Bharath
INSTITUTE OF HIGHER EDUCATION AND RESEARCH
(Declared as Deemed - to - be - University under section 3 of UGC Act 1956)
NAAC
BHARATH INSTITUTE OF SCIENCE AND TECHNOLOGY
No.173, Agharam Road, Selaiyur, Chennai - T.N - 600 073.

**Requisition Letter**

Date: 27-01-2020

From
Dr. K.P.Kaliyamurthie,
Professor & Head,
Department of CSE,
Bharath Institute of Higher Education and Research,
Chennai

To
The Dean Engineering,
Bharath Institute of Higher Education and Research,
Chennai

Respected sir

Subject: Request of Permission to conduct a value-added course on "**Soft Computing techniques**" -Reg

With reference to above subject, I would like to bring to your kind notice that, our department interested to organize value added course on "**Soft Computing techniques**" in our campus premises on **03-02-2020**, students would be participating in this course. We request you kindly to give permission to organize this event.

Venue: **CSE Smart Room**

Timing : 9:30 AM to 12:30 PM (FN) and 1:30 PM to 4:30 PM(AN) and Saturday (FN&AN).

Submitted to Principal for approval to organize this value-added course.

**HOD**

HEAD OF DEPARTMENT
Computer Science & Engg.,
Bharath Institute of Higher Education & Research
(Deemed to be University U/S 3 Of UGC Act 1956)
Chennai - 600 073. INDIA

**DEAN ENGINEERING**

DEAN (Engineering)
Bharath Institute of Science & Technology
BHARATH INSTITUTE OF HIGHER EDUCATION & RESEARCH
(Declared as Deemed to be University U/S 3 of UGC Act. 1956)
Selaiyur, Chennai-600 073.

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# CIRCULAR

**29-01-2020**

The school of computing, Bharath Institute of Higher Education and Research is planned to conduct a certification value added course on **Certificate Course of Soft Computing techniques** for the benefit of students. This course is scheduled from 03-02-2020 to 15-02-2020 which includes theory and practical. The timings are 9:30 AM to 12:30 PM (FN) and 1:30 PM to 4:30 PM (AN) and Saturday (FN&AN).

| **All Registered Students must attend all the classes without fail. The following faculty members are assigned to handle the course. S.NO** | **Name of the Faculty** | **Designation** |
|---|---|---|
| 1 | Mr.G.Michael | Professor |
| 2 | Mr.G.Kovitha. | Assistant Professor |

**Head of Department**

HEAD OF DEPARTMENT
Department Of Computer Science & Engg.,
Bharath Institute Of Higher Education & Research
(Declared as Deemed to be University U/S 3 Of UGC Act, 1956)
Chennai - 600 073. INDIA

To

Copy to CSE

Copy to IT

# CERTIFICATE COURSE ON STATISTICS WITH SOFT COMPUTING TECHNIQUES

## Date of Introduction of the Course: 02-03-2020

## *COURSE SYLLABUS*

### 1. Introduction to Soft Computing

Concept of computing systems, "Soft" computing versus "Hard" computing, Characteristics of Soft computing, Some applications of Soft computing techniques

### 2. Introduction to fuzzy set theory

Probabilistic reasoning, Fuzzy sets, mathematics of fuzzy set theory, operations on fuzzy sets, comparison of fuzzy and crisp set theory.

### 3. Fuzzy logic & Defuzzification techniques

Fuzzy relations, rules, propositions, implications and inferences, Defuzzification techniques, Fuzzy logic controller design, some applications of Fuzzy logic

### 4. Fuzzy mapping

One to one mapping, max-min principle, extension principle, implication rules –implications

### 5. Membership functions

Universe of discourse, mapping inside fuzzy domain, fuzzy membership mapping methods, and application to real world problems.

### 6. Genetic Algorithms

Concept of "Genetics" and "Evolution" and its application to search techniques, GA operators: Encoding, Crossover, Selection, Mutation, etc.

### 7. Artificial Neural Networks

Artificial Neural Networks (ANN) and their biological roots and motivations.

### 8. Biological Neural Networks

Comparison between Artificial and Biological Neural Networks, Applications of Neural network.

### 9. Multi-objective Optimization Problem Solving

Concept of multi-objective optimization problems (MOOPs) and issues of solving them.Multi-Objective Evolutionary Algorithm (MOEA).

