DEPARTMENT OF MATHEMATICS

LIST OF SLOW LEARNERS

II B.Sc (MPC &MPCS)

S.NO	NAME OF THE STUDENT	REGISTERED NUMBER	GRADE OBTAINED IN PREVIOUS ODD SEMSTER SEMESER (I)
1	A.ASHOK KUMAR	1900441005	F
2	G.HAREESH	1900442003	F
3	K.HYMAVATHI	1900442004	F
4	S.RAMESH	1900442008	F

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DEPARTMENT OF MATHEMATICS

LIST OF REMEDIAL QUESTIONS/TOPICS TAUGHT TO SLOW LEARNERS

II B.Sc. (MPC &MPCS)

S.NO	NAME OF THE TOPIC/QUESTION	DATE OF CLASS TAKEN	NUMBER OF STUDENTS ATTENDED
1	Problems on Variables and Separable	15-02-2021	1
2	Problems on Homogeneous Equations	16-02-2021	2
3	Exact differential Equations	17-02-2021	1
4	Non Exact Differential Equations	18-02-2021	2
5	Method of Variation of parameters	19-02-2021	2
6	Method of Q(x)=sinax or cosax,solving problems	20-02-2021	2
7	Problems for Method of change of variables when the part of c.f. is known	22-02-2021	2
8	Previous question papers discussed	23-02-2021	1
9	Previous model papers explained	24-02-2021	2

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DEPARTMENT OF MATHEMATICS

OUTCOME OF THE REMEDIAL CLASSES TO SLOW LEARNERS

II B.Sc (MPC & MPCS)

S.NO	NAME OF THE STUDENT	REGISTERED NUMBER	NUMBER OF REMEDIAL CLASSES ATTENDED	GRADE OBTAINED BY STUDENT AFTER CLASSES
1	A.ASHOK KUMAR	1900441005	7	P
2	G.HAREESH	1900442003	8	P
3	K.HYMAVATHI	1900442004	0	F
4	S.RAMESH	1900442008	0	F

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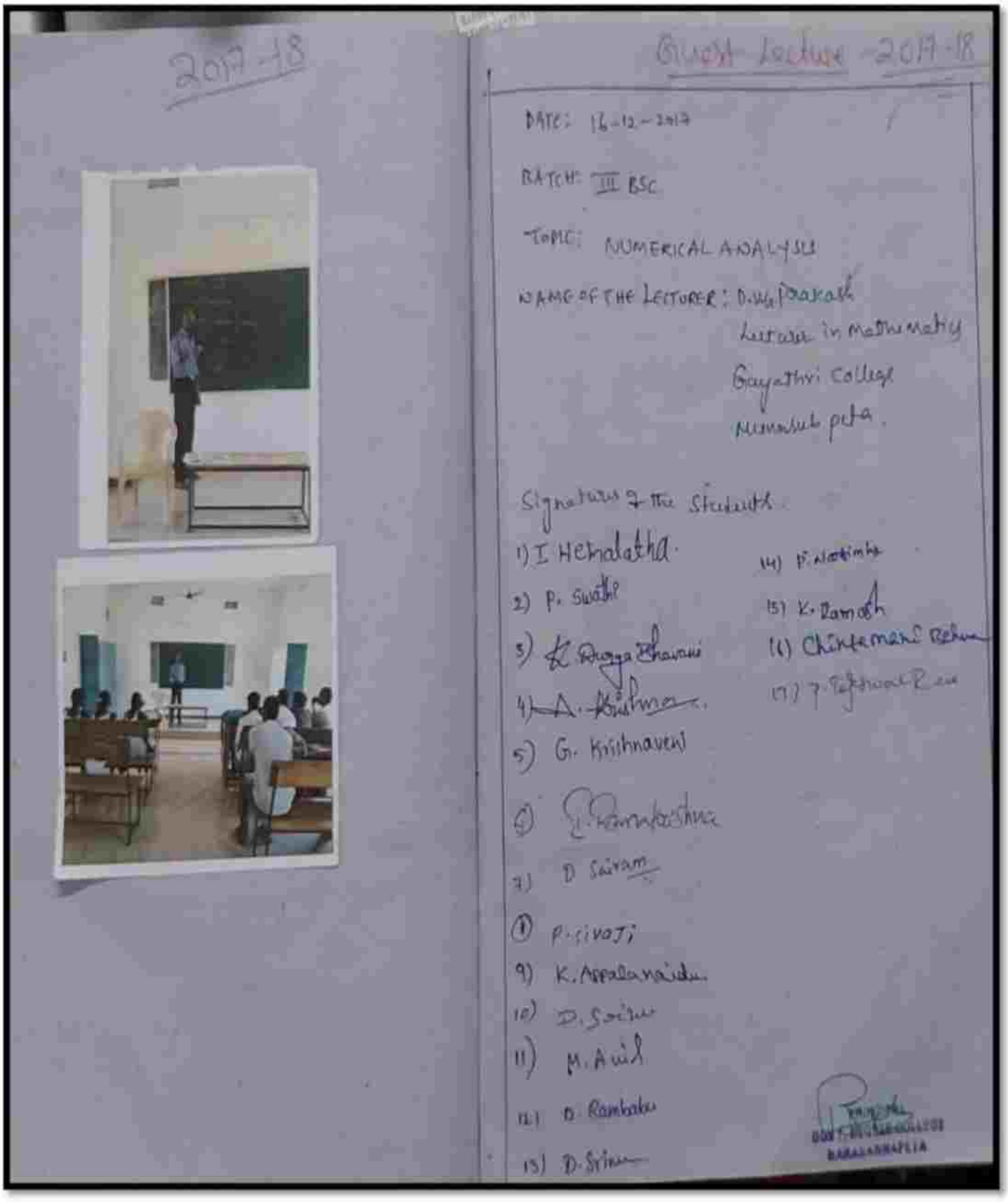
GUEST LECTURE 2017-2018



