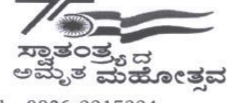




KARNATAK UNIVERSITY, DHARWAD
ACADEMIC (S&T) SECTION
ಕರ್ನಾಟಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಧಾರವಾಡ
ವಿದ್ಯಾಮಂಡಳ (ಎಸ್&ಟಿ) ವಿಭಾಗ



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NAAC Accredited
 'A' Grade 2014

website: kud.ac.in

No. KU/Aca(S&T)/JS-125/ Sci. Fac./2022-23/1350

Date: 29 NOV 2022

ಅಧಿಸೂಚನೆ

ವಿಷಯ: 2022-23ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿಗಾಗಿ ಸಿ.ಬಿ.ಸಿ.ಎಸ್. ಅಡಿಯಲ್ಲಿ ಜಾರಿಯಲ್ಲಿರುವ ಸ್ನಾತಕ ಜೈವಿಕ ತಂತ್ರಜ್ಞಾನ (Biotechnology) ಪದವಿಯ 5 ಮತ್ತು 6ನೇ ಸೆಮಿಸ್ಟರ್‌ನ SEC ಸೈದ್ಧಾಂತಿಕ ಪತ್ರಿಕೆಯ ಬದಲಾಗಿ ಪ್ರಾಯೋಗಿಕ ಪತ್ರಿಕೆಯಾಗಿ ಪಠ್ಯಕ್ರಮದಲ್ಲಿ ಪರಿವರ್ತಿಸಿ ಪಠ್ಯಕ್ರಮವನ್ನು ಅಳವಡಿಸಿರುವ ಕುರಿತು.

- ಉಲ್ಲೇಖ: 1. ವಿಶೇಷ ಆಡ್-ಹಾಕ್ ಸಮಿತಿ ಸಭೆಯ ಠರಾವು ಪತ್ರ ದಿ: 23.11.2022.
 2. ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಆದೇಶ ದಿನಾಂಕ: 29/11/2022

ಮೇಲ್ಕಾಣಿಸಿದ ವಿಷಯ ಹಾಗೂ ಉಲ್ಲೇಖಗಳನ್ವಯ ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಆದೇಶದ ಮೇರೆಗೆ, 2022-23ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿಗಾಗಿ ಸಿ.ಬಿ.ಸಿ.ಎಸ್. (CBCS) ಅಡಿಯಲ್ಲಿ ಜಾರಿಯಲ್ಲಿರುವ ಸ್ನಾತಕ ಪದವಿಯ 5 ಮತ್ತು 6ನೇ ಸೆಮಿಸ್ಟರ್‌ಗಳ ಜೈವಿಕ ತಂತ್ರಜ್ಞಾನ (Biotechnology) SEC Theory ವಿಷಯವನ್ನು Practical ಎಂದು ಪರಿಷ್ಕರಿಸಿದ ಪಠ್ಯಕ್ರಮವನ್ನು ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ಅನುಮೋದನೆಯನ್ನು (Pending Approval of Academic Council Meeting) ನಿರೀಕ್ಷೆಯಲ್ಲಿರಿಸಿ ಅಳವಡಿಸಲಾಗಿದೆ.