**10. Types of learning**

Learning Laws: Hebb's rule, Delta rule, Widrow - Hoff (The Least-Mean-Square) learning rule

**11. Supervised and unsupervised learning laws**

Correlation learning rule, instar and out-star learning rules, Competitive learning, Credit Assignment Problem, Error Correction learning, Memory based learning, Boltzmann learning.

**12. The Perceptron and its learning law**

Classification of linearly separable patterns, Multi-Layer Perceptron, Supervised Learning, Back-Propagation Learning law. Feed forward networks, Recurrent Networks

## ***COURSE OBJECTIVES***

This course will cover fundamental concepts used in Soft computing. The concepts of Fuzzy logic (FL) will be covered first, followed by Artificial Neural Networks (ANNs) and optimization techniques using Genetic Algorithm (GA).

**Specifically, the course has the following objectives:**

1. Understanding fuzzy set theory
2. Understanding Fuzzy logic & Defuzzification techniques
3. Know about Genetic Algorithms
4. Comparison between Artificial and Biological Neural Networks
5. Understanding Supervised and unsupervised learning laws

G. Kavitha

**COURSE COORDINATOR**

**HEAD OF THE DEPARTMENT**

HEAD OF DEPARTMENT
Department Of Computer Science & Engg.,
Bharath Institute Of Higher Education & Research
(Declared as Deemed to be University U/S 3 Of UGC Act, 1956)
Chennai - 600 073. INDIA

# CERTIFICATE COURSE ON STATISTICS WITH SOFT COMPUTING TECHNIQUES

## Date of Introduction of the Course: 02-03-2020

**The timings are 9:30 AM to 12:30 PM (FN) and 1:30 PM to 4:30 PM(AN) Saturday (FN&AN).**

## Time Table & Lesson plan

| CLASS | DATE | TOPIC |
|---|---|---|
| 1 | 03-02-2020 (FN) | **1. Introduction to Soft Computing**<br>Concept of computing systems, "Soft" computing versus "Hard" computing, Characteristics of Soft computing, Some applications of Soft computing techniques |
| 2 | 04-02-2020 (FN) | **2. Introduction to fuzzy set theory**<br>Probabilistic reasoning, Fuzzy sets, mathematics of fuzzy set theory, operations on fuzzy sets, comparison of fuzzy and crisp set theory. |
| 3 | 05-02-2020 (FN) | **3. Fuzzy logic & Defuzzification techniques**<br>Fuzzy relations, rules, propositions, implications and inferences, Defuzzification techniques, Fuzzy logic controller design, some applications of Fuzzy logic |
| 4 | 06-02-2020 (FN) | **4. Fuzzy mapping**<br>One to one mapping, max-min principle, extension principle, implication rules –implications |
| 6 | 07-02-2020 (FN) | **5. Membership functions**<br>Universe of discourse, mapping inside fuzzy domain, fuzzy membership mapping methods, and application to real world problems. |
| 7 | 08-02-2020 (FN & AN) | **6. Genetic Algorithms**<br>Concept of "Genetics" and "Evolution" and its application to search techniques, GA operators: Encoding, Crossover, Selection, Mutation, etc. |
| 8 | 10-02-2020 (FN) | **7. Artificial Neural Networks** |

| | | |
|---|---|---|
| | | Artificial Neural Networks (ANN) and their biological roots and motivations. |
| **10** | **11-02-2020(FN)** | **8. Biological Neural Networks**<br>Comparison between Artificial and Biological Neural Networks, Applications of Neural network. |
| **11** | **12-02-2020 (FN)** | **9. Multi-objective Optimization Problem Solving**<br>Concept of multi-objective optimization problems (MOOPs) and issues of solving them.Multi-Objective Evolutionary Algorithm (MOEA). |
| **12** | **13-02-2020 (FN)** | **10. Types of learning**<br>Learning Laws: Hebb's rule, Delta rule, Widrow - Hoff (The Least-Mean-Square) learning rule |
| **13** | **14-02-2020 (FN)** | **11. Supervised and unsupervised learning laws**<br>Correlation learning rule, instar and out-star learning rules, Competitive learning, Credit Assignment Problem, Error Correction learning, Memory based learning, Boltzmann learning. |
| **14** | **15-02-2020 (FN)** | **12. The Perceptron and its learning law**<br>Classification of linearly separable patterns, Multi-Layer Perceptron, Supervised Learning, Back-Propagation Learning law. Feed forward networks, Recurrent Networks |

