A

***Course File Report***

**On**

***“WEB SERVICES”***

*In the department of*

***INFORMATION TECHNOLOGY***



***CMR TECHNICAL CAMPUS***

**(Affiliated to J.N.T.U, HYDERABAD)**

 Kandlakoya(v),Medchal -501 401

CMR TECHNICAL CAMPUS

Kandlakoya(V), Medchal Road, Hyderabad

**Department of Information Technology**

**COURSE FILE**

**Sub: WEB SERVICES**

**Year : IVB.Tech–II sem**

**Contents of Course file**

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2. List of PEOs and POs &PSOs
3. List of COs (Action verbs as per Blooms)
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8. Assignment Questions along with sample assignment scrip
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12. Attainment of COs , POs and PSOs (Excel Sheet)
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**1. Department vision & mission**

**Vision:**

To produce globally competent and industry ready graduates in Computer Science & Engineering by imparting quality education with a know-how of cutting edge technology and holistic personality.

**Mission**

**M1**. To offer high quality education in Computer Science & Engineering in order to build core competence for the students by laying solid foundation in Applied Mathematics, and program framework with a focus on concept building.

**M2**. The department promotes excellence in teaching, research, and collaborative activities to prepare students for professional career or higher studies.

**M3**. Creating intellectual environment for developing logical skills and problem solving strategies, thus to develop, able and proficient computer engineer to compete in the current global scenario.

**2. List of PEOs and POs & PSOs**

**2.1 Program Educational Objectives (PEO):**

**PEO 1:** Excel in professional career or higher education by acquiring knowledge in mathematical, computing and engineering principles.

**PEO 2:** To provide intellectual environment for analyzing and designing computing systems for technical problems socially and economically.

**PEO 3:** Exhibit professionalism, multidisciplinary teamwork and adapt to current trends by engaging in lifelong learning and practice their profession with legal and ethical responsibilities

**2.2 Program OutcomeS(POs)**

|  |  |
| --- | --- |
| PO No. | **Program Outcomes (PO’s)** |
| PO1 |  An ability to apply knowledge of computing, mathematics, science and engineering fundamentals appropriate to the discipline. |
| PO2 | An ability to analyze a problem, and identify and formulate the computing requirements appropriate to its solution. |
| PO3 | An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations. |
| PO4 | An ability to design and conduct experiments, as well as to analyze and interpret data. |
| PO5 | An ability to use current techniques, skills, and modern tools necessary for computing practice. |
| PO6 | An ability to analyze the local and global impact of computing on individuals, organizations, and society. |
| PO7 | Knowledge of contemporary issues. |
| PO8 | An understanding of professional, ethical, legal, security and social issues and responsibilities. |
| PO9 | An ability to function effectively individually and on teams, including diverse and multidisciplinary, to accomplish a common goal. |
| PO10 | An ability to communicate effectively with a range of audiences. |
| PO11 | An understanding of engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects. |
| PO12 | Recognition of the need for and an ability to engage in continuing professional development. |

|  |  |
| --- | --- |
| PSO No. | **Program Specific Outcomes (PSO’s)** |
| PSO1 | **Professional Skills and Foundations of Software development:** Ability to analyze, design and develop applications by adopting the dynamic nature of Software developments. |
| PSO2 | **Applications of Computing and Research Ability**: Ability to use knowledge in cutting edge technologies in identifying research gaps and to render solutions with innovative ideas. |

**2.3 Program Specific Outcomes (PSO’s)**

**NBA Graduate Attributes**

**PO1 Engineering knowledge**

**PO2 Problem analysis**

**PO3 Design/development of solutions**

**PO4 Conduct investigations of complex problems**

**PO5 Modern tool usage**

**PO6 The engineer and society**

**PO7 Environment and sustainability**

**PO8 Ethics**

**PO9 Individual and team work**

**PO10 Communication**

**PO11 Project management and finance**

**PO12 Life-long learning**

1. **List of Cos (Action Verbs as Per Blooms)**

**Course Outcomes**

|  |  |
| --- | --- |
| CO1 | Define the basic operational models of webservices |
| CO2 | Explain evolution of web services and their architecture. |
| CO3 | Apply tools and technologies to develop web services. |
| CO4 | Classify CORBA architecture and java RMI. |
| CO5 | Compare the applications of SOAP, WSDL & UDDI. |
| CO6 | Create web service enabled applications. |

**4. Syllabus Copy and Suggested/Reference Books**

**UNIT-I**

**Evolution and Emergence of web Services**- Evolution of distributed computing, core distributed computing technologies- client/server , CORBA, JAVA RMI, Microsoft DCOM,MOM,challenges in distributed computing, role of J2EE and XML in distributed computing emergence of web services and service oriented architecture(SOA).