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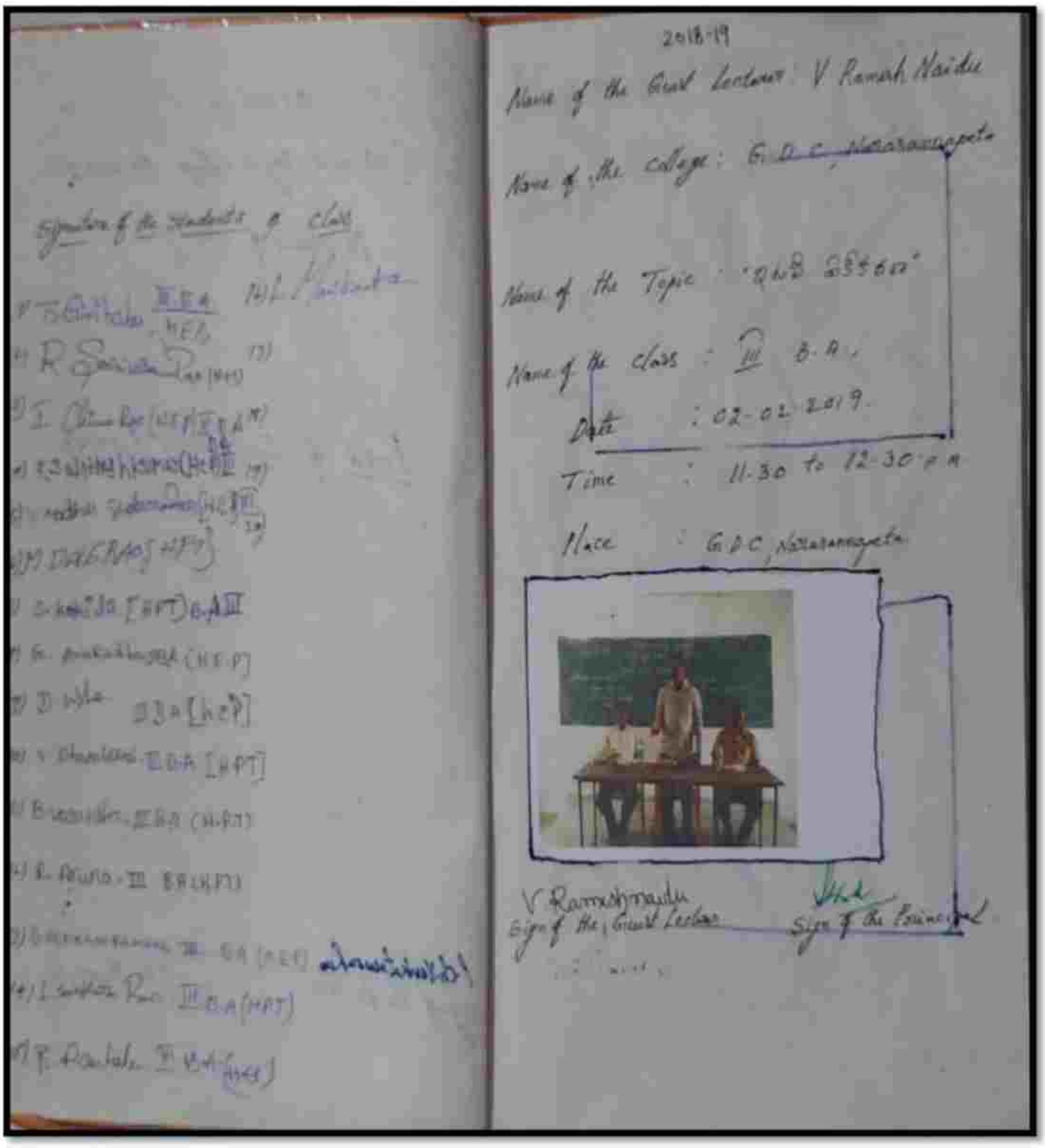
GUEST LECTURE 2018-2019