G. Kavitha

**COURSE COORDINATOR**

**HEAD OF THE DEPARTMENT**

HEAD OF THE DEPARTMENT
Computer Science & Engg.
Of Higher Education & Research
(Deemed to be University U/S 3 Of UGC Act, 1956)

## Soft Computing techniques
## Date of Introduction of the Course: 02-03-2020

# School of Computing
# Registered Students Name List

| S.NO | REG.NO | NAME OF THE STUDENT |
|---|---|---|
| 1 | U19CS301 | ERAKALA SAI TEJA |
| 2 | U19CS302 | ERAVENI YASWANTH |
| 3 | U19CS303 | EERELLA BHANU |
| 4 | U19CS304 | E ESWAR |
| 5 | U19CS305 | ETTABONIA AKHIL VARMA |
| 6 | U19CS306 | FRANCY K |
| 7 | U19CS307 | GADA SRIMANTH |
| 8 | U19CS308 | GADDAM GANESH |
| 9 | U19CS309 | GADDAM RANGA UDAY SUDHEER |
| 10 | U19CS310 | GADDE PRAVALLIKA |
| 11 | U19CS311 | GADE NIKHIL SAI |
| 12 | U19CS312 | GADEY YASASWI KAMALA VAISHNAVI |
| 13 | U19CS313 | GADIRAJU SUMANTH KUMAR VARMA |
| 14 | U19CS314 | GAJJA ROHAN |
| 15 | U19CS315 | GAJJALA RAM PRAKASH REDDY |
| 16 | U19CS316 | GAJULA GOWTHAM |
| 17 | U19CS317 | GAJULA PAVAN KUMAR |
| 18 | U19CS318 | GAJULA SRI RANGANATH |
| 19 | U19CS319 | GALI NAVEEN |
| 20 | U19CS320 | GALI UMA MAHESWARA REDDY |
| 21 | U19CS321 | GALLA AJAY KUMAR |
| 22 | U19CS322 | GANDAVARAPU ROSHAN |
| 23 | U19CS323 | GANDE KARTHIK RAJ |
| 24 | U19CS324 | GANDEPALLI THARAKESWARA PRASAD |
| 25 | U19CS325 | GANDHAM SAISUSHEEL |

| 26 | U19CS326 | GANDLA HARI CHANDANA |
|---|---|---|
| 27 | U19CS327 | GANDLURU BHANU PRAKASH REDDY |
| 28 | U19CS328 | GANGAVARAPU MAHESH |
| 29 | U19CS329 | GANGAVARAPU VENKATESH |
| 30 | U19CS330 | GANGIREDDY ABHISHEK REDDY |
| 31 | U19CS331 | GANGULA SHASHI KUMAR |
| 32 | U19CS332 | GANIMINENI YASWANTH |
| 33 | U19CS333 | GANJANABOINA RAMANJANEYULU |
| 34 | U19CS334 | GANJI LAKSHMI PRASANNA KUMAR |
| 35 | U19CS335 | GANJIKUNTA SANTOSH |
| 36 | U19CS336 | GANTA DEEPAK |
| 37 | U19CS337 | GARLANKALA VENKATA CHAITANYA |
| 38 | U19CS338 | GASAGANI NIKITH |
| 39 | U19CS339 | GATTA VENKATA SAI SIVA KUMAR |
| 40 | U19CS340 | GAYAM GANESH KRISHNAREDDY |
| 41 | U19CS341 | GEETA GARPATI |
| 42 | U19CS342 | GELLE DEEPIKA |
| 43 | U19CS343 | GEMBALI REVANTH |
| 44 | U19CS344 | B GIRI |
| 45 | U19CS345 | GODDINDLA JANARDHAN |
| 46 | U19CS346 | GOGIREDDY LAKSHMI NARASIMHA REDDY |
| 47 | U19CS347 | GOGULA ANIL KUMAR |
| 48 | U19CS348 | GOKUL AJAY C P |
| 49 | U19CS349 | GOLLA RAMJEE |
| 50 | U19CS350 | GOLLADI SAI MAHESH VARDHAN |
| 51 | U19CS351 | GOLLAPALLI VINAY JYOTHI |
| 52 | U19CS352 | GOLLAPROLU NAGA KOTESWARA RAO |
| 53 | U19CS353 | GONA VARUN KUMAR REDDY |
| 54 | U19CS354 | GONDI VEERANJANEYULU |
| 55 | U19CS355 | GONELA NARESH |
| 56 | U19CS356 | GONUGUNTLA VAMSI KRISHNA |