**Introduction To Web Services**- The definition of web services, basic operational model of web services, tools and technologies enabling web services, benefits and challenges of using web services.

**Web services architecture-** web services architecture and its characteristics , core building blocks of web services standards and technologies available for implementation web services, web services, web services communication basic steps of implementing web services, developing web services enable application.

**UNIT - II**

**Fundamentals Of SOAP**- SOAP message structure , SOAP encoding ,Encoding of different data types, SOAP message exchange models ,SOAP communication and messaging , Java and Axis, Limitations of SOAP.

**UNIT - III**

**Describing web services** –WSDL-WSDL in the world of web services , web services life cycle ,anatomy of WSDL definition document, WSDL binding , WSDL tool , limitations of WSDL.

**UNIT - IV**

**Discovering Web Services-**services discovery, role of service discovery in a SOA ,servicediscovery mechanisms, UDDI-UDDI registries, uses of UDDI registry, programming with UDDI, UDDI data structure, API, Publishing, searching and Deleting information in a UDDI registry, limitations of UDDI.

**UNIT - V**

 **Web Services Interopebility--**Means of ensuring Interoperability, Overview of .NET, creating a .NET client for an Axis Web Service, creating Java client for a web service, challenges in web services interoperability.

**Web Services security—**XML security frame work, Goals of Cryptography, digital Signature, Digital Cerificate, XML Encryption.