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GUEST LECTURE 2019-2020

36

2019-2020

37

GUEST LECTURE

Date: 07/01/2020

Topic: NMR Spectroscopy

Resource person:

Sri. Adinarayana. D
Lecturer in Chemistry
Government Degree College.
Tekkali.

Student attended

S.No	Name of the student	Group	Signature
1.	D. Dhanalakshmi	IInd M.P.C	D. Dhanalakshmi
2.	K. Geetha	IInd M.P.C	K. Geetha
3.	T. Rambabu	IInd M.P.C	T. Rambabu
4.	P. Prasanth	IInd M.P.C	P. Prasanth
5.	R. Prasanth Kumar	IInd M.P.C	R. Prasanth Kumar
6.	K. Lakshmi narayana	IInd M.P.C	K. Lakshmi narayana
7.	K. Sirisha	IInd M.P.C	K. Sirisha
8.	K. Venkatesh	IInd M.P.C	K. Venkatesh
9.	M. Mallikarjuna	IInd M.P.C	M. Mallikarjuna
10.	R. Vijaykumar	IInd M.P.C	R. Vijaykumar
11.	M. Hemalatha	IInd B.Sc	M. Hemalatha
12.	U. Aparna	IInd B.Sc	U. Aparna
13.	B. Madhavi	IInd B.Sc	B. Madhavi
14.	B.R. Mouni	IInd B.Sc	B.R. Mouni
15.	K.S. Ganesh	IInd B.Sc	K.S. Ganesh
16.	K. Shanmukha Rao	IInd B.Sc	K. Shanmukha Rao
17.	K. Purushottam	IInd B.Sc	K. Purushottam
18.	M. Ramu	IInd B.Sc	M. Ramu
19.	Ch. Yogeswara Rao	IInd B.Sc	Ch. Yogeswara Rao