G. Kavith

**COURSE COORDINATOR**

**HEAD OF THE DEPARTMENT**

HEAD OF DEPARTMENT
Department Of Computer Science & Engg.,
Bharath Institute Of Higher Education & Research
(Declared as Deemed to be University U/S 3 Of UGC Act, 1956)
Chennai - 600 073. INDIA

# COURSE FEEDBACK FORM

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Academic Year | | 2019-2020 | | | | | |
| Term | | | | | | | |
| Course Number | | | | | | | |
| Course Title | | Soft Computing techniques | | | | | |
| Number of Credits | | | | | | | |
| Type of Course | Regular | | Elective | | Add-on | ✓ | |

**I. Information on the Respondent: (Tick (√) Appropriately)**

1. **Percentage of classes attended**

| 0-20 | | 20-40 | | 40-60 | | 60-80 | ✓ | 80-100 | |
|---|---|---|---|---|---|---|---|---|---|

2. **Number of hours per week spent on the course (Other than lecture hours)**

| 0-2 | | 2-4 | | 4-6 | | 6-8 | | 8-10 | ✓ |
|---|---|---|---|---|---|---|---|---|---|

3. **Preparation for the course by the student:**

| | | |
|---|---|---|
| (i) | Have done part of this course earlier | No |
| (ii) | Has adequate prior exposure to the prerequisites | Yes |
| (iii) | Had to pickup relevant additional topics through concurrent study | No |
| (iv) | Have no exposure to the background material | Yes |

4. **The expectations for taking the course by the student are:**

| | | |
|---|---|---|
| (a) | Enhance by skill base in the area of specializations | Yes |
| (b) | Get exposed to a relevant subject | Yes |
| (c) | Curiosity | Yes |
| (d) | Better Employment Opportunity | Yes |
| (e) | Complete Course requirements | Yes |
| (f) | To Improve CGPA | Yes |

**About the Instructor: Information on the Respondent: (Tick (√) Appropriately)**

| | | A | B | C | D | E |
|---|---|---|---|---|---|---|
| 1. | Pace of the Teaching/lecture | ✓ | | | | |
| 2. | Comment of the Subject | | ✓ | | | |
| 3. | Clarity of expression | ✓ | | | | |
| 4. | Level of preparation | | ✓ | | | |
| 5. | Level of interaction | ✓ | | | | |
| 6. | Accessibility outside the class | ✓ | | | | |
| 7. | Others (please specify | ✓ | | | | |

| A: Excellent | | B: Very Good | ✓ | C: Good | | D: Satisfactory | | E: Poor | |
|---|---|---|---|---|---|---|---|---|---|

HEAD OF THE DEPARTMENT

HEAD OF DEPARTMENT
Department Of Computer Science & E...

# COURSE FEEDBACK FORM

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Academic Year | | 2019-2020 | | | | | |
| Term | | | | | | | |
| Course Number | | | | | | | |
| Course Title | | Soft Computing techniques | | | | | |
| Number of Credits | | | | | | | |
| Type of Course | Regular | | Elective | | Add-on | ✓ | |

**I. Information on the Respondent: (Tick (√) Appropriately)**

1. **Percentage of classes attended**

| 0-20 | | 20-40 | | 40-60 | | 60-80 | ✓ | 80-100 | |
|---|---|---|---|---|---|---|---|---|---|

2. **Number of hours per week spent on the course (Other than lecture hours)**

| 0-2 | | 2-4 | | 4-6 | | 6-8 | | 8-10 | ✓ |
|---|---|---|---|---|---|---|---|---|---|

3. **Preparation for the course by the student:**

| | | |
|---|---|---|
| (i) | Have done part of this course earlier | No |
| (ii) | Has adequate prior exposure to the prerequisites | No |
| (iii) | Had to pickup relevant additional topics through concurrent study | No |
| (iv) | Have no exposure to the background material | Yes |

4. **The expectations for taking the course by the student are:**

| | | |
|---|---|---|
| (a) | Enhance by skill base in the area of specializations | Yes |
| (b) | Get exposed to a relevant subject | Yes |
| (c) | Curiosity | Yes |
| (d) | Better Employment Opportunity | Yes |
| (e) | Complete Course requirements | Yes |
| (f) | To Improve CGPA | |