ಅದರಂತೆ, 2022-23ನೇ ಸಾಲಿನ ಸಿ.ಬಿ.ಸಿ.ಎಸ್. (CBCS) ಪದ್ಧತಿಯಲ್ಲಿ ಜಾರಿಯಲ್ಲಿರುವ 5 ಮತ್ತು 6ನೇ ಸೆಮಿಸ್ಟರ್‌ಗಳಿಗೆ ಅಳವಡಿಸಿಕೊಳ್ಳಲಾಗಿದೆ ಹಾಗೂ ಸದರ ಪಠ್ಯಕ್ರಮವನ್ನು ಕ.ವಿ.ವಿ. www.kud.ac.in ಅಂತರ್ಜಾಲದಿಂದ ಡೌನ್‌ಲೋಡ್ ಮಾಡಿಕೊಳ್ಳಲು ಸೂಚಿಸುತ್ತಾ, ವಿದ್ಯಾರ್ಥಿಗಳ ಹಾಗೂ ಸಂಬಂಧಿಸಿದ ಎಲ್ಲ ಬೋಧಕರ ಗಮನಕ್ಕೆ ತಂದು ಅದರಂತೆ ಕಾರ್ಯಪ್ರವೃತ್ತಿಗಳು ಕವಿವಿ ಅಧೀನದ / ಸಂಲಗ್ನ ಮಹಾವಿದ್ಯಾಲಯಗಳ ಪ್ರಾಚಾರ್ಯರುಗಳಿಗೆ ಸೂಚಿಸಲಾಗಿದೆ.

ಅಡಕ: ಮೇಲಿನಂತೆ


 ಕುಲಸಚಿವರು
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ಗೆ,

ಕರ್ನಾಟಕ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವ್ಯಾಪ್ತಿಯಲ್ಲಿ ಬರುವ ಎಲ್ಲ ಅಧೀನ ಹಾಗೂ ಸಂಲಗ್ನ ಮಹಾವಿದ್ಯಾಲಯಗಳ ಪ್ರಾಚಾರ್ಯರುಗಳಿಗೆ. (ಕ.ವಿ.ವಿ. ಅಂತರ್ಜಾಲ ಹಾಗೂ ಮಿಂಚಂಚೆ ಮೂಲಕ ಬಿತ್ತರಿಸಲಾಗುವುದು)

ಪ್ರತಿ:

1. ಅಧ್ಯಕ್ಷರು, ಸ್ನಾತಕೋತ್ತರ ಜೈವಿಕ ತಂತ್ರಜ್ಞಾನ (Biotechnology) ಅಧ್ಯಯನ ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
2. ಕುಲಪತಿಗಳ ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
3. ಕುಲಸಚಿವರ ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
4. ಕುಲಸಚಿವರು (ಮೌಲ್ಯಮಾಪನ) ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
5. ಅಧೀಕ್ಷಕರು, ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ / ಗೌಪ್ಯ / ಜಿ.ಎ.ಡಿ. / ವಿದ್ಯಾಮಂಡಳ (ಪಿ.ಜಿ.ಪಿ.ಎಚ್.ಡಿ) ವಿಭಾಗ, ಸಂಬಂಧಿಸಿದ ಕೋರ್ಸುಗಳ ವಿಭಾಗಗಳು ಪರೀಕ್ಷಾ ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.
6. ನಿರ್ದೇಶಕರು, ಕಾಲೇಜು ಅಭಿವೃದ್ಧಿ / ವಿದ್ಯಾರ್ಥಿ ಕಲ್ಯಾಣ ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.



KARNATAK UNIVERSITY, DHARWAD

B.Sc. Programme

(Revised SEC Practical Syllabus (V and VI Semesters))

BIOTECHNOLOGY (Optional)

**SKIL ENHANCEMENT COURSE (SEC) UNDER
CHOICE BASED CREDIT SYSTEM (CBCS)**

Effective from 2020-21

Karnatak University, Dharwad
CBCS syllabus for Under Graduate Programme in Biotechnology (optional)
Effective from 2020 - 21