 ***Suggested Books***

**TEXT BOOKS**

**T1**. Developing Java Web Services, R.Nagappam, R. Skoczylas, R.P.Sriganesh, Wiley India, rp-2008

**T2**. Developing Enterprise Web services, S.Chattrerjee, J. Webber, Pearson Education, 2008

**T3**. XML, Web Services and the Data Revolution, F.P.Coyle , Pearson Education

**REFERENCE BOOKS**

 **R1**  Building Web Services with Java,2nd Edition, S. Graham and others, Pearson Edn.,2008

**R2** Java Web Services, D.A. Chappell & T. Jewell, O’Reilly, SPD.

**R3** McGovern,Etal., “Java Web Services Architecture”, Morgan Kaufmann Publishers, 2005

**R4** J2EE Web Services, Richard Monson-Haefel, Pearson Education.

**R5** Web Services, G.Alonso,F.Casati and others, springer, 2005

1. **Session plan /Lesion plan**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S.No** | **Topic (JNTU syllabus)** | **Sub-Topic** | **No.of Lectures Required** | **Suggested Books** | **Remarks** |
| 1 | **UNIT-I****Evolution and Emergence of web Services****Introduction To Web Services****Web services architecture** | Evolution of distributed computing | L1 | T1,T2,R2,R3 |  |
| 2 | core distributed computing technologies- client/server | L2,l3 | T1,T2,R2,R3 |  |
| 3 | CORBA,JAVA RMI | L4 | T1,T2,R2,R3 |  |
| 4 | micro soft DCOM,MOM, | L5,l6 | T1,T2,R2,R3 |  |
| 5 | challenges in distributed computing | L7 | T1,T2,R2,R3 |  |
| 6 | role of J2EE and XML in distributed computing | L8 | T1,T2,R2,R3 |  |
| 7 | emergence of web services and service oriented architecture(SOA). | L9 | T1,T2,R2,R3 |  |
| 8 | The definition of web services | L10 | T1,R1,R2 |  |
| 9 | basic operational model of web services | L11 | T1,R1,R2 |  |
| 10 | Tools enabling web services, | L12 | T1,R1,R2 |  |
| 11 | technologies enabling web services, | L13 | T1,R1,R2 |  |
| 12 | benefits using web services | L14 | T1,R1,R2 |  |
| 13 |  challenges of web services | L15 | T1,R1,R2 |  |
| 14 | web services architecture  | L16 | T2,R1,R3 |  |
| 15 | web services characteristics | L17 | T2,R1,R3 |  |
| 16 | core building blocks of web services | L18 | T2,R1,R3 |  |
| 17 | standards and technologies available for implementation web services | L19,l20 | T2,R1,R3 |  |
| 18 | web services | L21 | T2,R1,R3 |  |
| 19 | web services communication models  | L22 | T2,R1,R3 |  |
| 20 | Basic steps of implementing web services. | L23 | T2,R1,R3 |  |
| 21 | **UNIT-II****Fundamentals Of SOAP** | SOAP message structure | L24 | T1.T2.R1,R5 |  |
| 22 | SOAP encoding, encoding of different data types. | L25 | T1.T2.R1,R5 |  |
| 23 | SOAP message exchange models | L26 | T1.T2.R1,R5 |  |
| 24 | SOAP communication and messaging | L27 | T1.T2.R1,R5 |  |
| 25 | Java and Axis, Limitations of SOAP | L28 | T1.T2.R1,R5 |  |
| 26 | **UNIT-III****Describing web services** | WSDL-WSDL in the world of web services | L29 | T1,T3,R2,R4 |  |
| 27 |  web services life cycle | L30 | T1,T3,R2,R4 |  |
| 28 | anatomy of WSDL definition document | L31 | T1,T3,R2,R4 |  |
| 29 | WSDL binding | L32,L33 | T1,T3,R2,R4 |  |
| 30 | WSDL tool | L34,L35 | T1,T3,R2,R4 |  |
| 31 | limitations of WSDL | L36 | T1,T3,R2,R4 |  |
| 32 | **UNIT-IV****Discovering Web Services** | services discovery | L37 | T1,T2,R2,R5 |  |
| 33 | role of service discovery in a SOA | L38 | T1,T2,R2,R5 |  |
| 34 | servicediscovery mechanisms | L39 | T1,T2,R2,R5 |  |
| 35 | UDDI-UDDI registries | L40 | T1,T2,R2,R5 |  |
| 36 | uses of UDDI registry | L41 | T1,T2,R2,R5 |  |
| 37 | programming with UDDI | L42 | T1,T2,R2,R5 |  |
| 38 | UDDI data structures | L43 | T1,T2,R2,R5 |  |
| 39 | publishing API | L44 | T1,T2,R2,R5 |  |
| 40 | publishing information to a UDDI registry | L45 | T1,T2,R2,R5 |  |
| 41 | searching and deleting information in a UDDI registry, limitations of UDDI | L46 | T1,T2,R2,R5 |  |
| 42 | **UNIT-V****Web Services Interopebility--**,**Security** | Means of ensuring Interoperability | L47 | T3,R2,R4 |  |
| 43 | Overview of .NET Web services | L48 | T3,R2,R4 |  |
| 44 | Overview of J2EE.Web Services | L49 | T3,R2,R4 |  |
| 45 | creating a .NET client for an Axis Web Service,  | L50 | T3,R2,R4 |  |
| 46 | creating Java client for a web service,  | L51 | T3,R2,R4 |  |
| 47 | challenges in web services interoperability. | L52 | T3,R2,R4 |  |
| 48 | XML security frame work | L53 | T3,R2,R4 |  |
| 49 | XML encryption | L54 |  |  |
| 50 | XML digital signature | L55 |  |  |
| 51 | XKMS structure | L56 |  |  |
| 52 | guidelines for signing XML XML documents | L57 |  |  |

**NOTE :**1**.** Any Subject in a Semester is suppose to be completed in 55 to 65 periods.

 2. Each Period is of 50 minutes.

 3. Each unit duration & completion should be mentioned in the Remarks Column.

 4. List of Suggested books can be marked with Codes like T1, T2, R1, R2 etc.

**6. Session Execution Log**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S. No** | **Unit** | **Scheduled completed date** | **Completed date** | **Remarks** |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |

**7. Lecture Notes- Attached**

**8. AssignmentQuestionsAlong With Sample Assignment**

**UNIT-I**

**SET-1**

1.Explain the evolution of distributed computing

2.Explain the client server architecture

3.Explain the web services definition

4.Write and explain the basic operational model of web services

5. Explain the Web services architecture

6. Explain the Web services characteristic

**SET-2**

1.Explain the JAVA RMI method

2.Explain the CORBA architecture

3. Write and explain the Tools enabling web ser vices

4. Write and explain the technologies enabling web ser vices

5. Explain the Core building blocks of web services

6. Explain the Standards available for implementation web services

**SET-3**

1. Explain the Micro soft DCOM, challenges in distributed computing,

2. Explain the COM, challenges in distributed computing,

3. Explain the Benefits of using web services

4. Explain the challenges of using web services

5. Explain the technologies available for implementation web services

6. Explain the Web services communication

**SET-4**

**1.** Explain the Role of J2EE and XML in distributed computing?

2. Explain the emergence of web services and service oriented architecture(SOA)

3. Explain the basic steps of implementing web services

4. Implementing a web services enable application

**UNIT-II**

**SET-1**

1. Write and explain the SOAP message structure ,

2. Explain the SOAP encoding methods

3. write the steps for Building SOAP web services

4. Build example SOAP web services

**SET-2**

1. Briefly explain SOAP message exchange models

2. Explain the SOAP communication models and messaging ,

3. wire methods for Developing SOAP web services using java

4 develop one example web services using java

**SET-3**

1. Briefly explain SOAP messaging

2. Briefly explain SOAP security **methods**

3. Wire and explain the Limitations of SOAP.

4.write and explain the benefits of SOAP

**UNIT-III**

**SET-1**

1 whiat is WSDL? briefly explain the -WSDL

2. explain the WSDL in the world of web services

**SET-2**

1. Explain the Web services life cycle

2. briefly explain the methods for development for WSDL definition document

**SET-3**

1. Explain the WSDL binding methods.

2. Explain all WSDL tools

**SET-4**

1. Explain the Limitations of WSDL

2.Consruct the one WSDL document

**UNIT –IV**

**SET-1**

1 Explain the Services discovery

2.Explain the role of service discovery in a SOA

**SET-2**

1.Explain the Servicediscovery mechanisms

2.Explain the UDDI- registries, uses of UDDI registry

**SET-3**

1. write and explain the programming with UDDI

2. Explain the categorization in UDDI registries

**SET-4**

1. write and explain publishing information to a UDDI registry

2. explain the limitations of UDDI

**UNIT-V**

**SET-1**

1.what is mean by Interoperability explain briefly

2.Explain the Overview of .NET web services

**SET-2**

1. Explain the Overview of J2EE.**Web Services**

2. Explain the XML security frame work,

**SET-3**

1 Explin the XML encryption methods ?

2. Explin the XML digital signature?.

**SET-4**

1.What is XKMS and explain the XKMS structure

2. write and explain the guidelines for signing XML documents

1. **MID EXAM QUESTION PAPERS ALONG WITH SAMPLE ANSWERS SCRIPTS**

 **CMR TECHNICAL CAMPUS**

 **KANDLAKOYA (V), MEDCHAL (M), R.R.DIST.**

**DEPARTMENT OF INFORMATION TECHNOLOGY**

**I MID Question Paper for the A.Y 2017-18, II-SEM**

**CLASS:** B.Tech IV - IT

**SUB**: WEB SERVICES

 **Date**: 7-2-2018

 **Time**: 10:00-11:00 A.M

**Answer any two of the following & each carries 5 marks. 2×5=10**

1. What is distributed computing & briefly explain DC technologies?(CO1)
2. Define web services & explain tools and technologies of web services?(C02)
3. Illustrate the basic operational model of web services along with tool and technologies used enable web services?(C02)
4. Define WSDL. Explain WSDL in the world of web services along with web service life cycle?(CO3)

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1. **SCHEME OF EVALUATION**

**MID-I**

1. What is distributed computing & briefly explain DC technologies?(CO1)

Definition ofdistributed computing 1 mark

 List of the dc technologies 1 mark

 Explanation about the technologies 3 marks

 **Total marks 5 marks**

2).Define web services & explain tools and technologies of web services? (C02)

Definition of web services 1 mark

 Explanation about tools 2 marks

 Explanation about technologies 2 marks

**Total marks 5 marks**

3). Illustrate the basic operational model of web services? (C02).