**About the Instructor: Information on the Respondent: (Tick (√) Appropriately)**

| | | A | B | C | D | E |
|---|---|---|---|---|---|---|
| 1. | Pace of the Teaching/lecture | ✓ | | | | |
| 2. | Comment of the Subject | | ✓ | | | |
| 3. | Clarity of expression | ✓ | | | | |
| 4. | Level of preparation | ✓ | | | | |
| 5. | Level of interaction | ✓ | ✓ | | | |
| 6. | Accessibility outside the class | | ✓ | | | |
| 7. | Others (please specify | ✓ | | | | |

| A: Excellent | | B: Very Good | ✓ | C: Good | | D: Satisfactory | | E: Poor | |
|---|---|---|---|---|---|---|---|---|---|

HEAD OF THE DEPARTMENT

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# COURSE FEEDBACK FORM

| | | | | | | |
|---|---|---|---|---|---|---|
| Academic Year | | 2019-2020 | | | | |
| Term | | | | | | |
| Course Number | | | | | | |
| Course Title | | Soft Computing techniques | | | | |
| Number of Credits | | | | | | |
| Type of Course | Regular | | Elective | | Add-on | ✓ |

**I. Information on the Respondent: (Tick (√) Appropriately)**

**1. Percentage of classes attended**

| 0-20 | | 20-40 | | 40-60 | | 60-80 | ✓ | 80-100 | |
|---|---|---|---|---|---|---|---|---|---|

**2. Number of hours per week spent on the course (Other than lecture hours)**

| 0-2 | | 2-4 | | 4-6 | | 6-8 | | 8-10 | ✓ |
|---|---|---|---|---|---|---|---|---|---|

**3. Preparation for the course by the student:**

| | | |
|---|---|---|
| (i) | Have done part of this course earlier | Yes |
| (ii) | Has adequate prior exposure to the prerequisites | Yes |
| (iii) | Had to pickup relevant additional topics through concurrent study | No |
| (iv) | Have no exposure to the background material | No |

**4. The expectations for taking the course by the student are:**

| | | |
|---|---|---|
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| (b) | Get exposed to a relevant subject | Yes |
| (c) | Curiosity | Yes |
| (d) | Better Employment Opportunity | Yes |
| (e) | Complete Course requirements | Yes |
| (f) | To Improve CGPA | |

**About the Instructor: Information on the Respondent: (Tick (√) Appropriately)**

| | | A | B | C | D | E |
|---|---|---|---|---|---|---|
| 1. | Pace of the Teaching/lecture | ✓ | | | | |
| 2. | Comment of the Subject | ✓ | | | | |
| 3. | Clarity of expression | ✓ | ✓ | | | |
| 4. | Level of preparation | ✓ | | | | |
| 5. | Level of interaction | ✓ | ✓ | | | |
| 6. | Accessibility outside the class | ✓ | | | | |
| 7. | Others (please specify | ✓ | | | | |

| A: Excellent | ✓ | B: Very Good | | C: Good | | D: Satisfactory | | E: Poor | |
|---|---|---|---|---|---|---|---|---|---|

**HEAD OF THE DEPARTMENT**

HEAD OF DEPARTMENT
Department Of [illegible] & Engg.,
Bharath Inst[illegible]
(Declared as Deemed [illegible])
Chennai - [illegible] INDIA

Bharath

INSTITUTE OF HIGHER EDUCATION AND RESEARCH

(Declared as Deemed - to - be - University under section 3 of UGC Act 1956)

BHARATH INSTITUTE OF SCIENCE AND TECHNOLOGY

No.173, Agharam Road, Selaiyur, Chennai , T.N - 600 073.

# CERTIFICATE OF PARTICIPATION

## Mr. GANDHAM SAISUSHEEL

For actively participating in the value added course **"Soft Computing techniques "**Conducted by School of Computing, BIHER from 03-02-2020 to 15-02-2020 .

G. Kavitha

**Course Coordinator**

**Head of the Department**

**Director**

# CERTIFICATE COURSE ON STATISTICS WITH SOFT COMPUTING TECHNIQUES

## Introduction of the Course: 02-03-2020

G. Kavitha

**Course Coordinator**

**Head of the Department**

HEAD OF DEPARTMENT
Department of Statistics
Bharathiar University
(Declared as Deemed University u/s 3 of the UGC Act, 1956)
Coimbatore - 641 046, INDIA