Sem	Theory /Practical	Subject Code	Total Teaching hours per week	Total Teaching hours per Semester	Duration of Exams	Internal Assessment Marks	Semester End Exam Marks	Total Marks	Credits
I	Theory	DSCBT T:1.1	04hrs	60	03hrs	20	80	100	04
	Practical	DSCBT P:1.1	04hrs	60	03hrs	10	40	50	02
II	Theory	DSCBT T:2.1	04hrs	60	03hrs	20	80	100	04
	Practical	DSCBT P:2.1	04hrs	60	03hrs	10	40	50	02
III	Theory	DSCBT T:3.1	04hrs	60	03hrs	20	80	100	04
	Practical	DSCBT P:3.1	04hrs	60	03hrs	10	40	50	02
IV	Theory	DSCBT T:4.1	04hrs	60	03hrs	20	80	100	04
	Practical	DSCBT P:4.1	04hrs	60	03hrs	10	40	50	02
V	Theory	DSEBT T:5.1OR BT T:5.2	04hrs	60	03hrs	20	80	100	04
	Practical	DSEBT T:5.1OR BT T:5.2	04hrs	60	03hrs	10	40	50	02
	Practical	SEC-1BT P:1.1	04hrs	60	03hrs	10	40	50	02
	Practical	SEC-2BT P:1.2	04hrs	60	03hrs	10	40	50	02
VI	Theory	DSEBT T:6.1 OR BT T:6.2	04hrs	60	03hrs	20	80	100	04
	Practical	DSEBT P:6.1OR BT P:6.1	04hrs	60	03hrs	10	40	50	02
	Practical	SEC-1 BT P:2.1	04hrs	60	03hrs	10	40	50	02
	Practical	SEC-2BT P:2.2	04hrs	60	03hrs	10	40	50	02
Total						220	880	1100	44

Credit means the unit by which the course work is measured. One hour session of Lecture per week for 16 weeks amount to 1 credit. Four hour session of Practicals per week for 16 weeks amount to 2 credits per semester.

Each DSE shall have at least two papers and students shall choose any one paper from each DSE.

[SEC shall be from anyone DSC and study two each in 5th and 6th semesters \(SEC may be practical or theory for 2 credit only\).](#)

Note: 1. Each DSC/DSE shall have 60 hrs syllabus/semester for 100 marks in theory (80 Sem. End exam + 20 IA Exam) and 52 hrs practical/sem for 50 marks (40 Sem. End exam + 10 IA Exam).

Karnatak University, Dharwad
CBCS syllabus for Under Graduate Programme in Biotechnology (opt.) as
DISCIPLINE SPECIFIC COURSE (DSC)
Effective from 2020-21

Semester	Theory/ Practical	Subject Code	Instruction hour per week	Total hours of Syllabus /Sem	Duration of Exam.	Internal Assess- ment Marks	Sem final Exam. Marks	Total Marks	Credits
I	Theory	DSCBT T:1.1	04hrs	60	03hrs	20	80	100	04
	Practical	DSCBT P:1.1	04hrs	52	03hrs	10	40	50	02
II	Theory	DSCBT T:2.1	04hrs	60	03hrs	20	80	100	04
	Practical	DSCBT P:2.1	04hrs	52	03hrs	10	40	50	02
III	Theory	DSCBT T:3.1	04hrs	60	03hrs	20	80	100	04
	Practical	DSCBT P:3.1	04hrs	52	03hrs	10	40	50	02
IV	Theory	DSCBT T:4.1	04hrs	60	03hrs	20	80	100	04
	Practical	DSCBT P:4.1	04hrs	52	03hrs	10	40	50	02
V	*Theory P-I/P-II	DSEBT T:5.1OR BT T:5.2	04hrs/ 04hrs	60/60	03hrs	20	80	100	04
	Practical	DSEBT P: 5.1OR BT P:5.2	04hrs/ 04hrs	52/52	03hrs	10	40	50	02
VI	*Theory P-I/P-II	DSE BT T: 6.1OR BT T:6.2	04hrs/ 04hrs	60/60	03hrs	20	80	100	04
	Practical	DSEBT P:6.1OR BT P:6.2	04hrs/ 04hrs	52/52	03hrs	10	40	50	02
Total						180	720	900	36

*Candidate shall choose either paper – I or P-II but not both in DSE theory.