 Basic operational model theory 3 marks

 Basic operational model diagram 2 marks

**Total marks 5 marks**

4).Define WSDL. Explain WSDL in the world of web services along with web service life cycle? (CO3)

 Definition of WSDL 1 mark

Life-cycle diagram WSDL 2 marks

 Description of life-cycle 2 marks

**Total marks 5 marks**

**11 . MAPPING OF COS WITH POS AND PSOS**

**Course Name: WEB SERVICES YEAR: 2017-18**

**Btech –IV Year-II Sem**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Outcomes (CO)** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO 1** | **PSO 2** |
| 1 | 2 | - | 1 | - | - | - | - | - | - | - | - | - | 1 | - |
| 2 | 1 | - | 3 | 1 | - | - | - | - | - | - | - | 1 | - | 1 |
| 3 | 1 | 2 | 1 | - | - | - | - | - | - | - | - | - | - | - |
| 4 | 1 | - | 3 | 2 | - | - | - | - | - | - | - | 1 | - | 2 |
| 5 | - | 3 | 3 | 2 | 1 | - | - | - | - | - | - | - | 2 | - |
| 6 | 1 | 3 | - | 1 | - | - | - | - | - | - | - | - | - | - |
|   | **1** | **1** | **2** | **1** | **0** | **-** | **-** | **-** | **-** | **-** | **-** | **0** |  |  |

**1-low 2-moderate 3-highly related.**

**12.Attainment of COs , POs And PSOs (Excel Sheet) – Attached**

|  |  |
| --- | --- |
| **ASSESSMENT OF POs THROUGH THE COs** | **Po A.V from direct method** |
| **PO** | **CO** | **Value** | **University** | **MID Attained value** |
| **PO1**  | CO1 | 3.0 | 2.5 | **3.0** | **2.7** |
| CO2 | 2.3 |
| CO3 | 3.0 |
| CO4 | 3.0 |
| CO6 | 1.0 |
| **PO2** | CO3 | 3.0 | 2.3 | **3.0** | **2.58** |
| CO5 | 3.0 |
| CO6 | 1.0 |
| **PO3** | CO1 | 3.0 | 2.9 | **3.0** | **2.94** |
| CO2 | 2.3 |
| CO3 | 3.0 |
| C04 | 3.0 |
| CO5 | 3.0 |
| **PO4** | CO2 | 2.3 | 2.3 | **3.0** | **2.58** |
| CO4 | 3.0 |
| CO5 | 3.0 |
| CO6 | 1.0 |
| **PO5** | CO5 | 3.0 | 3.0 | **3.0** | **1.2** |
|
| **PO12** | CO2 | 2.3 | 2.7 | **3.0** | **2.82** |
| CO4 | 3.0 |

**13. University question papers/Question Bank**

***UNIT-1***

1. What is distributed computing ?Explain the Importance Of distributed computing.
2. Briefly explain the core distributed computing technologies- client/server
3. Explain the CORBA AND JAVA RMI
4. Write and explain challenges in distributed computing

|  |  |
| --- | --- |
| 1. What are the web services? Explain the capabilities provided a by web service.

|  |
| --- |
| 1. Discuss the different tools needed for enabling web services.
 |

1. What are the benefits and challenges of using web services
2. What are the basic operational model of web services

9. With a neat diagram explain the architecture of web services and its core building blocks.10. Discuss the basic steps of implementing web services. 11. Why web services are important in IT enterprises?Explain it.12. Explain the technologies available for implementation web services |
|  |

***UNIT-II***

1. Explain the basic SOAP message exchange model
2. Explain the SOAP RPC communication model.
3. Explain SOAP encoding models
4. Discuss the different SOAP fault codes.
5. What are the various steps involving in implementing a web services with java and axis
6. Write a small SOAP envelop code bank account.
7. Explain the limitation of using SOAP.