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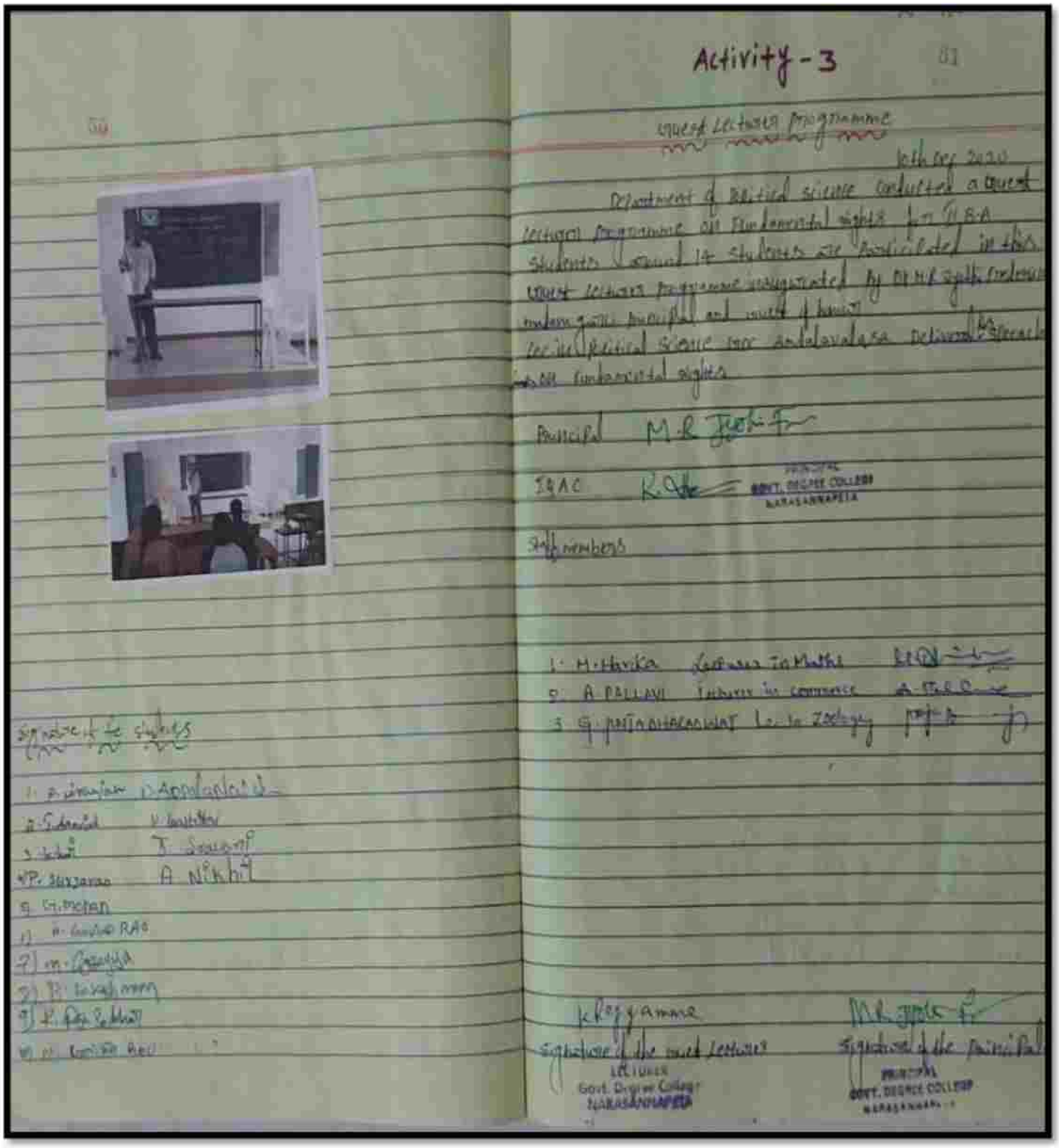
GUEST LECTURE 2020-2021



Activity - 3

Guest Lecturer Programme

16th Dec 2020

Department of Political Science conducted a Guest lecturer programme on Fundamental rights for II B.A students. Around 14 students are participated in this. Guest lecturer programme inaugurated by Dr M.R Jyothi Professor ... principal and ... lecturer in Political Science GDC Amadalavalasa Delivered the speech on Fundamental rights.

Principal M.R Jyothi

IQAC

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NARASANNAPETA

Staff members

1. M.Harika Lecturer in Maths
2. A PALLAVI Lecturer in Commerce
3. G.[illegible] Lec in Zoology

Signature of the students

1. [illegible] D.Appalanaidu
2. [illegible] V.[illegible]
3. [illegible] J. Sravani
4. P. Suryarao A Nikhil
5. G.Mohan
6. [illegible] RAO
7. M.[illegible]
8. [illegible]
9. [illegible]
10. [illegible] Rao

K.Rajyamma
Signature of the Guest lecturer
LECTURER
Govt. Degree College
NARASANNAPETA

Signature of the Principal
PRINCIPAL
GOVT. DEGREE COLLEGE
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GUEST LECTURE 2021-2022

48

B. Pavani
B. Harsha Sai
P. Avanthika
N. Gayatri
S. Pavansai
D. V. Sravya
M. Venkatesh
K. ...

T. K. Tharun kumar
G. Gangasai
N. KAVYA
L. Lavanya...

2021 - 2022

Guest lecturer 49

Date 2/03/2021

Department of commerce Govt Degree college Narasannapeta Conducted a Guest lecturer programme on 2nd march 2021 on the topic Fundamentals of Accounting for the 1st Year B.com Students 30 students are participated in this programme Guest lecturer by Sri M. Narayudu...rao lec in commerce Rtd Principal Govt Degree college Narasannapeta

Topic: Fundamentals of Accounting

This programme presided to by Dr M R Jyothi Prada vice principal and IQAC co-ordinator Mr Srinivasarao Patro garu participated in this programme

Topic: Guest lecturer: M. Narayudu...rao D/y
Rtd lec in commerce
GDC Narasannapeta

Signature of the Lecturer

Signature of the Principal

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