SKILL ENHANCEMENT COURSE (SEC) for Biotechnology optional DSC

Semester	Practical	Subject Code	Instruction hour per week	Total hours of Syllabus /Sem	Duration of Exam.	Internal Assessment Marks	Semfinal Exam Marks	Total Marks	Credits
V	Practical	SEC-1.1	04hrs	40	3hrs	10	40	50	02
V	Practical	SEC-1.2	04hrs	40	3hrs	10	40	50	02
VI	Practical	SEC-2.1	04hrs	40	3hrs	10	40	50	02
VI	Practical	SEC-2.2	04hrs	40	3hrs	10	40	50	02
Total						40	160	200	08

**Revised SEC Practical Syllabus
(B.Sc. V and VI Semester) in Biotechnology**

**SKILL ENHANCEMENT COURSES (SEC) in Biotechnology
B.Sc. Semester- V Biotechnology (Practicals):- SEC - 1 . 1**

BIOPHYSICAL AND BIOCHEMICAL TECHNIQUES

No. of Credits:02

Total Syllabus: 40hrs/Semester

Teaching hrs/week: 04hrs

Practical Examination: Maximum Marks: 50 (40 Semester end exam + 10 IA Exam)

Duration of Exam: 3hrs

1. Separation of plant pigments by paper chromatography.
2. Estimation of amino acids by ninhydrin method.
3. Estimation of proteins by Bradford method.
4. Horizontal electrophoresis (agarose gel electrophoresis).
5. Study of spectroscopic techniques:
 - a. Flame photometry.
 - b. Florescent spectroscopy.
6. Study of radio isotope in biology.
7. Separation of cell organelle (chloroplast) by density gradient method.
8. Study of principles of chromatographic instruments
 - a) HPLC b) GC c) UPLC d) LCMS
9. Study of Biological importance of Lasers & Microwaves.
10. Separation of amino acids by TLC.

SCHEME OF PRACTICAL EXAMINATION V SEMESTER BIOPHYSICAL AND BIOCHEMICAL TECHNIQUES

Duration: 3 hours

Max Marks: 40

1. ninhydrin method/ proteins by Bradford method. Estimation of amino acids by 12 Marks
2. Horizontal electrophoresis (agarose gel electrophoresis) . 08 Marks
3. Write Principle and applications of two , HPLC/GC/TLC/ Flame photometry/
Florescent spectroscopy / Radio isotopes . 5x2= 10 Marks
4. 05 Marks Journal
5. Viva -Voce

REFERENCEBOOKS:

- Voet, and Voet, D and, J.G. Voet (2004) Biochemistry, John Wiley and sons.
- Strayer. L. (2000) Biochemistry, 5th edn. W. H Freeman and company New York.
- Boyer, R (2002) Concepts in Biochemistry. 2nd edn – Brooks / Cole, Australia.
- Montgonary, R. M, Conway, T.W- and Spectator, A.A, (1996) Biochemistry- A Case – Oriented Approach 6th edn, Mosby Inc, Missouri.
- Roa, CNR, (1999) Understanding chemistry, University press Hyderabad.
- Nelson, D.L., and Cox, M.M. (2001) Biochemistry Mac Milan worth Publishers. Hampshire.
- Zubey, G.L, Pason, W.W, and Vance, D.E.(1995) Principles of Biochemistry WMC. Brown Publishers, Oxford.
- Devlin, T. M. (1997) Text book of Biochemistry with Clinical correlations, Wiley and sons, Inc New York.
- Garret and Grashem (1999) Biochemistry Saunders College Publishers.
- Knowler and Leader. The Biochemistry of the nucleic acids. 11th edn Chapman and Hall.