***UNIT-III***

1. Explain Web Services Life Cycle
2. with suitable code snippets explain section of a WSDL Life
3. how to bind SOAP with WSDL ?explain it.
4. With neat diagram explain WSDL structure.
5. Explain the limitations of WSDL.

***UNIT-IV***

1. Explain the UDDI registries ? what are uses of UDDI registry

2. differentiate telephone book application with UDDI.

3. Explain the limitations of UDDI in the web services

4. Explain the UDDI data structure support for categorization in UDDI registries

5.Explain the role of service discovery in a SOA

6. Explain the servicediscovery mechanisms.

***UNIT-V***

1. Explain j2EE technology in development if web services

2. list and explain the different steps for XML encryption with a credit card example

3. discuss the XKMS structure.

4. write and explain the guidelines for signing XML documents

**14.Powerpoint presentations –Attached**

**15.Websites/URLs e-resources**

**TEXT BOOKS**

**T1**. Developing Java Web Services, R.Nagappam, R. Skoczylas, R.P.Sriganesh, Wiley India, rp-2008

**T2**. Developing Enterprise Web services, S.Chattrerjee, J. Webber, Pearson Education, 2008

**T3**. XML, Web Services and the Data Revolution, F.P.Coyle , Pearson Education

**REFERENCE BOOKS**

 **R1**  Building Web Services with Java,2nd Edition, S. Graham and others, Pearson Edn.,2008

**R2** Java Web Services, D.A. Chappell & T. Jewell, O’Reilly, SPD.

**R3** McGovern,Etal., “Java Web Services Architecture”, Morgan Kaufmann Publishers, 2005

**R4** J2EE Web Services, Richard Monson-Haefel, Pearson Education.

**R5** Web Services, G.Alonso,F.Casati and others, springer, 2005

 ***Websites***

 **Do not confine yourself to the list of websites mentioned here alone. Be cognizant and keep yourself abreast of the others too. The given list is not exhaustive.**

1. <http://en.wikipedia.org/wiki/Web_service>

2. <http://www.w3schools.com/webservices/ws_intro.asp>

3. <http://javapostsforlearning.blogspot.in/2013/03/web-service-tutorial.html>

4. <http://searchsoa.techtarget.com/definition/Web-services>

5. <http://www.cs.nott.ac.uk/~jxz/iws/Lecture3-History-6up.pdf>

6. <http://www.artima.com/webservices/articles/whysoap.html>

7. <http://soapclient.com/soapsecurity.html>

8. <http://oreilly.com/catalog/webservess/chapter/ch06.html>

9. <http://www.w3.org/TR/wsdl#_document-s>

10. http://www.cs.nott.ac.uk/~jxz/iws/Lecture15-UDDI-6up.pdf

11..http://pic.dhe.ibm.com/infocenter/wasinfo/v6r0/index.jsp?topic=%2Fcom.ibm.websphere.base.doc%2Finfo%2Faes%2Fae%2Fuwbs\_server.html 12.https://www.google.co.in/search?q=web+services&tbm=isch&tbo=u&source=univ&sa=X&ei=H0yQUs2SFsmOrQfyz4GICA&ved=0CD4QsAQ&biw=1366&bih=629

 ***EXPERT DETAILS***

 **The Expert Details which have been mentioned below are only a few of the eminent ones known Internationally, Nationally and Locally. There are a few others known as well.**

**International**

1) Kowalski

2) Mark T Maybury Kluwer

3) Gerald

4) Ricardo Baeza-Yates

**National**

1) B.Vijay kumar - Professor, Deptt. of CSE

## 2) Dr.P.S.V Subramanyam

3) Prof. Muralidhara V. N

4) [Kamakoti V](http://www.iitm.ac.in/info/fac/kama)- Professor, Deptt. of CS, Madras

**Regional**

### 1) Dr. P.S.V.Srinivas Deptt. of CSE

**2)** Dr.Govardan Reddy, Deptt. Of CSE

 ***Journals***

**International**

# 1. International Journal of Web Services Research (IJWSR)

# 2. International Journal of Web and Grid Services

# 3. International Journal of Web Information Systems

**National**

# 1. International Journal of Web Science

 2) International Journal of Information and Communication Technology Research