**Rajiv Gandhi University of Health Sciences, Karnataka**

**4th T Block Jayanagar, Bengaluru**

Curriculum delivery design of B. Pharm. course of Semester VII

w.e.f Academic year 2020-21

**SEMESTER-VII**

**BP 704T: NOVEL DRUG DELIVERY SYSTEMS**

1. Departmental objectives (what the learners will be able to perform after completing the subject):

A. Learning Objectives: Upon completion of this course the student should be able to

1. To understand various approaches for development of novel drug delivery systems.

2. To understand the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation.

1. Content distribution as per the list of topics, time allotted for each topic, distribution for ‘Must know’, ‘Desirable to know’ and ‘Nice to know’ and the probable weightage.

 The following table can also be a reference frame for continuous and formative assessment of learning. If the curriculum management is scheduled as per the tabulation, there can be clarity for both learners and teachers to take stock of the mastery achieved in each objective. This will also help for professional excellence that goes beyond the examination process.

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| **UNIT-I** | **Hours: 10** | **Weightage: 22 Marks** |
| **Learning content distribution** | **Topics** |
| **Controlled drug delivery systems** |
| **Must to know** | **Controlled drug delivery systems:** Terminology/definitions and rationale, advantages, disadvantages and selection of drug candidates.Approaches to design controlled release formulations, Physicochemical and biological properties of drugs relevant to controlled release formulations. |
| **Desirable to know** | **Polymers:** Classification, properties and advantages.Polymers: Application of polymers in formulation of controlled release drug delivery systems. |
| **Nice to know** | Advanced technologies using modern polymers in controlled release drug delivery systems. |

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| **UNIT-II** | **Hours: 10** | **Weightage: 22 Marks** |
| **Learning content distribution** | **Topics** |
| **Microencapsulation, Mucosal Drug Delivery system & Implantable Drug Delivery Systems** |
| **Must to know** | **Microencapsulation:** Microspheres / microcapsules, microparticles. Methods of Microencapsulation and its applications.**Mucosal Drug Delivery system:** Principles of bioadhesion / mucoadhesion, concepts, advantages and disadvantages, transmucosal permeability and formulation considerations of buccal delivery systems.**Implantable Drug Delivery Systems:** Concept of implants and osmotic pump. |
| **Desirable to know** | Implantable Drug Delivery Systems: Advantages and disadvantages |
| **Nice to know** | Implantable Injection  |

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| **UNIT-III** | **Hours: 10** | **Weightage: 22 Marks** |
| **Learning content distribution** | **Topics** |
| **Transdermal Drug Delivery Systems, Gastroretentive drug delivery systems and Nasopulmonary drug delivery system** |
| **Must to know** | **Transdermal Drug Delivery Systems:** Factors affecting permeation, permeation enhancers, basic components of TDDS, formulation approaches.**Gastroretentive drug delivery systems**: Approaches for GRDDS – Floating, high density systems, inflatable and gastroadhesive systems.**Nasopulmonary drug delivery system:** Formulation of Inhalers (dry powder and metered dose), nasal sprays, nebulizers. |
| **Desirable to know** | **Transdermal Drug Delivery Systems:** Permeation through skin.**Gastroretentive drug delivery systems:** Advantages, disadvantages and their applications. |
| **Nice to know** | Evaluation methods of transdermal, Nasal drug delivery systems and GRDDS.Introduction to Nasal and Pulmonary routes of drug delivery |

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| **UNIT-IV** | **Hours: 10** | **Weightage: 22 Marks** |
| **Learning content distribution** | **Topics** |
| **Targeted drug Delivery** |
| **Must to know** | **Targeted drug Delivery:** Concepts and approaches.  |
| **Desirable to know** | **Targeted drug Delivery:** liposomes, niosomes, nanoparticles, monoclonal antibodies and their applications. Advantages and disadvantages. |
| **Nice to know** | Targeted drug Delivery system formulation available in market. |

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| **UNIT- V** | **Hours: 10** | **Weightage: 22 Marks** |
| **Learning content distribution** | **Topics** |
| **Ocular Drug Delivery Systems and Intrauterine Drug Delivery Systems** |
| **Must to know** | **Ocular Drug Delivery Systems:** Ocular formulations and ocuserts**Intrauterine Drug Delivery Systems:** Development of intra uterine devices (IUDs) and applications |
| **Desirable to know** | **Ocular Drug Delivery Systems:** Intra ocular barriers and methods to overcome –Preliminary study.**Intrauterine Drug Delivery Systems:** Advantages and disadvantages, |
| **Nice to know** | Preliminary studies of ocular drug delivery system and brief study in glaucoma. |

**Blueprint of question paper.**

This shows the weightage given to each chapter in the summative assessment.

This improves the content validity by distributing the assessment of learners in the competencies that are represented by learning objectives under each chapter.

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| BLUE PRINT OF MODEL QUESTION PAPER**BP 704T: NOVEL DRUG DELIVERY SYSTEMS** TIME: 3 HOURS MAX. MARKS: 75 |
| **Unit No** | **Hours** | **Must know** | **Desirable to know** | **Weightage of marks** |
| **LE****(10X3)** | **SE****(5X8)** | **SA****(2X5)** | **LE****(10X0)** | **SE****(5X1)** | **SA****(2X5)** |
| Unit-I | 10 | 1 | 1 | - | - | 1 | 1 | 22 |
| Unit-II | 10 | 1 | 1 | - | - | 1 | 1 | 22 |
| Unit-III | 10 | 1 | 2 | - | - | - | 1 | 22 |
| Unit-IV | 08 | - | 1 | 1 | - | 1 | - | 17 |
| Unit-V | 07 | - | 2 |  | - | - | 1 | 12 |
| **Total** | **45** | **30** | **40** | **2** | **-** | **15** | **8** | **95** |
|  |  | **72** | **23** | **95** |