SKILL ENHANCEMENT COURSES (SEC) in Biotechnology
B.Sc. Semester-V Biotechnology (Practicals): SEC - 1.2

MOLICULAR BIOLOGY TOOLS

No. of Credits: 02

Total Syllabus: 40hrs/Sem

Teaching hrs/week: 04 hrs

Practical Examination: Maximum Marks: 50(40 Semester End exam + 10 IA Exam)

Duration of Exam: 3hrs

1. Isolation of plasmids from bacteria (E.Coli).
2. Isolation of RNA from plant source.
3. Electrophoresis: Study of PAGE & SDS PAGE.
4. Study of blotting techniques: a) Southern blot b) Northern blot c) Western blot.
5. Restriction digestion.
6. Commercial expression vectors.
 - a. pET series.
 - b. PGEX vectors structures.
7. DNA isolation from plant cell.
8. Protein extraction from plant and animal source.
9. Study of PCR (RT - PCR) and types.
10. Demonstration of Ligation.

SCHEME OF PRACTICAL EXAMINATION V SEMESTER, MOLICULAR BIOLOGY TOOLS

Duration: 3 hours

Max Marks: 40

1.	Isolation of plasmids from bacteria (E.Coli)/Isolation of RNA from plant source.		12 Marks
2.	Extraction of protein from plant and animal source, write the principle & procedure..		08 Marks
3.	Write Principle and applications of two, pET series / PGEX vectors structures RT – PCR /Southern blot / Northern blot / Western blot /PAGE.		5x2=10 Marks
4.	Journal		05 Marks
5.	Viva-voce		05 Marks
		TOTAL	40 MARKS

REFERENCEBOOKS:

1. Lodish, H., Ber, A., Zipursky, L.S., matsudaira, P., bahimore, D and Darnell J. 2001, Molecular Biology W. H. Freeman
2. De Robertis. E.D.P. and De Robertis E.M.S. 1998: Cell and Molecular Biology, Lea and Jeliger. Philadelphians K.M Varghese Company
3. Freifelder, D. and Malacinski, G.M. 1993: Essentials of molecular biology, jones and Barklett Publishers, Inc
4. George, M. and Malacinski 1998: Essentials of molecular biology, jones and Barklett Publishers, Inc
5. Glick, B.R and Pasternak j. j 2000: Molecular Biotechnology, principle and applications of recombinant DNA. American society for Microbiology, Washington DC
6. Griffiths, A.J.F. Miller, J.H. Suzuki, D.T. Lewontic, R.C. Gilbert W.M 2000. An introduction to genetic analysis. 7th edn W.H. Freeman. New York
7. Howe. C.1995. Gene cloning and manipulation, Cambridge University Press. USA
8. Karp, G 1996: Cell and Molecular Biology Concept and Experiments. John Wiley and Sons Inc. New York

SKILL ENHANCEMENT COURSES (SEC) in Biotechnology

B.Sc. Semester-VI Biotechnology (Practicals): SEC- 2.1

PHARMACEUTICAL BIOTECHNOLOGY

No. of Credits: 02

Total Syllabus: 40hrs/Sem

Teaching hrs/week: 04hrs

Practical Examination: Maximum Marks: 50 (40Semester end exam + 10 IA Exam)

DurationofExam:3hrs

1. Antibiotic sensitivity test - paper disk method.
2. Blood group detection by using kits.
3. Effect of biopesticides on growth of microorganisms.
4. Photographic demonstration of genetically modified animals & applications.
5. Study of vaccines & it's types (charts & models).
6. Study of nanotechnology based drug delivery system for biopharmaceuticals.
7. Study of genetic engineering appraisal committee (GEAC), & central drug standard control organization (CDSCO).
8. Estimation of blood glucose by calorimetric method.
10. Study of Pharmacovigilance concept.
11. Study of protein based therapeutics, (Insulin, Streptokinase, and Erythropoietin).
12. Internship / In- Plant training in Research institute/Pharmaceutical industry/ minor project.

SCHEME OF PRACTICAL EXAMINATION VI SEMESTER PHARMACEUTICAL BIOTECHNOLOGY

Duration: 3 hours

Max Marks: 40

- | | |
|--|--|
| 1. Estimation of blood glucose by calorimetric method. | 12 Marks |
| 2. Blood group detection by using kits, write the principle & procedure. | 08 Marks |
| 3. Antibiotic sensitivity test / protein based therapeutics
GMO's/ Effect of biopesticides. | Write the principle and applications of,
05x02=10Marks |
| 4. 05Marks | Journal |
| 5. 05Marks | Visit report /Internship report
05Marks |

TOTAL 40 MARKS

REFERNCEBOOKS:

1. Daan J A Crommelin (2010), Pharmaceutical Biotechnology, 2nd edition, Taylor & Francis Group.
2. 2. Principles of pharmacology by D. Golan, A. Tashjian, E. Armstrong, J Galanter, A.W.Armstrong, R. Arnaout and H. Rose. 2005, Lippincott Williams and Wilkins.
3. Bhatia, S., Goli D. (2018). Introduction to Pharmaceutical Biotechnology: Basicftchniquest and Concepts. United Kingdom: Institute of Physics Publishing.
4. Gary Walsh (2007) Pharmaceutical Biotechnology: Concepts and Applications. John Wiley & Sons, Inc.
5. Walsh, G. (2013). Pharmaceutical Biotechnology: Concepts and Applications. Germany: Wiley.

SKILL ENHANCEMENT COURSES (SEC) in Biotechnology
B.Sc. Semester-VI Biotechnology (Practicals): SEC-6.2

GENETIC ENGINEERING

No.OfCredits:02

Total Syllabus: 40hrs/Sem

Teaching hrs/week:04hrs

Practical Examination: Maximum Marks: 50 (40 Semester End exam + 10 IA Exam)

Duration of Exam: 3hrs

1. Isolation/Extraction of genomic DNA from plant source by C-TAB method..
2. Isolation of plasmids.
3. Study of gene cloning through charts.
4. Study of DNA sequencing by Maxam Gilbert's & Sanger's dideoxy method..
5. Study of human genome project.
6. Study of transformation by kits.
7. Study of expression of cloned DNA in E.Coli.
8. Study of introduction of gene in prokaryotes & eukaryotes (E.coli & Yeast cells as cloning host).
9. Study of genomic library & cDNA library.
10. Restriction digestion.

SCHEME OF PRACTICAL EXAMINATION VI SEMESTER GENETIC ENGINEERING

Duration: 3 hours

Max Marks: 40

1. Isolation/Extraction of genomic DNA from plant source by C-TAB method. 12 Marks
2. Isolation of plasmids, Write the
principle & procedure.. 08 Marks
3. Write the principle and applications of any two, DNA sequencing /HGP/ Transformation by kits/
Introduction of gene in prokaryotes / Genomic library / cDNA library. 05x02=10 Marks
4. Journals 05 Marks
5. Viva – Voce 05 Marks

TOTAL 40 MARKS

REFERNCEBOOKS:

1. Benjamin Lewin, "Genes I, Wiley Eastern Ltd., Delhi.
2. Benjamin Lewin, "Genes-II, Genes III, Wiley and sons publications.
3. Benjamin Lewin, Genes-V & VI Oxford University press.
4. Brown, T.A. 1998: Genetics: A molecular approach 3rd Ed. Stanley Thornes (Publishers) Ltd. United Kingdom.
5. Christopher H. 1995 "Gene cloning and Manipulation", Cambridge University Press.
6. Davis, R.W. Boterin, D. and Roth, J.R. 1980: A manual for genetic engineering, cold spring harbor laboratory. Cold Spring Harbor. New York.
7. Gardner. Simmons. Snustad 1991: Principles of genetics. 8" Ed. John Wiley and Sons. Inc.
8. Mitchell, D.S.T. 1994: An introduction to genetic Engineering. Cambridge University Press.
9. Old and Primrose, "Principles of gene Manipulation", Black well Scientific publications.
10. Peters. P. 1993: A guide to genetic engineering. Dubuque, Iowa. WMC Brown.
11. Rigbu, P.W.J. 1987: Genetic Engineering 6, Academic Press Inc. Florida, USA.